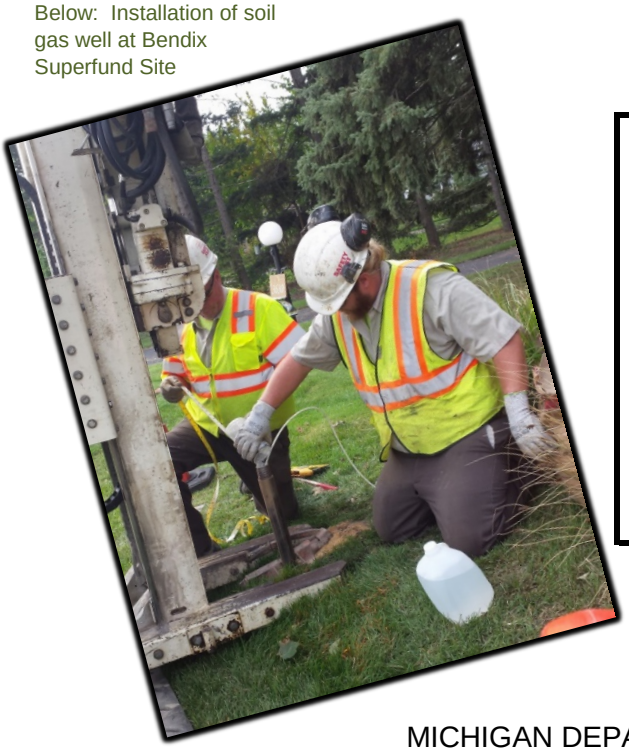
Michigan Department of Environmental Quality

FISCAL YEAR 2017 FEDERAL SUPERFUND LEGISLATIVE REPORT

Left: Kalamazoo River Superfund Site showing temporary sheet piling being inserted and the temporary water control structure being removed to help facilitate the excavation of contaminated soils and sediments and the final restoration of the water control structure corridor in Area 3.

Below: Installation of soil gas well at Bendix Superfund Site



Summary of Hazardous Substance Cleanups Funded By the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 1980 PL 96-510, as Amended By the Superfund Amendments and Reauthorization Act (SARA), 1986 PL 99-499, and the Small Business Liability Relief and Brownfields Revitalization Act, 2002 PL 107-118

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FEDERAL SUPERFUND PROGRAM REPORT
EXECUTIVE SUMMARY

The federal Superfund Program was created in 1980 to respond to releases of hazardous substances that may endanger public health or the environment. The Superfund Program protects the public and its resources, making communities safer, healthier, and more economically viable.

Superfund sites represent some of the most significant and expensive sites of environmental contamination. Michigan currently has 65 sites listed on Superfund's National Priorities List (NPL). An additional 19 sites were previously on the list and have been deleted because all necessary response actions have been completed.

Sites in the Superfund Program may be managed in different ways. The United States Environmental Protection Agency (EPA), the state, or private parties may implement the cleanup. The Superfund law has provisions to allow for enforcement actions to compel private parties responsible for the contamination to conduct the cleanup. Where there are viable responsible parties, the EPA may take the enforcement lead with the state providing support (36 sites in Michigan), or the state may take the site as a state-enforcement lead (10 sites in Michigan).

Where the responsible parties are bankrupt, or no longer able to fund necessary cleanup actions, federal funds are used for necessary actions at the site. If the state has the lead on one of these sites, the federal money is given directly to the state through a grant (there are currently 5 state-lead federally-financed sites in Michigan). If the EPA has the lead, then they expend the funds directly on site activities (there are currently 13 EPA-lead federally-financed sites in Michigan) using a Superfund State Contract (SSC) between the state and the EPA for situations where state match is required (Michigan has 7 active SSCs).

Because Superfund sites are frequently large and complex, they are sometimes broken down into operable units to facilitate site work. This can result in sites being in multiple categories and/or activities simultaneously. For example, one site in Michigan has a federal-lead enforcement component, a state enforcement component, a state-funded operation and maintenance component, and a federally-financed state-lead remedial action component.

For non-enforcement NPL sites, the federal Superfund Program pays 100 percent of the cost of site investigation and design of the cleanup plan, and 90 percent of the cost of the cleanup (remedial action). The EPA also pays 90 percent of the first year of operation for a soil remedy and 90 percent of the first 10 years of operation for a groundwater remedy. After that, the state is responsible for 100 percent of the cost of the operation and maintenance of the site remedy.

Pursuant to the Superfund law, the state is required to pay a match of 10 percent of the cleanup construction costs and of the long-term remedial action costs. In order to leverage the federally-funded 90 percent for cleanup costs on sites where the responsible parties are not viable, state funding for match, and for operation and maintenance of the remedy, is needed. The EPA

cannot conduct remedial actions at a site without a commitment from the state to pay the required matching funds and to accept responsibility for the ongoing operation and maintenance of the remedy at the site.

Since the beginning of the Superfund Program, more than $400 million in federal funding has been committed to Michigan Superfund sites through grants and SSCs with a state match amount of $41 million. In fiscal year (FY) 2017 more than $4.8 million in federal funds were spent on cleanup actions at 5 Superfund sites in Michigan with a state match amount of $0.5 million. These numbers do not capture direct federal expenditures for investigations and design, nor do they include non-site-specific grants.

Approximately $6 million per year of state funding is needed to match federal construction work and finance the operation and maintenance of ongoing treatment systems. This amount does not factor in the Velsicol Chemical Corporation Superfund site, a national mega-site, where the construction costs are expected to exceed $145 million, the 10-year operation of the remedy is estimated at $50 million, and state-funded operation and maintenance of the remedy is anticipated to cost $4.6 million per year.

In 2017 the state had 10 Superfund sites in the operation and maintenance phase. The state continues to work with the EPA to further evaluate and enhance the remedies in place at 6 of these sites with the goal of reducing both the costs and the duration of the ongoing operation and maintenance of the remedies.

The 2017 Superfund Legislative Report has been prepared pursuant to the requirements of Section 216 of Article VII, Part 2, of 2016 PA 268, the FY 2017 appropriations bill for the Michigan Department of Environmental Quality (MDEQ). The report details the federal Superfund appropriations awarded during FY 2017 for use at specific National Priorities List sites. In addition, the report summarizes the federal funding history and cleanup activities at each site.

Please direct your comments or questions to Ms. Kathleen Shirey, Acting Director, Remediation and Redevelopment Division, MDEQ, at 517-284-5144 or ShireyK@michigan.gov.

TABLE OF CONTENTS

	PAGE
Introduction ……..	I-1
Superfund Program Background …….	I-1
The Superfund Process …….	I-1
Michigan Participation …….	I-2
Brownfield Redevelopment …….	I-3
Superfund Money in Michigan …….	I-4
Table 1 - Superfund Funding in Michigan …….	I-5
Cleanup Progress …….	I-5
Table 2 - Cleanup Progress at Federal NPL and Removal Sites in Michigan ……	I-6
2017 Superfund Legislative Report …….	I-6
Map of Michigan Superfund Sites - Figure 1 …….	I-7
Superfund Federal Grant Dollars Awarded in FY 2017 …….	I-8
Superfund State Contracts Signed in FY 2017 …….	I-8
Michigan Sites Deleted from the Final NPL …….	I-9
Michigan Sites Proposed for the NPL …….	I-9

Superfund Site Summaries (listed alphabetically by county)

COUNTY	SITE NAME	
Allegan	Rockwell International Corp.....…….	1
Antrim	Tar Lake …….	10
Berrien	Aircraft Components (D&L Sales)…….	20
	Bendix Corp./Allied Automotive ……..	29
	Electrovoice …….	39
Branch	Bronson Reel Company ……..	47
	L.A. Darling Subarea ……..…….	51
	North Bronson Industrial Area …….	58
	Scott & Fetzer Corporation ……..……..…….	67
Calhoun	Albion-Sheridan Township Landfill……..	74
	McGraw Edison Corporation …….	82
	Verona Well Field …….	88
Cass	U.S. Aviex……..…….	103
Charlevoix	Charlevoix Municipal Well Field …….	110
Chippewa	Cannelton Industries, Inc.……..…….	117

Superfund Site Summaries (Continued)

Clare	Clare Water Supply	124
Eaton	Parsons Chemical Works, Inc.	135
Emmet	Petoskey Municipal Well Field	142
Genesee	Forest Waste Products	153
Gratiot	Gratiot County Landfill	164
	Velsicol Burn Pit	170
	Velsicol Chemical Corp.	175
Houghton	Torch Lake	188
Ingham	Adams Plating Company	201
	Motor Wheel, Inc.	211
Ionia	American Anodco, Inc.	220
	Ionia City Landfill	225
Iosco	Hedblum Industries	235
Kalamazoo	Allied Paper/Portage Creek/Kalamazoo River	243
	Auto Ion Chemicals, Inc.	262
	KL Avenue Landfill	269
	Michigan Disposal (Cork Street Landfill)	280
	Roto-Finish Co., Inc.	286
Kent	Butterworth #2 Landfill	294
	Chem Central	301
	H. Brown Company, Inc.	309
	Kentwood Landfill	315
	Organic Chemicals, Inc.	323
	Sparta Landfill	331
	Spartan Chemical	337
	State Disposal Landfill	345
Lake	Wash King Laundry	350
Lapeer	Metamora Landfill	357
Leelanau	Grand Traverse Overall Supply Company	366
Livingston	Rasmussen's Dump	378
	Shiawassee River	385

Superfund Site Summaries (Continued)

Macomb	G & H Landfill……	392
	Liquid Disposal, Inc.……	401
	South Macomb Disposal Authority (Landfills 9 & 9A)……	408
	Ten Mile Drain……	414
Manistee	Packaging Corporation of America……	421
Mason	Mason County Landfill……	426
Muskegon	Bofors Nobel, Inc.……	434
	Duell & Gardner Landfill……	446
	Kaydon Corporation……	456
	Muskegon Chemical Company……	463
	Ott/Story/Cordova Chemical Company……	468
	Peerless Plating Company……	479
	SCA Independent Landfill……	490
	Thermo-Chem, Inc.……	494
Oakland	Hi-Mill Manufacturing Company……	502
	J & L Landfill (Avon Twp.)……	508
	Rose Township Dump……	516
	Springfield Township Dump……	523
Ottawa	Southwest Ottawa County Landfill……	531
St. Joseph	Sturgis Municipal Wells……	538
Wayne	DSC McLouth Steel Gibraltar Plant……	548

Appendix A - Index of Superfund Site Summaries (alphabetically by site name)…… A-1

Appendix B - Commonly Used Acronyms …… B-1

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FEDERAL SUPERFUND PROGRAM IN MICHIGAN
INTRODUCTION

Superfund Program Background

The Superfund Remedial Program protects the public and its resources, making communities safer, healthier, and more economically viable. It is responsible for implementing the federal program aimed at longer term cleanup at the nation's largest, most complex contaminated sites.

The Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, as amended (CERCLA), was passed by the United States Congress in 1980 and authorized the federal government to respond directly to releases, or threatened releases, of hazardous substances that may endanger public health, welfare, or the environment. The CERCLA also established a trust fund (referred to as the "Superfund"), which can be used to pay for the cleanup of hazardous substance contamination. State involvement in the Superfund Program is also specifically provided for in the CERCLA and is further explained under the Michigan Participation section, on pages I-2 and I-3, of this report. The United States Environmental Protection Agency (EPA) is the federal agency responsible for implementing the CERCLA.

Pursuant to the CERCLA, the EPA can take legal enforcement action against the parties responsible for the contamination to conduct a cleanup. If potentially responsible parties (PRPs) cannot be found, or are unwilling to cooperate, the EPA can use money from the Superfund to complete a cleanup at sites on the National Priorities List (NPL). Under these circumstances, the EPA can later sue the PRPs for reimbursement of cleanup costs to the Superfund; plus, if the PRPs have refused to follow an order to perform the cleanup, a penalty of up to three times the EPA's cost of the cleanup can be imposed.

The Superfund Process

When the state determines that a site should be evaluated for its potential to be designated as a Superfund site, it requests the EPA to place it on the candidate site list. A Preliminary Assessment is conducted using existing information on the site in order to determine if there have been releases of hazardous substances from the site that may pose threats to human health or the environment. If additional data are needed, a Site Inspection is completed. The Site Inspection may involve sampling of soil, groundwater, surface water, air, or wastes at the site. The data from the Site Inspection are used to justify an emergency removal or non-time-critical removal action and/or score the site using the Hazard Ranking System. If the site score is high enough and has the Governor's concurrence, the site can be listed on the NPL, a list of the most seriously contaminated sites in the nation. Sites listed on the NPL are eligible for cleanup using Superfund money if there are no PRPs willing or able to conduct the cleanup. It should be noted that if site cleanup is proposed or implemented pursuant to Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), at any time during the Superfund evaluation process prior to nomination to the NPL, investigation using the Superfund process can be deferred.

The Preliminary Assessment/Site Inspection process may reveal that the site poses an imminent and substantial endangerment to public health or the environment that would justify an Emergency Removal. An example of such an endangerment situation would be abandoned drums or lagoons of hazardous waste, which are easily accessed by humans or wildlife. Resources are available through the EPA's Superfund Emergency Removal Program to quickly eliminate the immediate hazards at a site whether or not it is on the NPL. If placed on the NPL, the site would then proceed through the normal Superfund cleanup process to deal with any concerns beyond those addressed by the emergency removal.

A non-time-critical removal action may be appropriate for a site where an imminent and substantial endangerment may not exist, but there is still a significant risk to public health or the environment. Non-time-critical removal actions are best suited to situations where there are only a few obvious actions for cleanup, remedy selection can be easily accomplished, and implementation completed within a fairly short time.

The first step of the process toward cleanup of an NPL site is to conduct a thorough investigation of the nature and extent of contamination at the site. This is referred to as a Remedial Investigation (RI). Based on this information, an evaluation of possible cleanup technologies, known as a Feasibility Study (FS), is completed and an appropriate remedy for cleaning up the site is proposed by the EPA or the state. After the public has had an opportunity to comment on the RI/FS and the proposed remedy, the EPA or the state selects a final remedy and documents this selection in a Record of Decision (ROD). Next, the plans and specifications for the cleanup, known as the Remedial Design (RD), are prepared, and the Remedial Action (RA) is implemented. For groundwater restoration remedies, the ten years of operation following the RA construction and shakedown are known as Long-Term Response Action (LTRA).

It may take many years for the RA to completely clean up the site. During this period, and after the LTRA, Operation and Maintenance (O & M) of the remediation system is required. After the cleanup goals have been achieved, the site can be deleted from the NPL.

Michigan Participation

The CERCLA specifically provides for state involvement in the Superfund Program. For example, state acceptance of the proposed cleanup remedy is one criterion which the EPA must evaluate before selecting a site remedy. States must also concur with the EPA that the cleanup is complete before a site can be removed from the NPL. States are required to fund 10 percent of the cost of any RA paid for by the Superfund. In addition, the state is required to fund 100 percent of the O & M costs after the first year of operation of the RA for source control measures and after the ten years of LTRA for groundwater restoration measures. RAs funded by Superfund cannot be implemented unless the state signs a contract providing assurance that the state will provide both the 10 percent required funding, referred to as State Match funding, and a commitment to provide for long-term O & M. Thus, both states and the EPA have recognized the necessity for state involvement in the Superfund Program.

The CERCLA provides a funding source for state involvement through Cooperative Agreements (CAs). Through Multi-Site CAs, Michigan receives funding to assist the EPA with the management of site activities. Activities covered may include on-site assistance, review of technical documents and issues, community relations activities, legal assistance during negotiations with the PRPs, or oversight of cleanup activities conducted by the PRPs. The CERCLA also allows states to take primary responsibility for the management of a cleanup through a Site-Specific CA. Under a Site-Specific CA, the EPA provides funding to the state to assume any or all of the functions that the EPA would normally perform while managing a site cleanup. Non-site-specific activities that develop and maintain a state's ability to participate in the CERCLA response program are funded with Superfund Core Program CAs. Also funded through a CA, the Michigan Department of Environmental Quality (MDEQ) conducts Preliminary Assessments/Site Inspections and site scoring activities on behalf of the EPA and nominates the most serious and potentially costly sites to be listed on the NPL. In fiscal year (FY) 2017 the MDEQ completed 12 Pre-CERCLA Screenings, 3 Preliminary Assessments, 2 Site Inspections, and 3 Site Reassessments.

Michigan participates fully with the EPA in the Superfund Program through the MDEQ, Remediation and Redevelopment Division, Superfund Section. Michigan has had up to 84, and currently has 65, sites on the NPL (See map, Figure 1). No sites were added to the NPL in 2017. There have been 19 sites deleted from the NPL. The MDEQ has, or has had, lead agency responsibility for response actions at many of these sites. Addressing the worst sites through the Superfund Program conserves state funds that can then be used to address other Michigan sites of environmental contamination using the authority of Part 201. To further conserve state funds that are used to address site emergencies, the MDEQ frequently recommends appropriate sites to the EPA's Emergency Removal Program. In addition, the MDEQ participates with the EPA in the Regional Response Team, which conducts contingency planning activities for spills of oil and other hazardous substances and coordinates spill response actions. In addition to performing response actions at state-lead sites, the MDEQ provides assistance at the EPA and PRP managed sites to ensure that Michigan cleanup requirements, such as Part 201, are met.

Michigan's involvement in Superfund is also necessary to evaluate the RA and O & M costs of cleanup remedies proposed by the EPA. The MDEQ's participation in the remedy selection process favors remedies that attain cleanup standards and minimize State Match and O & M costs. The average cost for Superfund remedies nationwide is approximately $30 million, and the range of costs for remedies selected at Superfund sites in Michigan is from $1 million to $210 million. The cost for O & M at individual sites can reach as high as $4.6 million per year. It is in Michigan's financial interest to ensure that remedies are selected that meet state requirements and minimize State Match and O & M costs. In addition, it is imperative that the state participates in the design and construction of the facilities that the state will be required to fund, operate, and maintain for long periods of time.

Brownfield Redevelopment

Michigan has focused substantial efforts in working to foster redevelopment of brownfields, sites for which business expansion or economic development is hindered by the existence of, or potential for, environmental contamination. The federal Superfund Program is supplying funding to local

units of governments and states for their redevelopment efforts. Between FY 1999 and FY 2004, a total of $1,495,607 in federal funds was awarded to Michigan for this program. This funding primarily assisted in the implementation of the brownfield redevelopment aspects of the Clean Michigan Initiative.

To further support brownfield redevelopment, the CERCLA was amended by the Small Business Liability Relief and Brownfields Revitalization Act, 2002 PL 107-118, on January 11, 2002. This Act authorizes funding for brownfield assessment and cleanup, as well as for state response programs. Since FY 2005, Michigan has received $14,773,608 through CAs to enhance the state's brownfield redevelopment efforts, including brownfield assessments. Of that amount, $822,142 was received in FY 2017. The Act also provided certain liability protection for certain contiguous property owners, prospective purchasers, and extremely small contributors of hazardous substances.

Brownfield assessments on properties in Michigan are done at the request of a local unit of government, without making the site subject to the federal Superfund process. Sampling is conducted to determine whether contamination may be present at concentrations that would define the property as a facility pursuant to Part 201, to recommend a level of mitigation for the property, and to determine whether asbestos is present at quantities regulated by the National Emission Standards for Hazardous Air Pollutants. In FY 2017 the MDEQ completed 5 Brownfield Assessments.

Superfund Money in Michigan

Since the beginning of the program in 1980, federal Superfund money has been awarded to the state to address NPL sites. Page I-8 lists the federal grant dollars awarded in FY 2017. In FY 2017 the state committed to $571,067.63 in state-funded site response actions at Superfund sites, not including the match commitments identified in Table 1. A summary of Superfund funding in Michigan can be found in Table 1, on the next page.

TABLE 1 SUPERFUND FUNDING IN MICHIGAN			
FUNDING SOURCE	**FUNDS PRIOR TO FY 2017**	**FUNDS IN FY 2017**	**TOTAL BY SOURCE**
SUPERFUND STATE CONTRACTS (Federal, Direct)**	$ 284,003,406	$ 2,107,526	$ 286,110,932
SUPERFUND STATE CONTRACTS (State Match)**	$ 30,963,355	$ 234,169	$ 31,197,524
SUPERFUND SITE ASSESSMENTS (Federal, CA)	$ 10,003,196	$ 226,167	$ 10,229,363
SUPERFUND SITE AWARDS (Federal, CA)	$ 113,555,593	$ 361,794	$ 113,917,387
STATE FUNDS (State Match, CA)**	$ 9,941,390	$ 0	$ 9,941,390
PRP COMMITMENTS*	$ 601,143,925	$ 200,000	$ 601,343,925
SUBTOTAL SITE ACTIVITY	**$ 1,049,610,865**	**$ 3,129,656**	**$ 1,052,740,521**
BROWNFIELDS REVITALIZATION CA (Federal)	$ 13,951,466	$ 822,142	$ 14,773,608
BROWNFIELD CA (Federal) (closed)	$ 1,495,607	$ 0	$ 1,495,607
SUPERFUND CORE CA (Federal)	$ 14,663,393	$ 0	$ 14,663,393
BROWNFIELDS & CORE CA (State Match)	$ 1,779,768	$ 0	$ 1,779,768
TOTAL FUNDING*	**$ 1,081,501,099**	**$ 3,951,798**	**$ 1,085,452,897**

*These totals do not include complete information on expenditures by the EPA or liable parties for response actions, which account for well over half of the Superfund-related expenditures. Please note that the beginning balance for PRP commitments has been increased to correct errors in prior years.

**The funding shown in Superfund State Contracts is the amount committed to cleanups in these contracts. In some cases, these funds have not yet been expended. The match associated with site awards is awarded in full, even when the federal funds are only partially awarded, as long as the EPA has approved the total funding amount.

Cleanup Progress

Details on progress toward addressing Superfund sites in Michigan can be found in Table 2, on the next page. To date, 19 sites have been deleted from the NPL (see page I-9). As evidenced by the data in the table, significant progress has been made in the cleanup of the 65 sites remaining on the NPL. The EPA considers construction of the remedy to be complete at 56 sites (at these sites, the remedy is in operational status and the cleanup goals are not yet achieved).

We are also working to facilitate the redevelopment or reuse of Superfund sites. Currently, the EPA considers 44 NPL sites in Michigan as ready for anticipated use, including the Rasmussen Dump site in Brighton that was designated as ready for anticipated use in 2017. The EPA recognizes 27 Michigan NPL sites as currently being in reuse, which is an increase of 3 sites over the 2016 total.

Many of the Michigan sites that have appeared on the NPL have been divided into operable units by the EPA in order to more effectively address different aspects of the site. Each of these operable units may have its own remedy and go through the various remedial stages independent of activities at other parts of the site. Therefore, each site may have several remedies. An example of this would be contaminated soil being removed at one operable unit while wells are being installed to delineate contamination in the same site's groundwater operable unit. The EPA, state, or the PRP groups may address different operable units at a site at different times, or concurrently.

TABLE 2
CLEANUP PROGRESS AT FEDERAL NPL AND REMOVAL SITES IN MICHIGAN

ACTIVITY*	PRIOR TO FY 2017	FY 2017	TOTAL
REMOVAL ACTIONS	435	9	444
WATER SUPPLY REPLACEMENTS	25	0	25
RI/FS STARTS	140	0	140
RI/FS COMPLETIONS	123	1	124
RODS and ROD AMENDMENTS	165	1	166
RD STARTS	104	3	107
RD COMPLETIONS	95	1	96
RA STARTS	119	2	121
RA (CONSTRUCTION) COMPLETIONS	101	0	101
ONGOING O & M, LTRA	65	63	63
SITE DELETIONS	19	0	19
SITE ADDITIONS	84	0	84
FIVE-YEAR REVIEWS	201	13	214

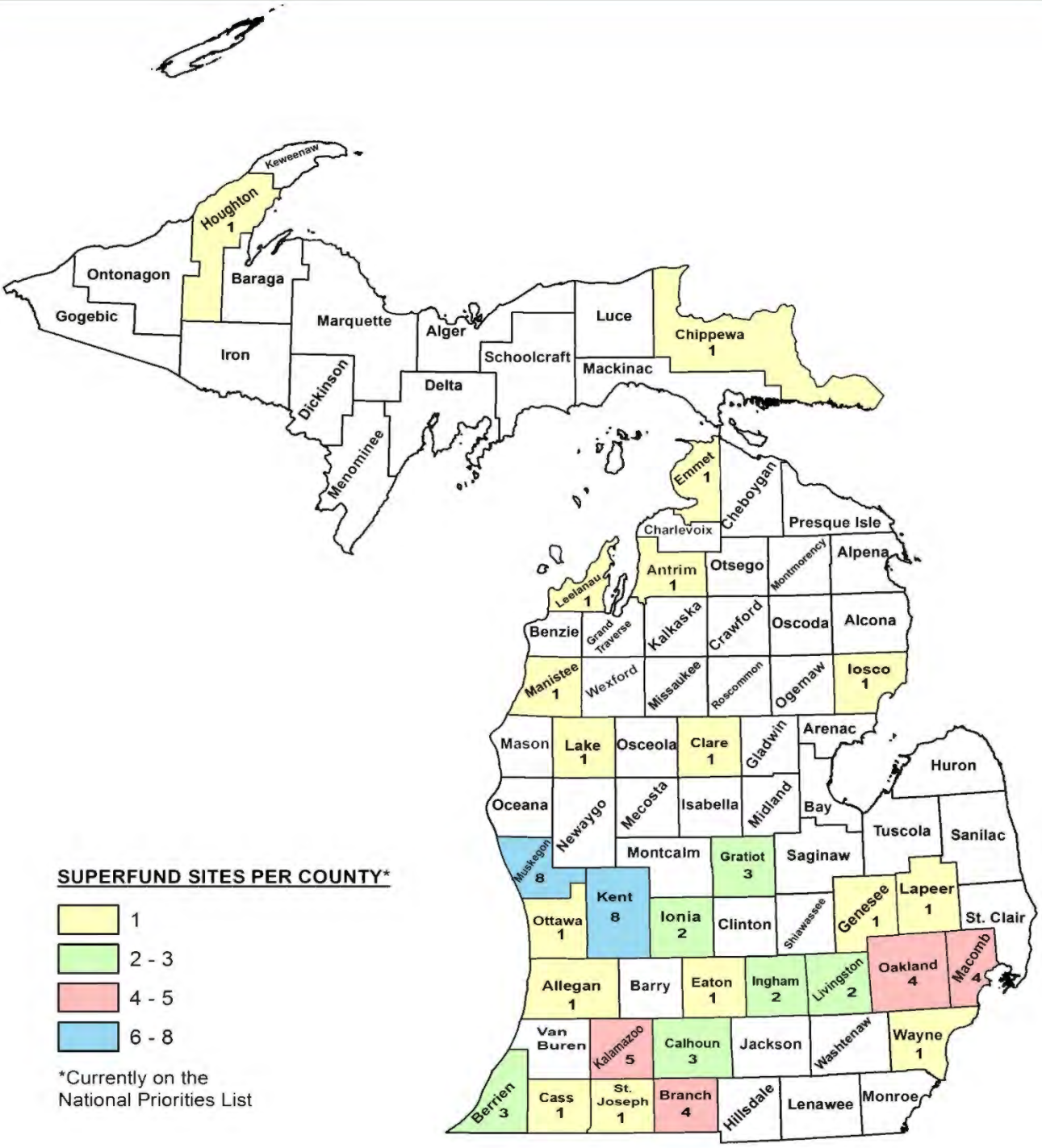
*Note: More than one of these activities may occur at an individual site.

2017 Superfund Legislative Report

Superfund Site Summaries have been prepared for all of the Michigan sites currently on the NPL. Each summary discusses the contamination problem at the site, the cleanup actions taken, the projected schedule for future cleanup activities, the amount of Federal Superfund money awarded to the site, and State Match utilized.

The Site Summaries appear in alphabetical order by county. Appendix A contains an index to the Site Summaries, organized alphabetically by site name. Appendix B is an alphabetical list of commonly used acronyms.

FIGURE 1
MICHIGAN SUPERFUND SITES
FY 2017



Total Sites: 65

SUPERFUND FEDERAL GRANT DOLLARS AWARDED IN FY 2017

CA#	FEDERAL AMOUNT	STATE MATCH	DATE	SITE/PROJECT
V03E0776	$ 321,794	$ 0	2/2/17	Provides funding to conduct Management Assistance activities.
V04E0778	$ 226,167	$ 0	2/22/17	Provides funding to conduct Site Assessment (Pre-Remedial) activities.
RP96507711	$ 500,005	$ 0	5/31/17	Partial funding to conduct Brownfields 128(a) activities in FY18.
V00E01983-1	$ 40,000	$ 0	8/30/17	Provides funding for RI activities at the Wash King site.
RP96507711-1	$ 322,137	$ 0	8/30/17	Provides balance of funding to conduct Brownfields 128(a) activities in FY18.
TOTAL	**$ 1,410,103**	**$ 0**		

SUPERFUND STATE CONTRACTS* SIGNED IN FY 2017

DATE	FEDERAL AMOUNT	STATE MATCH	SITE/PROJECT
3/27/17	$ 2,388,908	$ 265,434	Increase to the Ott/Story/Cordova site contract for extended Long-Term Remedial Action.
5/31/17	$ -281,382	$ -31,265	Adjustment for final costs in Forest Waste site contract closeout.
TOTAL	**$ 2,107,526**	**$ 234,169**	

*Superfund state contracts are a financial mechanism whereby the state can provide the EPA with the required 10 percent match when the EPA is conducting the remediation.

MICHIGAN SITES DELETED FROM THE FINAL NPL

(Alphabetically by County)

COUNTY	SITE NAME	DATE DELETED
Alpena	Ossineke Residental Wells	January 31, 1996
Benzie	Metal Working Shop	December 23, 1992
Charlevoix	Charlevoix Municipal Well	December 2, 1993
Genesee	Berlin and Farro	June 24, 1998
Grand Traverse	Avenue E Groundwater	March 20, 2007
Ionia	H & K Sales	May 21, 1998
Kent	Folkertsma Refuse	April 10, 1996
Kent	Kent City Mobile Home Park	March 20, 1995
Lenawee	Anderson Development Co.	January 26, 1996
Livingston	Spiegelberg Landfill	June 13, 2011
Marquette	Cliffs/Dow Dump	November 17, 2000
Mason	Mason County Landfill	September 9, 1999
Monroe	Novaco Industries	July 14, 1998
Muskegon	Whitehall Municipal Wells	February 11, 1991
Oakland	Cemetery Dump	April 19, 1995
Ottawa	Waste Management of Michigan - Holland Lagoons	January 14, 2013
Van Buren	Burrows Sanitation	July 14, 2015
Wayne	Carter Industrials	March 25, 1997
Wayne	Lower Ecorse Creek	July 1, 2005

MICHIGAN SITES PROPOSED FOR THE NPL

(Alphabetically by County)

COUNTY	SITE NAME	PROPOSED DATE
Bay	Bay City Middlegrounds	February 13, 1995
Iosco	Wurtsmith Air Force Base	January 18, 1994

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LEGISLATIVE REPORT
2017

Site Name: Rockwell International Corp.
One Glass Street
Allegan , MI

County: Allegan
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: 1B
State Site ID#: 03000030
State Site Score: 48

LOCATION
The Rockwell International Corporation site encompasses approximately 30.4 acres at One Glass Street, Allegan, Michigan. It is bound by the Kalamazoo River to the north, by residential areas and an elementary school on North Street to the south, River Street to the east, and the city of Allegan wastewater treatment plant (WWTP) to the west.

SITE HISTORY
Operations at the Old Rockwell site began in 1901 with the manufacture of glass and mirrors. In 1916, the facilities at the site were sold and, thereafter, operated for the machining and assembly of automotive drive-line parts until 1992. Operations included steel heat treating, machining and parts assembly. After 1992, the buildings were leased for various purposes ranging from tire recycling and composting businesses to a paint shop. Waste streams generated at the site contained cutting oils, lubricants, emulsifiers, oxidation inhibitors, cleaning compounds, treatment compounds, metal filings, and metal and cyanide salts. Three holding ponds and a soluble oil pond were located near the river. Several oil spills to the Kalamazoo River were documented. The site is being addressed by the Potentially Responsible Party (PRP), Meritor, Inc. The Rockwell Former Manufacturing Building was declared hazardous and the building was demolished in 2005. Much of the footers and floor slab remains. The former Drive Line Assembly Building remains and is being reused.

Several environmental investigations have been completed at the site. Historic contaminants of concern included volatile organic compounds, semi-volatile organic compounds, polychlorinated biphenyls (PCBs), dioxins, and various other metals, light non-aqueous phase liquid (LNAPL) have also been identified at the site.

Under a 1988 Administrative Order by Consent, the PRP initiated a Remedial Investigation (RI) and Feasibility Study (FS). A series of drafts were submitted in 1990, 1993, 1994, and 1997 and the EPA eventually took over all site activities from the PRP in 1998. A Record of Decision (ROD), completed in July 1995, separated the Landfill Contents Operable Unit (OU) from the rest of the site. The Landfill Contents OU was determined to present no threat to human health and the environment as long as it was restricted to industrial use. A no action remedy was selected for the contents. However, groundwater contamination was to be investigated and treated with the rest of the Rockwell site. This allowed the city of Allegan WWTP facility to expand onto a portion of the landfill property.

The EPA took over the site and Tetratech, a contractor for the EPA, completed a draft RI/FS and risk assessment in 2001. Samples, collected in 2000 and 2001, show that the oil that was identified on the water table and in the site soils contains extremely high levels of PCBs (up to 1,900 parts per million [ppm]). An emergency removal action was undertaken by the PRP, Arvin-Meritor, at a residential property located south of the site, and overseen by the EPA. The area in which the removal action took place was found to be contaminated with PCB-impacted oil that was originally discharged into a drain that emptied into the Kalamazoo River.

In September 2002, a ROD was issued to address remaining contaminated soil and groundwater at the facility. The 2002 ROD required an aggressive removal program through the excavation and off-site disposal of source areas, including removal of any remaining oil. The ROD allows for contaminated soil with levels below direct contact values to be left in place. A slurry wall groundwater containment system with a passive treatment system (funnel and gate) was to be installed around the perimeter of the site to address any contamination migrating off-site. The ROD also required institutional controls (ICs) such as water well restrictions to be put in place. The ROD does not address impacts to the Kalamazoo River. The EPA issued a Unilateral Administrative Order to Arvin-Meritor, the PRP, requiring them to initiate and complete the cleanup identified in the September 2002 ROD. Meritor, Inc. (successor to Arvin-Meritor) is currently complying with the Unilateral Administrative Order.

Arvin-Meritor in 2005 began implementing the approved remedial action. In 2005 and 2006, all of the former manufacturing buildings that were located on the western (tax reverted) portion of the site were demolished. However, large portions of the foundations and concrete floor slab remain in place. Upon completion of the demolition, excavation of contaminated areas, and removal activities, the site was regraded and seeded in late 2006. In the fall of 2007, Arvin-Meritor submitted a work plan meant to determine whether or not the installation of a funnel and gate system was necessary. The EPA and the MDEQ provided comments on the work plan. Additional groundwater monitoring wells were installed in 2008 to better assess the current conditions and assist in the determination of whether the groundwater treatment system will be needed.

In 2008, non-aqueous phase liquid (NAPL) was again observed in multiple monitoring wells across the site. In addition, PCBs and mercury were detected in wells near the river. The EPA requested that Arvin-Meritor re-evaluate the extent of NAPL present across the site. Removal of NAPL by excavation started in October 2010 and was completed in January 2011.

The EPA, the MDEQ, and the PRP group updated the Interim Monitoring Plan to characterize the quality of the groundwater at the site and provide necessary data to support the Remedial Design of the slurry wall, as outlined in the 2002 ROD. Additional wells were installed and existing wells repaired as part of that effort in 2012. The four rounds of required groundwater sampling were completed in 2013. The PRP submitted a summary report to the EPA and MDEQ containing the groundwater data collected during the four total rounds of sampling completed over 2012 and 2013.

A Five-Year Review (FYR) was executed on April 28, 2015. The main conclusions of this review were that the site remedies will be protective of human health and the environment upon completion of the following: ICs to restrict residential use of the site and to prohibit use of groundwater at the site need to be implemented; an IC implementation and assurance plan must be submitted to ensure that the ICs are maintained, monitored and enforced; and a long-term groundwater monitoring plan needs to be developed and implemented.

August 2016, a ROD Amendment was executed to remove the following three components of the groundwater containment system described in the 2002 ROD. 1) Construction of a soil-bentonite slurry wall to laterally surround the site (fully or partially) and restrict groundwater flow; and 2) Installation of permeable reactive gates within the slurry wall footprint to allow in-situ treatment of groundwater prior to its discharge into the Kalamazoo River. 3) Contingency for closure of the slurry wall and extraction of groundwater if the slurry wall and permeable reactive gates fail to sufficiently prevent the movement of contaminated groundwater to the Kalamazoo River. Based on 2013-2016 groundwater monitoring results,

it was concluded that this portion of the remedy is no longer necessary to protect the public health and welfare and the environment from actual or threatened releases of hazardous substance, pollutants, or contaminants from the Site.

EPA in consultation with MDEQ, approved the Long-Term Monitoring Plan (LTMP) (dated August 11, 2016) which requires at least two years of annual (every Spring) sampling to confirm that no LNAPL is continuing to impact the site soils or groundwater. If analytical data indicate consistent contaminant concentrations during the two years of sampling, PRPs may request in writing to change in the parameters of the Long-Term Groundwater Monitoring Program.

SITE STATUS
The city of Allegan continues to consider redevelopment options for the property. Various commercial, industrial, and recreational uses that have been suggested include use as a county complex, additional fairgrounds parking, a soccer and/or football field and/or an indoor tennis/racquetball facility. However, the final redevelopment plan for the site has not been selected.

The spring 2016 and 2017 groundwater sampling events were completed in general accordance with the LTMP developed for the Site and approved by the EPA in consultation with MDEQ on September 2, 2016. EPA and MDEQ reviewing the reports and data to develop a long-term monitoring program.

ENFORCEMENT STATUS
Arvin-Meritor (formerly Rockwell International Corporation) is a PRP under the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 95-510, as amended, and signed an Order in 1988 to conduct the RI/FS. The EPA later took over and completed the RI/FS. The PRP's contractor has completed an emergency removal action for the LNAPL in the area south of North Street and is currently working under a Unilateral Administrative Order to complete the site remediation.

The MDEQ notified Arvin-Meritor of their liability for past state costs and in 2007 a settlement was agreed upon.

After reviewing the Unilateral Administrative Order, EPA in consultation with MDEQ approved the PRP's request to reduce the Performance Guarantee to $459,113. The Performance Guarantee commonly referred to as financial assurance, required at the Site in accordance with paragraph 102 of Unilateral Administrative Order no. V-W-02-C-718.. The basis for this request was construction completion and the ROD Amendment, eliminating the slurry wall requirement, which estimates that the net present value of the remedy is $459,113.

SPECIAL CONSIDERATIONS
This property is surrounded by residential areas, a WWTP, and the Kalamazoo River. The site is adjacent to the Kalamazoo River which flows past nature preserves, a great blue heron rookery, and a bald eagle nest, all within approximately 20 miles downstream.

OPERABLE UNITS

00	Entire Site
01	Landfill Contents

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/2002**

The 2002 ROD requires an aggressive removal program through the excavation and off-site disposal of source areas. Impacted soil with levels below direct contact values will be left. A slurry wall containment system with passive groundwater treatment system (funnel and gate) will be installed around the perimeter of the site to address any contamination migrating off-site as well as residual soil contamination that may continue to impact the groundwater. The ROD also requires ICs such as water well restrictions to be put in place. The ROD does not address impacts to the Kalamazoo River.

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 08/24/2016**

The ROD Amendment was executed to remove three components in the groundwater containment system described in the 2002 ROD. Based on 2013-2016 groundwater monitoring results, it was concluded that this portion of the remedy is no longer necessary to protect the public health and welfare and the environment from actual or threatened releases of hazardous substance, pollutants, or contaminants from the Site.

All other requirements of the 2002 ROD remain unchanged.

Response Accomplishments: Completed

Remedial Investigation

After several years of the facility being investigated by the PRP, the EPA took the lead. The EPA contractor started work in 2000 and completed a draft RI/FS. During 2001, the MDEQ also performed an exacerbation assessment in order to aid in the development of the facility and to further assess the facilty.

Start Date: *07/22/1987*	Primary Cost:	$900,000	Source:	State
End Date: *07/01/2002*	Secondary Cost:	$800,000	Source:	Federal

Interim Response

NAPL and soils containing oil and/or PCBs (up to 1,900 ppm) were removed from the residential yard and area south of North Street in the area of a former drain pipe to the Kalamazoo River.

Start Date: *09/03/2001*	Primary Cost:	$1,350,000	Source:	Private
End Date: *05/01/2003*	Secondary Cost:	$50,000	Source:	Federal

Remedial Design

Remedial Design (RD) of the groundwater treatment system included a slurry wall groundwater containment system with a passive treatment system (funnel and gate) was to be installed around the perimeter of the site to address any contamination migrating off-site.

Start Date: *12/02/2002*	Primary Cost:	$1,500,000	Source:	Private
End Date: *06/01/2005*	Secondary Cost:	$50,000	Source:	Federal

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Interim Response

The PRPs completed the decommissioning and demolition of the former manufacturing building and the former site wastewater treatment building. The action included the decommissioning of underground utilities, the closure of site WWTP ponds, remediation of areas of the site where soil concentrations exceeded the site-wide cleanup criteria, and the grading and restoration of the site. This removal also included removal of associated NAPL areas.

Start Date: 06/01/2005	Primary Cost:	$0	Source:
End Date: 11/30/2006	Secondary Cost:	$0	Source:

Remedial Action

The need for a slurry wall and funnel and gate system was evaluated through the Interim Monitoring Plan, which was concluded in late 2013. The PRP summarized the data collected during the required four rounds of groundwater sampling and submitted the report to the EPA and MDEQ in January 2014. The EPA and MDEQ evaluated the data and concluded, that based on the low level of contamination identified, that the slurry wall containment system and funnel and gate groundwater treatment system are not necessary. A ROD Amendment to remove this requirement from the 2002 ROD was executed in August 2016. A long-term groundwater monitoring plan was implemented beginning in spring of 2016.

Start Date: 06/01/2005	Primary Cost:	$12,000,000	Source: Private
End Date: 08/24/2016	Secondary Cost:	$193,000	Source: Federal

5 Year Review

The First FYR was completed in 2010. The remedy from the ROD called for excavation of the NAPL and installation of a slurry wall with a funnel and gate system. The PRPs completed a decommissioning and demolition of the former manufacturing building and the former site wastewater treatment building. The action included the decommissioning of underground utilities, the closure of site WWTP ponds, remediation of areas of the site where soil concentrations exceeded the site-wide cleanup criteria, and the grading and restoration of the site. This removal also included removal of associated NAPL areas.

Start Date: 08/11/2009	Primary Cost:	$0	Source: Federal
End Date: 05/05/2010	Secondary Cost:	$0	Source:

Interim Response

The PRPs undertook a second NAPL removal action in the winter of 2010/2011. The removal was anticipated to take about three weeks, based on the preliminary geoprobe testing. The oil in soil test using Sudan IV dye detected oil in clear and odorless samples, but did not register some of the stained and smelly samples if the NAPL was not available. Several underground pipes and 32,571 tons of contaminated soil were removed. Standing water was pumped from the excavations to holding tanks where it was filtered, sampled, and treated; then discharged under permit to the adjacent city of Allegan WWTP.

Start Date: 10/04/2010	Primary Cost:	$0	Source:
End Date: 02/10/2011	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The Second FYR was completed in 2015. The soil remedy was completed in February 2011. Four quarters of groundwater sampling were conducted during 2012-2013. The contaminants of concern detected during these sampling events were generally at low concentrations. Therefore, installation of a slurry wall containment system with treatment gates is not warranted. A long-term monitoring plan needs to be developed and implemented. Institutional controls need to be maintained, monitored and enforced.

Start Date: *05/19/2014*	Primary Cost:	$0	Source:
End Date: *04/28/2015*	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance Costs for Operation and Maintenance are estimated for a per year cost.

Start Date: *01/01/2007*	Primary Cost:	$200,000	Source: Private
End Date: *06/01/2033*	Secondary Cost:	$10,000	Source: Federal

Monitoring EPA in consultation with MDEQ, approved the LTMP (dated August 11, 2016) which requires at least two years of annual (every Spring) sampling to confirm that no LNAPL is continuing to impact the site soils or groundwater. If analytical data indicate consistent contaminant concentrations during the two years of sampling, PRPs may request in writing to change in the parameters of the Long-Term Groundwater Monitoring Program.

Start Date: *10/24/2016*	Primary Cost:	$0	Source: Private
End Date: *10/24/2018*	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

5 Year Review The next FYR is due in 2020.

Start Date: *05/20/2019*	Primary Cost:	$0	Source:
End Date: *04/27/2020*	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Landfill Contents

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 07/11/1995**

A ROD, completed in July 1995, separated the Landfill Contents Operable Unit from the rest of the site. The Landfill Contents Operational Unit was determined to present no threat to human health and the environment as long as it was restricted to industrial use. A no action remedy was selected and no site-use restrictions or institutional control such as fencing or construction restrictions was imposed for the contents.

The landfill contents operable unit was formerly a city dump area. The area is now serving as expansion space for the city of Allegan publicly owned treatment works.

Response Accomplishments: Ongoing

Operation and Maintenance

The city of Allegan WWTP purchased, fenced, and paved or landscaped a portion of the former landfill property to prevent direct contact hazards. The city of Allegan was aware of the contaminants of concern on the property at the time of the ROD. The city has utilized the parcel for a WWTP expansion and has agreed to keep the area covered (vegetated or paved) and fenced to eliminate direct contact hazards.

Start Date: 07/11/1995 Primary Cost: $40,000 Source: Private

End Date: 07/11/2025 Secondary Cost: $0 Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$1,317	$0	$1,317	$1,317	$1,317

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$30,000	$0	$0	$30,000	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$38,765	$0	$0	$38,765	$0

Cooperative Agreement Number V995260-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$6,184	$0	$0	$6,184	$0

Cooperative Agreement Number V995258-03 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$20,073	$0	$0	$20,073	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$2,335	$0	$0	$2,333	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$40,338	$0	$0	$40,338	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$48,150	$0	$0	$48,150	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$10,632	$0	$0	$10,632	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$14,509	$0	$0	$14,509	$161

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$100,000	$0	$0	$76,667	$0

Cooperative Agreement Number V995339-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$45,000	$0	$0	$44,991	$0
Totals:	$357,302	$0	$1,317	$333,958	$1,478

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Tar Lake
U.S. 131
Mancelona , MI

County: Antrim
MDEQ District Location: Gaylord
Managed By: RRD-Superfund

Federal Site Code: 71
State Site ID#: 05000012
State Site Score: 36

LOCATION
The Tar Lake site is located in Antrim County, on the east side of the intersection of Highway 131 and Elder Road in Mancelona Township, Michigan.

SITE HISTORY
The Tar Lake Superfund Site is a former iron manufacturing facility (Antrim Iron Works) that operated from about 1882 to 1945. The site is in a rural area about one mile south of Mancelona, Michigan. The site was placed on the National Priorities List in September 1983 and originally consisted of several parcels of property totaling 234 acres. Three parcels totaling 120 acres have subsequently been deleted from the site.

Antrim Iron Works' manufacturing operations created a tar-like waste residue (tar) which was discharged to a low-lying area of the site called Tar Lake. The tar contains phenols, heavy metals, and volatile organic compounds. Direct contact with the tar caused burns to exposed skin. Other major operations areas of the site included an iron production area, a creosote production area, and a retort and chemical production area.

The EPA conducted a fund-lead removal action in 1998-1999 and removed 47,043 tons of tar and tar debris from the tar lake depression Operable Unit (OU) 1. The EPA also began a fund-lead remedial investigation/feasibility study (RI/FS) to address soil below the excavated tar, groundwater, the other operations areas, and a former municipal dump that also contains tar; these areas are OU2.

The Tar Lake site has two primary contaminants with different properties. The first type of contaminant includes the wood tar organics, polynuclear aromatic hydrocarbons, and phenolics. These are being destroyed by the operation of the biosparge system. The other (inorganic) contamination is soluble iron and manganese, which cannot be destroyed, but can be immobilized by creating oxidizing conditions. The full extent of inorganic contamination has not been addressed, but will be evaluated once the organic contamination is remediated.

Several domestic wells are contaminated with phenolic compounds and high levels of dissolved iron and manganese, and have been abandoned. Large portions of the local aquifer encompassing an area approximately 1/2 mile wide by almost 6 miles long are unusable. Due to the poor aesthetic quality of the groundwater emanating from the site, the MDEQ authorized the replacement of private wells with a municipal water supply extended from an expansion of the Mancelona municipal system. Water was supplied to residents in the path of the Tar Lake plume and the neighboring Dura (Wickes Manufacturing) plumes, (a trichloroethylene plume) as part of a comprehensive $6,000,000 water system expansion funded by the state. A local water and sewer authority has been established to administer the operation and maintenance (O & M) of the system. Additional source material was encountered along Elder Road during the water main installation.

The MDEQ conducted an emergency removal of some contaminated soil so that the water

main installation could be completed. Additional investigations were conducted in the Tar Lake, adjacent smoke tunnel and creosote areas of the site in 2011 and 2012 to evaluate increasing groundwater contamination and potential sources of contamination. The EPA issued an Explanation of Significant Differences (ESD) in 2013 to document a significant increase in the scope and cost of the soil excavation and groundwater remedy. The ESD provides for excavating approximately 138,000 additional tons of contaminated soil from the Tar Lake area, adjacent smoke tunnel area and from the creosote area; expanding the north end of the biosparge groundwater treatment system approximately 225 feet to the northwest, across Elder Road; and expanding the biosparge system approximately 550 feet upgradient into the low-lying Tar Lake area.

Based on the results of the 2012 investigation, additional pre-design investigation was conducted in the fall of 2015 and a final report has been drafted.

Investigation activities have also been conducted to evaluate the extent and magnitude of contamination originating in a former municipal dump on-site. Tar has been discovered in a low-lying area and in the spring of 2016, additional investigation was conducted to delineate the extent.

The most recent Five-Year Review (FYR) was completed in September 2014. The review found that Remedial Actions (RAs) in the former "Tar Lake" area of the site (tar and soil removal, biosparge groundwater treatment system) are protective in the short term; however, Institutional Controls (ICs) are required, along with additional RAs to assure long-term protectiveness. The ten-year long-term response action period ended in February 2012; however, the agencies recognize additional source material remains. O & M of the biosparge system downgradient of the "Tar Lake" depression continues. State match of any potential future RA of these areas will be partially funded through existing state credits with the EPA.

The EPA completed the Phase 2 Landfill (municipal dump) Investigation and Pre-design Studies in 2017.

SITE STATUS

Further pre-design investigation was conducted in 2015 and 2016 to refine estimates of the extent of proposed additional excavation(s) of unsaturated soil; verify horizontal and vertical extent of north end biosparge expansion; and verify appropriate extent of source area (tar lake depression) biosparge expansion. The agencies are waiting for funding to implement the necessary additional RA.

Additional investigation was also conducted in April 2016 to further evaluate the extent of source material; e.g., tar, in the former municipal dump and extent of impact from that area and a report summarizing those results is being drafted. Remedial alternatives are being develped to address the contamination in that area.

ENFORCEMENT STATUS

Prior to 1999, property owners (Viacom) had been identified as Potentially Responsible Parties (PRPs) and were liable under the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, as amended, and perhaps Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The EPA was unsuccessful in negotiating with the PRPs to implement the tar removal portion of the site. The EPA negotiated with the PRPs for cash settlement of approximately $3,500,000 for the tar removal portion of the site activities.

In the fall of 1999, a non-profit organization, called the Mancelona Community Resource

Development, purchased the fenced portion of the site, and the neighboring property that includes Peckham Lake, from Viacom. The Mancelona Community Resource Development plans to (eventually) develop the uncontaminated portion of the properties.

During the spring of 2003, the EPA re-entered into cost recovery negotiations with Viacom. The EPA was unsuccessful in having Viacom voluntarily reimburse either federal or state expenditures or in getting Viacom to commit to undertake the RA.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site
01	Tar Removal
02	Soil and Groundwater

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Cancelled

Remedial Design

Start Date: 07/01/1993	Primary Cost:	$300,000	Source:	Federal
End Date: 01/01/1995	Secondary Cost:	$0	Source:	

Response Accomplishments: Completed

Remedial Investigation The RI/FS was conducted by CH2MHill for the EPA on a performance-based contract. All the field work was conducted within a two-week window.

Start Date: 06/02/1999	Primary Cost:	$1,300,000	Source:	Federal
End Date: 06/18/1999	Secondary Cost:	$0	Source:	

Bottled Water Bottled water was supplied to residents affected by the Tar Lake dissolved iron plume until municipal water was extended.

Start Date: 11/06/2000	Primary Cost:	$60,000	Source:	State
End Date: 11/01/2002	Secondary Cost:	$0	Source:	

5 Year Review First FYR completed by the EPA on June 12, 2009. The review found that RAs in the Tar Lake area of the site (tar and soil removal, biosparge groundwater treatment system) are protective in the short term. Required ICs are necessary for the site to be protective in the long term. Additional information and actions are also needed to assure long-term protectiveness and are identified in the review.

Start Date: 09/21/2008	Primary Cost:	$0	Source:	Federal
End Date: 06/12/2009	Secondary Cost:	$0	Source:	

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

The EPA executed the FYR on May 14, 2014. Findings included: remedy protective in the short term; need for ICs; and conduct additional investigation to identify additional RAs. The state provided comments on outstanding issues to the EPA via a letter dated November 8, 2013.

Start Date: 08/27/2013	Primary Cost:	$5,000	Source: State
End Date: 05/14/2014	Secondary Cost:	$0	Source:

Response Accomplishments: In Progress

Remedial Investigation

Additional investigation/pre-design activities were implemented in 2015 for the "Tar Lake," creosote areas, etc., of the site, and additonal investigation was conducted in 2016 to characterize the contamination originating near the former municipal dump, which also includes tar waste. It is anticipated that the investigation activities will be deemed complete with the finalization of reports in 2018. This report will include preliminary design of RA specified in the ESD.

Start Date: 07/01/1986	Primary Cost:	$900,000	Source: Private
End Date: 03/30/2018	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

Remedial Action

Excavation of approximately 138,000 tons of contaminated soil from locations around the Tar Lake area, adjacent smoke tunnel area and from the creosote area; expanding the north end of the biosparge groundwater treatment system 225 feet to the northwest, across Elder Road; and expanding the biosparge system 550 feet upgradient into the low-lying tar lake area.

Start Date: 05/25/2018	Primary Cost:	$21,000,000	Source: Federal
End Date: 10/25/2018	Secondary Cost:	$1,100,000	Source: State

5 Year Review

Start Date: 09/22/2018	Primary Cost:	$0	Source:
End Date: 05/14/2019	Secondary Cost:	$0	Source:

Operation and Maintenance

State cost share for O & M of the additional biosparge systems proposed to be extended across Elder Road and also upgradient into Tar Lake will be required. Actual costs to conduct the O & M will not be determined until the system(s) are in place and operational and functional.

Start Date: 11/25/2018	Primary Cost:	$50,000	Source:
End Date: 06/25/2022	Secondary Cost:	$5,000	Source:

OPERABLE UNIT 01: Tar Removal

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/29/1992**

In 1992, a Record of Decision (ROD) was signed for the site which called for the excavation of the tar material and contaminated soil which was to be stabilized and placed and capped within on-site Resource Conservation and Recovery Act, Subtitle C containment cells. In addition, as an interim measure, the contaminated groundwater was to be treated at an on-site pump and treatment system and reinjected upgradient.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 06/12/1998**

In 1998, an ESD was signed to change the remedy from excavation and containment in cells to excavation and off-site disposal. The tar was excavated in 1998-1999 by the EPA and hauled to energy recovery facilities in New York and Illinois.

Response Accomplishments: Completed

Emergency

The tar was removed as part of an EPA emergency removal action. The state installed an interim biosparge groundwater treatment (remedy) and is sampling a series of monitoring wells to evaluate the effectiveness of the system. The state's portion of the action included the installation and operation of the biosparge system and the associated periodic groundwater monitoring.

Start Date: 09/07/1998	Primary Cost:	$6,300,000	Source: Federal
End Date: 11/06/2000	Secondary Cost:	$3,500,000	Source: Private

Alternate Water

Clean Michigan Initiative funds and Drinking Water and Radiological Protection Division funds financed the municipal water expansion that encompassed the Tar Lake and Dura (Wickes Manufacturing) plumes. The system is operated and owned by the Mancelona Area Water and Sewer Authority. The overall cost of the expansion is approximately $6,700,000. The final portion of the water main (next to the site) was completed in the fall of 2004 with ambient air monitoring assistance provided by the EPA. The final state-funded connections to the system were completed in 2005.

Start Date: 11/01/2001	Primary Cost:	$6,750,000	Source: State
End Date: 09/30/2005	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: Soil and Groundwater

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 02/25/2002**

The RA chosen for the site is air-biosparging of the groundwater in the source area with limited soil removal. Biosparging will continue downgradient of the source area.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 09/27/2004**

This ESD deleted the bioventing and groundwater recirculation components of the 2002 ROD and instead required the tar and contaminated soil associated with the rind of the "Tar Lake" depression to be excavated and disposed of in an off-site landfill. The estimated cost of excavation and off-site disposal was $1,200,000 versus $1,600,000 for the bioventing and groundwater recirculation. Also, the ESD prescribed that the tar excavated from the Creosote Area be disposed in an off-site landfill rather than sent to an energy recovery facility as anticipated in the 2002 ROD.

Record of Decision *Amendment:* 0 *ESD:* 2 **Effective 09/14/2009**

The ESD documents a change in the IC component of the groundwater remedy the EPA selected for Tar Lake.

Record of Decision *Amendment:* 0 *ESD:* 3 **Effective 09/19/2013**

This ESD provides for the excavation of approximately 138,000 additional tons of contaminated soil from the Tar Lake depression, the adjacent smoke tunnel area, and the creosote area; expanding the north end of the biosparge groundwater treatment system approximately 225 feet to the northwest--across Elder Road; expanding the biosparge system approximately 550 feet upgradient into the low-lying Tar Lake depression; updating the cleanup standards in the 2002 ROD to current Michigan Part 201 Criteria; and adding cleanup standards for additional volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) and inorganic chemicals in soil; and for additional VOC and SVOC chemicals in groundwater.

Response Accomplishments: Cancelled

Remedial Design

Start Date: 08/01/2003	Primary Cost:	$230,000	Source: Federal
End Date: 09/30/2004	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: Soil and Groundwater

Response Accomplishments: Completed

Interim Response The PRPs fenced the entire 14-acre property directly surrounding the Tar Lake depression.

Start Date:	*07/01/1985*	Primary Cost:	$18,900	Source: Private
End Date:	*07/31/1985*	Secondary Cost:	$0	Source:

Interim Response The state installed a biosparging system as an interim response to prevent contaminant migration in the groundwater as a result of the tar excavation performed by the EPA. The primary costs were for system installation by Mateco with the secondary costs for Harding Lawson Associates (now Mactec) for design, oversight, and optimization.

Start Date:	*11/15/1998*	Primary Cost:	$263,000	Source: State
End Date:	*03/01/2006*	Secondary Cost:	$0	Source: <None>

Long Term Remedial Action The MDEQ operated the treatment system under a grant from the EPA.

Start Date:	*03/01/2006*	Primary Cost:	$395,902	Source: Federal
End Date:	*02/25/2012*	Secondary Cost:	$0	Source: State

Response Accomplishments: Construction Complete

Remedial Action This remedy included: removal of highly contaminated soils, continued biosparging, removal of polyliner, and removal of some of the on-site foundations. The cost estimate was the amount spent by the EPA during the RA.

In mid-2004, the EPA removed the rind of contaminated soil that had existed under the former tar deposit and also the creosote deposit that was located north of Elder Road. The groundwater at the site will require additional treatment with the biosparging system to remediate the contaminants that were mobilized during the soil removal.

Start Date:	*06/01/2004*	Primary Cost:	$1,200,000	Source: Federal
End Date:	*09/15/2004*	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance O & M of the biosparge groundwater treatment system downgradient of the Tar Lake depression continues along with semi-annual groundwater sampling to evaluate the effectiveness of the remedy. Annual costs are approximately $70,000.

Start Date:	*02/26/2012*	Primary Cost:	$70,000	Source: State
End Date:	*02/26/2022*	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: Soil and Groundwater

Response Accomplishments: Future Need

Remedial Design Remedy design to address source material and contamination from the former municipal dump area of the Site.

Start Date: 02/25/2019 Primary Cost: $100,000 Source: Federal

End Date: 01/25/2020 Secondary Cost: $0 Source:

Remedial Action Implementation of remedy to address contamination originating from the former municipal dump.

Start Date: 03/25/2021 Primary Cost: $3,000,000 Source: Federal

End Date: 03/25/2022 Secondary Cost: $300,000 Source: State

Operation and Maintenance O & M of remedy implemented to address contamination originating from the former municipal dump. State cost share will be predicated based on whatever remedy is selected.

Start Date: 03/25/2022 Primary Cost: $50,000 Source: Federal

End Date: 03/25/2027 Secondary Cost: $5,000 Source: State

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V965858-01-0 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Operation and Maintenance	$411,457	$0	$0	$395,902	$0
Totals:	$411,457	$0	$0	$395,902	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$14,989	$0	$14,989	$14,989	$14,989

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$27,071	$0	$0	$27,071	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$26,535	$0	$0	$26,236	$0

Cooperative Agreement Number V995259-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$4,933	$0	$0	$4,933	$0

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$14,456	$0	$0	$14,456	$0

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$41,500	$0	$0	$40,304	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$17,855	$0	$0	$17,855	$0

Cooperative Agreement Number V995258-03 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$8,212	$0	$0	$8,212	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$17,682	$0	$0	$17,682	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$35,000	$0	$0	$24,703	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$30,000	$0	$0	$28,068	$0

Cooperative Agreement Number V995261-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$40,000	$4,000	$0	$39,718	$0

Cooperative Agreement Number V995259-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Design	$20,101	$0	$0	$19,445	$0

Cooperative Agreement Number V995339-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$40,000	$0	$0	$39,909	$0
Totals:	$338,334	$4,000	$14,989	$323,580	$14,989

STATE SUPERFUND CONTRACTS

For Operable Unit 00 : Entire Site : Open

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Action	$0	$0	$0	$0
Totals:	$0	$0	$0	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Aircraft Components
671 North Shore Drive
Benton Harbor , MI

County: Berrien
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: 0W
State Site ID#: 11000320
State Site Score: 41

LOCATION
The Aircraft Components site (a.k.a. D & L Sales, Benton Harbor Warehouse) covers 17 acres on the north side of the city of Benton Harbor. The site is bounded by the Paw Paw River and associated wetlands to the south and east, North Shore Drive and residential areas to the west and north.

SITE HISTORY
With the end of World War II, the United States Air Force (Air Force) sold leftover aircraft components, including gauges with radioactive luminescent painted dials, to Aircraft Components of Benton Harbor, Michigan. Aircraft Components operated a mail order catalog business selling army surplus supplies and equipment. The radioactive gauges purchased from the Air Force were stored in a warehouse on the site. Many of the gauges were cracked and broken, which allowed the paint to escape as particulate matter. A number of such gauges were also found partially buried outside the warehouse. Due to fugitive dust tracked out by employees, and the burial of the gauges outside, there was concern that the radioactive material had migrated outside the building and impacted surface soils, riverbank soils, surface water and possibly sediments, and groundwater. Based upon preliminary data, other types of contamination (e.g., volatiles and metals) appeared to have impacted the environment outside the warehouse, possibly extending to the banks of the Paw Paw River.

In 1999, the EPA completed a removal action which dealt with the bulk of the radioactive materials. The old aircraft gauges and dials were shredded on the site and placed in drums for transportation to appropriate disposal facilities outside the State.

The EPA then conducted a Phase I and Phase II Remedial Investigation/Feasibility Study (RI/FS) with State technical assistance. It was determined that the only remaining radioactive contamination was associated with the warehouse buildings along with a small area of surface soils. A Record of Decision (ROD) for the radiation contamination operable unit (OU) 1 was signed in September 2000; the Remedial Design (RD) was completed in 2001; and, the Remedial Action (RA) was initiated in November 2002 by the EPA. Building demolition and the final inspection were both completed.

In addition to defining the remaining radiological contamination, the RI also determined that chemical contamination existed at the site due to a history of various industrial practices. Samples taken during the RI showed significant levels of vinyl chloride, cis-1,2-dichloroethene, trichloroethylene, tetrachloroethylene, benzo[a]pyrene, aluminum, iron, mercury, as well as numerous other metals in the soil, sediments, groundwater, and surface water, at the site. To determine the full extent of this problem, a Phase III RI/FS for chemical contamination OU2 was initiated in 2001. The ROD for chemical contamination operable unit was signed by the EPA in September 2002 and the State conditionally concurred. The EPA initiated Treatability Study activities in the summer of 2003 with the final round of sampling conducted in January 2004.

The EPA completed the soil excavation activities portion of the RA at the site in August 2004. The groundwater work began in June 2004 with the injection of hydrogen releasing compound completed by mid-August. Quarterly groundwater sampling was conducted through April 2007 to evaluate the effectiveness of the selected groundwater remedy.

In May 2007, the Harbor Shores redevelopment project was initiated. The development encompasses 530 acres that spans parts of Benton Harbor, St. Joseph, and Benton Township. The new development would include new homes, space for new businesses, a hotel/conference center, a Jack Nicholas Signature golf course, indoor water park, marina, parks, and new green space. The Aircraft Components site was included in the new golf course, designated as Hole 14. Grading and relocation of the soil on the site was completed in late fall of 2007. Two follow-up hydrogen releasing compound injections into the contamination source area were completed in November 2007 and March 2008.

The EPA wrote the Five-Year Review (FYR) which was signed on August 11, 2008. The FYR concluded for the radiation contamination OU the remedy was protective in both the short and long-term. For the chemical contamination operable unit, in the short-term, the remedy continued to be protective of human health and the environment but restrictions were needed to prevent the use of the groundwater, excavation, and interference with the remedy by future property residents. Long-term protectiveness would occur after institutional controls are implemented, maintained, and monitored. Institutional controls (ICs) were later placed on the site property in May 2012.

Both the EPA and the MDEQ reviewed and approved a Residential Use Demonstration Work Plan submitted by Harbor Shores in May 2009. Soil and methane gas sampling under this work plan was completed in August and November 2009. Review of the investigation results was completed in early 2010.

Quarterly groundwater sampling under the long-term RA resumed at the site in June 2008 and was reduced to semi-annual sampling in 2011.

Both the EPA and the MDEQ review of the Residential Use Demonstration Investigation report determined that two hot spots of elevated contamination were located in the site soil. In May 2010, Harbor Shores excavated one of the two hot spot areas and added clean soil and completed excavation and addition of clean soil in the second hot spot in September 2010.

With Harbor Shores moving forward with plans for residential redevelopment of the western half of the site, the EPA developed an Explanation of Significant Differences (ESD), which was signed on September 30, 2010. The ESD requires Harbor Shores to perform specific requirements prior to the redevelopment. The remedy modifications included in the ESD are the following: changes in the land use for portions of the property from commercial/industrial to limited residential; excavation and disposal of a limited quantity of contaminated soil; placement of a 12-inch cap of clean soil cover over the area where proposed residential development would be allowed; residential construction requirements; modifications to institutional controls to ensure adequate protection of future residential development; and, determination of the need for additional injections of hydrogen releasing compound to remediate the remaining groundwater contamination plume.

A Consent Decree between the EPA, Harbor Shores Development, D & L Sales, and the Department of Defense was approved in 2012. As part of the Consent Decree, settlement money from the Department of Defense was paid to the EPA. A restrictive covenant has been filed for the site property. The EPA developed, and the MDEQ reviewed and approved, a pilot study to conduct one additional bioremedy in-situ injection for the

remaining on-site source contamination. The pilot study was implemented and a full-scale injection was completed in 2014.

The full scale groundwater RA was implemented in March 2014, which the EPA considers to be the start of a new RA for the site. Completion of the remedy will be determined with future monitoring. To assess the extent of the groundwater contamination, the EPA installed three additional monitoring wells in the wetland area south of the Paw Paw River in an attempt to locate the groundwater plume boundary; however, the plume boundary is still not defined. As part of the full scale injection, the EPA installed additional monitoring wells on site, to monitor the effectiveness of the remedy.

A restrictive covenant was placed on the site property in 2012. MDEQ staff split groundwater samples with EPA contractors in September 2016 in efforts to determine accuracy in data to assess the effectiveness of the full scale sodium persulfate injection treatment for the groundwater. Venting groundwater was found to have acutely toxic levels of total dissolved solids.

The property was sold September 16, 2016, by Harbor Shores Land Development, LLC. to Darrow Properties. The new property owner submitted plans for a brewery warehouse and parking lot to EPA. Construction of the building began in July 2017.

SITE STATUS

Actions at this site continue to address threats to groundwater and to the Paw Paw River. MDEQ continues to evaluate the effectiveness of the sodium persulfate injection treatment from quarterly groundwater monitoring. MDEQ staff have requested EPA to perform acute whole effluent toxicity tests for total dissolved solids in 2018 to determine if there are potential threats to surface water from venting groundwater. MDEQ staff will work with EPA to ensure that approriate land use restrictions are in place for parcels with groundwater impacts above appropriate clean up levels.

MDEQ staff will evaluate the effectiveness of the vapor intrustion barrier to protect future workers in the warehouse building.

The 2018 FYR of the protectiveness of the RA will be conducted. MDEQ staff will provide comments to EPA on the draft FYR.

ENFORCEMENT STATUS

The former property owner, D & L Sales, is considered non-viable in regards to undertaking necessary actions at the site. The Air Force has been identified by the EPA as a potentially responsible party due to their former ownership of the aircraft gauges. They declined to take on the response actions at the site, claiming budgetary and staffing constraints.

With the incorporation of the site as part of the Harbor Shores Development, the EPA negotiated a Consent Decree, Scope of Work, and ICs to allow for the redevelopment of the site. The Consent Decree was signed in 2012. Under the Consent Decree and Scope of Work, Harbor Shores Development agreed to replace all the monitoring wells damaged during the redevelopment, conduct a hydrogen releasing compound injection treatment in the source area soils, and allow the EPA and the MDEQ future access to the site to continue the scheduled groundwater monitoring sampling plus conduct any future hydrogen releasing compound injections which may be required to remediate the source contamination. The Consent Decree also designates Harbor Shores Development as a non-liable party and releases the developer from future liability costs. The property was sold to Darrow Properties in September 2016.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site
1	Radiation Contamination
2	Chemical Contamination

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The EPA wrote the FYR which was signed on August 11, 2008. The FYR concluded for the radiation contamination OU that the remedy was protective in both the short and long-term. For the chemical contamination operable unit, in the short-term, the remedy continued to be protective of human health and the environment but restrictions were needed to prevent the use of the groundwater and prohibitions against residential use, excavation, and interference with the remedy needed to be implemented. Long-term protectiveness will occur after ICs are implemented, maintained, and monitored.

Start Date: 12/01/2007 Primary Cost: $0 Source: Federal
End Date: 07/11/2008 Secondary Cost: $0 Source:

5 Year Review A Five-Year Review, written by the EPA, was completed on April 10, 2013. The MDEQ provided review and comments on the review and agreed that future response activities for the radiation contamination operable unit are protective for human health and the environment for short and long-term and that the long-term effectiveness for human health and the environment for the chemical contamination operable unit has not yet been determined. Additional evaluation after the groundwater RA is conducted, which began in 2014, will be needed to determine protectiveness.

Start Date: 07/01/2012 Primary Cost: $0 Source: Federal
End Date: 04/10/2013 Secondary Cost: $0 Source:

OPERABLE UNIT 1 : Radiation Contamination

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/15/2000**

The EPA ROD called for demolition of brick buildings and off-site transportation of debris. State funded 10 percent of RA cost under a Superfund State Contract.

OPERABLE UNIT 1 : Radiation Contamination

Response Accomplishments: Completed

Interim Response

The removal addressed the bulk of the radiation contamination. The aircraft dials and gauges were shredded and put into drums and taken off the site for appropriate disposal out of State.

Start Date: 09/16/1996	Primary Cost:	$6,169,000	Source: Federal
End Date: 09/28/2000	Secondary Cost:	$0	Source:

Remedial Investigation

Start Date: 06/28/1998	Primary Cost:	$339,000	Source: Federal
End Date: 09/25/2002	Secondary Cost:	$0	Source:

Remedial Design

Start Date: 11/21/2000	Primary Cost:	$10,000	Source: Federal
End Date: 07/29/2002	Secondary Cost:	$0	Source:

Remedial Action

Demolition of brick buildings and off-site transportation of debris. State funded 10 percent of RA cost under a Superfund State Contract. Final Report was completed and reviewed by the MDEQ.

Start Date: 11/04/2002	Primary Cost:	$2,089,800	Source: Federal
End Date: 07/31/2003	Secondary Cost:	$232,200	Source: State

OPERABLE UNIT 2 : Chemical Contamination

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/25/2002**

State provided conditional concurrence.

OPERABLE UNIT 2 : Chemical Contamination

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 09/30/2010**

With Harbor Shores moving forward with plans for residential redevelopment of the western half of the site, the EPA developed an ESD, which was signed on September 30, 2010. The ESD requires Harbor Shores to perform specific requirements prior to the redevelopment. The remedy modifications included in the ESD are the following: changes in the land use for portions of the property from commercial/industrial to limited residential; excavation and disposal of a limited quantity of contaminated soil (i.e., excavation of the second hot spot found during the Residential Use Demonstration investigation); placement of a 12-inch cap of clean soil cover over the area where proposed residential development would be allowed; residential construction requirements; modifications to ICs to ensure adequate protection of future residential development; and determination of the need for additional injections of hydrogen releasing compound to remediate the remaining groundwater contamination plume.

Response Accomplishments: Completed

Remedial Investigation RI dollars for the radiation contamination operable unit and the chemical contamination OU are combined and were not tracked separately.

Start Date: 02/01/2001	Primary Cost:	$0	Source: Federal
End Date: 06/28/2002	Secondary Cost:	$0	Source:

Remedial Design The EPA submitted the initial RD document addressing both soil and groundwater remedial actions in July 2003. The MDEQ reviewed and commented on the report. Based on that review, the EPA split the soil and groundwater remedies into two separate documents. The soil RD was completed in November 2003, the groundwater RD was completed in June 2004 following the completion of the groundwater Treatability Study Report in the spring of 2004.

Start Date: 09/26/2002	Primary Cost:	$0	Source: Federal
End Date: 03/17/2004	Secondary Cost:	$0	Source: Federal

OPERABLE UNIT 2 : Chemical Contamination

Response Accomplishments: In Progress

Remedial Action The Potentially Responsible Parties performed two hydrogen releasing compound injections in November 2007 and March 2008. The regular monitoring of groundwater at the site began in 2004 to evaluate the effectiveness of the selected groundwater remedy. Groundwater monitoring was suspended after April 2007 to allow the site to be redeveloped into a new golf course. Upon replacement of the monitoring wells removed due to redevelopment activities, quarterly groundwater sampling resumed in June 2008 and was reduced to semi-annual sampling in 2011. Two hot spots of contaminated soils were excavated and the area was backfilled with twelve inches of clean cover in May 2012. A deed restriction prohibiting excavation and use of the groundwater for the property was filed with the Berrien County Register of Deeds office in May 2012. MDEQ staff have commented on plans for a vapor intrusion barrier needed due to construction of a building on the property and stormwater retention pond construction specifications.

Start Date: 08/30/2003	Primary Cost:	$0	Source:
End Date: 06/30/2018	Secondary Cost:	$0	Source:

Remedial Action The EPA has implemented a full scale in-situ chemical oxidation process to address the remaining groundwater contamination on the site. The new remedy should also reduce and potentially eliminate methane generation as a byproduct of the new bioremedy. A pilot test was conducted in spring of 2013 with a full remedy injection which occurred in March 2014. Additional quarterly groundwater monitoring is being performed to determine the success of the injection to address groundwater contamination. An evaluation of the effectiveness of the injections to remediate groundwater will be conducted by the EPA and MDEQ staff. Property information for restrictive covenants is also being obtained by EPA and MDEQ staff on the south side of the Paw Paw River for areas known to be affected by groundwater contamination.

Start Date: 04/10/2013	Primary Cost:	$260,000	Source: Federal
End Date: 12/31/2018	Secondary Cost:	$4,000	Source: State

Response Accomplishments: Future Need

5 Year Review A FYR will be written by EPA, beginning approximately in July 2017 and be completed in mid 2018. The MDEQ will review and provide comments to determine if the response action for groundwater in the chemical contamination OU was successful and is protective for human health and the environment for the short and long-term.

Start Date: 07/01/2017	Primary Cost:	$0	Source: Federal
End Date: 06/30/2018	Secondary Cost:	$0	Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$9,078	$0	$9,078	$9,078	$9,078

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$16,553	$0	$0	$16,553	$410

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$17,334	$0	$0	$17,334	$0

Cooperative Agreement Number V995260-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$12,434	$0	$0	$12,434	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$21,400	$0	$0	$21,400	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$10,481	$0	$0	$10,481	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$57,883	$0	$0	$57,883	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$21,122	$0	$0	$21,122	$0

Cooperative Agreement Number V995261-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$27,778	$2,778	$0	$27,547	$0

Cooperative Agreement Number V995259-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Design	$10,000	$0	$0	$0	$0

Cooperative Agreement Number V995339-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$55,000	$0	$0	$54,980	$0
Totals:	$259,064	$2,778	$9,078	$248,812	$9,488

STATE SUPERFUND CONTRACTS

For Operable Unit 1 : Radiation Contamination : Open

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Action	$2,322,000	$232,200	$232,200	$0

For Operable Unit 2 : Chemical Contamination : Open

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Action	$3,500,000	$350,000	$350,000	$0
Totals:	$5,822,000	$582,200	$582,200	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Bendix Corp./Allied Automotive
3737 Red Arrow Highway
St. Joseph , MI

County: Berrien
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: AS
State Site ID#: 11000005
State Site Score: 26

LOCATION

The Bendix Corp./Allied Automotive Superfund site (Bendix site) is located at 3737 Red Arrow Highway, Lincoln Township, Berrien County, Michigan, approximately four miles south of the city of St. Joseph. The Bendix site is approximately 1/2 mile from the eastern shore of Lake Michigan, approximately 1/3 mile west of Hickory Creek, and bordered to the west by Red Arrow Highway.

The western groundwater contamination plume originates near the north parking lot at the Bosch plant (source location unknown) and travels to the northwest under Red Arrow Highway, under the Churchill Farms subdivision, and discharges into Lake Michigan approximately 25 feet from shore. The eastern groundwater contamination plume originates near the eastern loading dock area at the Bosch plant (former seepage lagoon) and migrates east and northeast of the plant, discharging into Hickory Creek north and south of Maiden Lane.

SITE HISTORY

The Bendix site was originally farm land but was developed in 1939 by the Nylen Products Corporation. The 36-acre facility consisted of an iron casting foundry and a machine shop. The Bendix Corporation (Bendix) purchased the property in 1952 and manufactured automotive braking systems. Allied Automotive purchased Bendix in 1983. Its successor, AlliedSignal, Inc., sold the facility to Bosch Braking Systems Corporation (Bosch), the current owner, in 1996. No baseline environmental assessment was conducted on the property.

Oil-based cutting fluids were used at the facility during the 1950s and 1960s. Water soluble cutting fluids were used beginning in 1967. Chlorinated solvents were reportedly used in the 1960s and 1970s. From 1965 to 1975, foundry dust collector and machine shop oily wastewaters were disposed into three unlined lagoons: (1) foundry "A" lagoon, (2) south lagoon, and (3) the loading dock lagoon. The wastewater contained chlorinated organic solvents, electroplating wastes, and heavy metals. Between 1975 and 1978, the foundry "A" lagoon and the loading dock lagoon were closed and their contents were disposed into the south lagoon. The south lagoon was closed in 1978 with the installation of an MDEQ approved clay cap.

Environmental investigations began at the Bendix site in 1975 when three groundwater wells were installed around the south lagoon. Over the years, Bendix/AlliedSignal/Bosch have conducted numerous investigations to evaluate the nature and distribution of industrial chemicals in soil, groundwater, surface water, and sediments associated with the Bendix site and neighboring properties. Industrial chemicals identified in the environment include trichloroethylene (TCE), arsenic, nickel, chromium, asbestos and lead, which are associated with the manufacture of braking systems.

As a result of industrial activities at the Bendix site and the influence of the natural groundwater divide in the area, two volatile organic compound (VOC) plumes have been

identified (eastern and western plumes) that extend beyond the property boundaries, discharging into Hickory Creek and Lake Michigan, respectively. The major site-related contaminants are primarily TCE and its biological degradation products. Contaminant levels exceed drinking water, groundwater/surface water interface (GSI), and surface water criteria. The eastern plume source is in the vicinity of the loading dock, creating a plume that extends northeast to its primary discharge zone along Hickory Creek. The western plume originates in the area of the north parking lot and extends to the northwest where it discharges to Lake Michigan. The closed south lagoon is located over the groundwater divide and continues to release low levels of industrial cutting oil residuals and chlorinated solvents to the groundwater.

A Record of Decision (ROD) was signed by the EPA on September 30, 1997. Based on the information available at the time, the MDEQ concurred with the remedy selected by the EPA. The preferred remedy for the western groundwater plume venting into Lake Michigan was monitored natural attenuation (MNA). The remedy chosen for the eastern plume venting into Hickory Creek was MNA for the groundwater contamination, with soil vapor extraction (SVE) technology to be implemented to remediate the source area identified near the loading dock area of the Bosch plant.

In the summer of 1998, Bosch conducted additional characterization of the eastern and western groundwater plumes. In 1999, the EPA and Bosch negotiated and agreed to a Statement of Work and Consent Decree for the construction and operation of an SVE system for the eastern plume source area and compliance monitoring wells in the eastern and western plumes.

During mid-1999 and early 2000, the MDEQ initiated an investigation to determine the zone of discharge of the two groundwater plumes to the open water sources. This study, as well as subsequent investigations, showed much higher levels of contamination in venting groundwater than were previously known, and that it was discharging much closer to shore than was previously believed. In the summer of 2002, Bosch completed a benthic invertebrate study to help determine the ecological effects of the plume discharge into Lake Michigan. No benthic organisms were found in the study or control areas, probably due to the disruption of the benthos in the high-energy surf area along the beaches. As part of their study, Bosch also collected pore water samples and lake water samples in the plume discharge area identified by the MDEQ. Their findings confirmed the work conducted by the MDEQ and also confirmed that there are areas where VOCs are present in the lake water column above the discharge in excess of surface water criteria. The MDEQ performed additional sampling in Lake Michigan during the winter of 2002/03 to further define the area(s) of contaminant discharge.

The last of 12 baseline rounds of quarterly sampling in the point of compliance wells was conducted during December 2003. The data from the point of compliance wells indicate that in most wells not associated with the western plume core, concentrations are decreasing slightly over time. Some of the wells in the core of the plume have been dramatically increasing in concentration, and at least one of the point of compliance wells has had consistent levels of VOCs above the site-specific mixing zone based chronic GSI criteria, occasionally above the acute GSI criteria established for the discharge. Unfortunately, none of Bosch's GSI point of compliance wells are monitoring the plume core. One GSI monitoring well cluster at the south edge of the plume has had increasing concentrations indicating a slight southerly movement of the plume. It is likely that this decreasing trend in concentrations found in the western plume point of compliance wells is an artifact of the lateral movement of the plume over time as evidenced in the movement of the discharge since 1999. This movement has caused the plume core to reside between the existing monitoring wells, thus necessitating the installation of additional point of compliance wells.

Recent data indicate an increase in VOC concentrations near the source area, which will probably translate to increasing concentrations within the plume as this source water moves downgradient.

In June 2003, the MDEQ performed a comprehensive sampling of the pore water in the western plume discharge area to define the areal extent and magnitude of the plume discharge. The results indicate that the core of the plume discharge was located approximately 50 feet south of the location identified in 1999, and that the plume is discharging concentrations of VOCs approximately twice the levels found in 1999.

The EPA completed its First Five-Year Review (FYR) evaluation of the site in 2004. The findings of this review identified a number of action items to be performed to ensure that the site remedy was addressing all contaminants. This FYR was generally supported by the MDEQ.

In conjunction with the 2004 FYR conclusions, the potentially responsible party (PRP) replaced several monitoring wells, installed four monitoring well clusters near Lake Michigan (representing the far northern portion of the plume discharge), and compiled historical data from the site. The PRP was not able to install the monitoring wells across the plume core as recommended in the 2004 FYR.

The Michigan Department of Community Health (MDCH) has been involved in reviewing the potential human health effects of the plume discharge at the beach. A preliminary health assessment was conducted by the MDCH in 2001 and 2002, and was revised in 2005, for release in 2007. The MDCH study concluded that there is an "indeterminate public health hazard" associated with the plume discharge, and recommends that annual notifications be sent to individual residents, additional monitoring be performed, and that activity-based sampling be performed in the area of discharge to better quantify the risks posed by the discharge.

Due to ongoing exceedances of criteria in the point of compliance wells, the PRP submitted a work plan to install three extraction wells and two additional monitoring well clusters to be used to effect a "mass reduction" in the source area. This extraction was proposed without the monitoring necessary to determine its effectiveness, and without the GSI monitoring mandated by state regulations.

In September 2008, the PRP installed three small capacity extraction wells and two monitoring well clusters. The MDEQ requested that the PRP install additional source area monitoring wells to provide an infrastructure capable of monitoring the effects of the PRP's source control efforts. This request was not supported by the EPA and was rejected by the PRP. Thus, the MDEQ has installed a monitoring network representative of the groundwater directly downgradient of the source area and also near the point where the contaminated groundwater discharges to Lake Michigan.

In February 2009, the EPA issued an Explanation of Significant Differences (ESD) for the site, modifying the ROD remedy to include Bosch's near-source groundwater extraction system as part of the remedy.

The EPA prepared a Second FYR report for the site in 2009. The only recommendation from this review was for Bosch to implement its contingent remedial action (RA). The MDEQ provided extensive comments to this Review, most of which were not incorporated. The MDEQ's concerns were further expressed to the EPA, Region 5 Administrator, in correspondence from the MDEQ Director. The EPA had not adequately addressed these concerns in subsequent years.

In August 2009, Bosch started operation of its new source area groundwater extraction system. The entire system pumps about 20 gallons per minute of groundwater and was anticipated to extract 30 pounds of contamination per month. The source area near the Bosch plant has not been adequately characterized; therefore, it is impossible to predict whether the system will be effective or how long it may need to operate. From August 2009 to December 2014, about 1,032 pounds of contaminants were removed from the source area. Despite a series of problems associated with the operation of this pump and treat system, most of these operational problems have been overcome and the system is in operation a majority of the time.

The MDEQ requested and received voluntary access from Shoreham Village and installed three nested monitoring wells within the roadway of Churchill Farms (owned by the Village) in 2012 to be sampled for groundwater and soil vapor. The new monitoring wells were installed in the core of the plume and have documented the most elevated levels of contaminated groundwater at the site to date.

In December 2013, the Churchill Farms Condo Association sent a letter and report to the EPA and MDEQ requesting additional assessment work to further evaluate risks at the site. The MDEQ has gone on record supporting the condo association's request.

The EPA prepared the Third FYR report for the site in April 2014. This five-year review included recommendations from the EPA to the PRP to conduct soil vapor monitoring along the core of the western plume, installation of additional monitoring wells along Red Arrow Highway to evaluate the effectiveness of the groundwater extraction and treatment system, conduct annual monitoring of beach conditions along the Churchill Farms beach to evaluate the potential for human exposure to site contaminants, conduct a mass flux analysis to determine the effectiveness of the groundwater extraction and treatment system, and to develop an Institutional Control Implementation and Assurance Plan.

Six new monitoring wells were installed by the PRP to satisfy the EPA recommendation in the 2014 FYR to install additional monitoring wells to evaluate the effectiveness of the groundwater extraction and treatment system. These wells, in addition to the existing wells, represent a transect across the plume to conduct a mass flux calculation on an annual basis.

Based upon the four rounds of soil vapor sampling that have been completed on the MDEQ wells that were installed in 2012, soil gas vapors are present in the soil at the Churchill Farms subdivision. However, this was a limited investigation and was not intended to adequately assess the vapor intrusion (VI) pathway at this site to determine if a human health risk is present.

SITE STATUS

The PRP, in conjunction with EPA, determined that it is approriate to do further investigation of the potental VI in Churchill Farms subdivision. A draft plan for conducting the VI pathway in Churchill Farms was submitted in 2016 and a final copy was submitted in the fall of 2017. Soil gas wells were installed in the subdivision and one round of sampling has been completed. The analytical results were non-detect for site related contaminants. An additional rounds of sampling will take place in 2018.

The PRP is in the process of implementing the EPA recommendations contained in the 2014 FYR. In addition to the VI study discussed above, the recommendations included performing an activity based risk assessment on the beach at the Churchill Farms subdivision. The PRP has developed a draft work plan for this activity.

The newly installed six monitoring wells were monitored for the first time in April 2015 and

the PRP is continuing the monitoring of the site groundwater on a quarterly basis.

MDEQ and EPA are collaborating on developing a revised conceptual site model in order to evaluate the protectiveness of the current remedy. Although screening for vapor intrusion has commenced at Churchill Farms, VI issues near the factory and surrounding properties has never been evaluated. The magnitude of the dense non-aqueous phase liquid at the northern source area still needs to be determined. Plume configurations and groundwater flow directions contradict each other under the existing conceptual site model.

ENFORCEMENT STATUS
In June 1988, the Bendix site was proposed by the EPA for inclusion on the National Priorities List (NPL). AlliedSignal, Inc., owner of the Bendix site at that time, was informed that it was potentially responsible for contamination at the Bendix site. On February 14, 1989, AlliedSignal, Inc., entered into a Consent Agreement with the EPA to conduct a remedial investigation/feasibility study (RI/FS). The Bendix site was officially listed on the NPL on February 21, 1990. Bosch and the EPA entered into a Consent Decree in 1999 for the implementation of the RA.

The MDEQ may elect to cost recover funds spent by the state to adequately monitor the plume and for measures to mitigate the discharge.

SPECIAL CONSIDERATIONS
Additional investigation of the site has been identified through the process of development of a conceptual site model. The conceptual site model is being developed in collaboration with the EPA and the PRP will be given the opportunity to review and comment on the model. From the intial work it appears that groundwater contamination, source volume and distribution, potential vapor intrusion by volatile contaminants, and the full suite of contaminant released at the site are not adequately characterized. Potential risks from these problems that have been identified cannot be evaluated until more characterization of the site is complete.

OPERABLE UNITS

00	Entire Site
1	Eastern Plume, SVE, Monitored Natural Attenuation
2	Western Plume, Monitored Natural Attenuation
3	Western Plume, Contingent RA

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/1997**

The groundwater remedy for the eastern and western groundwater plumes is monitored natural attenuation. For the eastern plume only, the treatment for the soil is SVE.

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 1 **Effective 02/19/2009**

An ESD that presents the EPA's rationale for requiring the installation of a groundwater extraction and treatment system to reduce contaminant loading from the source of the western plume and enhance the effectiveness of natural attenuation was signed on February 19, 2009.

Response Accomplishments: Completed

Remedial Investigation RI conducted to determine the nature and extent of contamination.

Start Date: 02/01/1989	Primary Cost:	$250,000	Source:	Private
End Date: 07/31/1997	Secondary Cost:	$0	Source:	

Remedial Design

Start Date: 04/14/1999	Primary Cost:	$75,000	Source:	Private
End Date: 06/17/1999	Secondary Cost:	$0	Source:	

5 Year Review The EPA, in consultation with the MDEQ, concluded in the 2004 FYR that monitored natural attenuation (MNA) was not working as expected, additional monitoring wells needed to be installed, certain monitoring wells needed replacing, and that there was not an unacceptable human health risk associated with the western plume discharge.

Start Date: 06/01/2004	Primary Cost:	$123,000	Source:	Federal
End Date: 09/01/2004	Secondary Cost:	$0	Source:	

5 Year Review The Second FYR found that the remedy is currently protective of human health and the environment in the short term. The state disagreed with this assessment and detailed our concerns to EPA upper management. They were not addressed within the FYR.

Start Date: 09/09/2008	Primary Cost:	$0	Source:	
End Date: 08/18/2009	Secondary Cost:	$0	Source:	

5 Year Review The Third FYR found that the remedy is currently protective of human health and the environment in the short term. The state disagreed with this assessment and detailed our concerns but they were not addressed within the FYR. At EPA's request, the PRP is currently preparing work plans to implement recommendations for another activity based risk assessment for the Churchill Farms beach area and for an investigation to screen for VI in the Churchill Farms area. Cooperation with MDEQ has improved in recent months and some of our concerns are being addressed in the new work plans.

Start Date: 01/22/2014	Primary Cost:	$0	Source:	
End Date: 04/14/2014	Secondary Cost:	$0	Source:	

OPERABLE UNIT 00: Entire Site

Response Accomplishments: In Progress

Remedial Investigation This RI includes the vapor intrusion investigation at the Churchill Farms Subdivision, located to the west of the site. The inital round of VI sampling took place in October 2017 and additional sampling rounds will take place in the future. The cost associated with this is being incurred by the PRP and the cost is unknown to the MDEQ.

Start Date: 10/09/2017	Primary Cost:	$0	Source:
End Date: 09/28/2018	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

5 Year Review

Start Date: 09/01/2018	Primary Cost:	$0	Source:
End Date: 04/12/2019	Secondary Cost:	$0	Source:

OPERABLE UNIT 1 : Eastern Plume, SVE, Monitored Natural Attenuation

Response Accomplishments: Construction Complete

Remedial Action SVE and MNA were chosen for remediation of the eastern plume. The SVE was installed near the eastern Bosch loading dock and seems to be effective. MNA of the groundwater is ongoing.

Start Date: 06/17/1999	Primary Cost:	$606,000	Source: Private
End Date: 12/13/2000	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance The eastern plume SVE system seems to be effective in removing VOCs from the source area soils. The groundwater VOC concentrations downgradient from the source have been increasing lately and have recently been found in previously unimpacted areas of this part of the site which will need additional evaluation, possible additional characterization, and perhaps remediation.

Start Date: 12/13/2000	Primary Cost:	$2,612,000	Source: Private
End Date: 09/30/2050	Secondary Cost:	$0	Source:

OPERABLE UNIT 2 : Western Plume, Monitored Natural Attenuation

Response Accomplishments: Completed

Remedial Action Installation of extraction well sytstem.

Start Date: 12/06/2007	Primary Cost:	$700,000	Source: State
End Date: 09/30/2008	Secondary Cost:	$0	Source:

OPERABLE UNIT 2 : Western Plume, Monitored Natural Attenuation

Response Accomplishments: Construction Complete

Remedial Action The western plume has been allowed to naturally attenuate per the 1997 ROD. Post-construction information regarding the plume discharge has caused this decision to be modified, and a more active in-situ RA has been initiated, but has not yet been shown to be effective. Small amounts of contaminant mass have been recovered from the groundwater but the contamination levels emanating from the site are unchanged and have been shown to increase in the southern portion of the plume.

Start Date: 06/17/1999	Primary Cost:	$150,000	Source:	Private
End Date: 12/13/2000	Secondary Cost:	$0	Source:	

Response Accomplishments: Ongoing

Operation and Maintenance Groundwater sampling for MNA of the eastern and western plumes will continue indefinitely. Monitoring conducted to date demonstrates that alternate concentration levels have yet to be attained.

Start Date: 12/13/2000	Primary Cost:	$800,000	Source:	Private
End Date: 12/31/2050	Secondary Cost:	$0	Source:	

OPERABLE UNIT 3 : Western Plume, Contingent RA

Response Accomplishments: Construction Complete

Remedial Action Contingent RA for the western plume source area. The system consists of a small groundwater extraction and treatment system near the inferred source area.

Start Date: 09/14/2007	Primary Cost:	$1,250,000	Source:	Private
End Date: 09/15/2009	Secondary Cost:	$0	Source:	

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$16,939	$0	$16,939	$16,939	$16,939

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$45,367	$0	$0	$45,367	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$35,722	$0	$0	$35,722	$0

Cooperative Agreement Number V995258-03 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$14,515	$0	$0	$14,514	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$11,868	$0	$0	$11,868	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$5,204	$0	$0	$5,204	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$42,139	$0	$0	$41,733	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$20,210	$0	$0	$20,210	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$14,621	$0	$0	$14,621	$6,152

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$5,000	$0	$0	$538	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$140,846	$0	$0	$133,086	$0
Totals:	$352,430	$0	$16,939	$339,801	$23,091

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Electrovoice, Inc.
600 Cecil Street
Buchanan , MI

County: Berrien
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: E8
State Site ID#: 11000010
State Site Score: 29

LOCATION
The Electrovoice, Inc. site (the site) is an 11.5-acre parcel in Buchanan Township, Berrien County, and is located at 600 Cecil Street, Buchanan, Michigan. The area surrounding the site is primarily residential. McCoy Creek, a tributary to the St. Joseph River, is approximately two thousand feet from the source of contamination.

SITE HISTORY
Mark IV Dayco Products, Inc., (formerly Electrovoice, Inc.), is the current owner of the property; however, Electrovoice, Inc. (the potentially responsible party [PRP]) assumes responsibility for any site-related remediation. Activities at the site included assembly; die casting; machining; painting; electroplating; and research and development. Electrovoice, Inc. used two on-site seepage lagoons for discharge of plating waste from 1952 to 1962. In 1962, the use of these lagoons was discontinued and the wastes were removed. From 1964 to 1973, paint wastes and solvents from the plant glue shop were discharged to a drywell.

In 1979, an industrial sewer line broke, resulting in the discharge of an unknown quantity of plating wastes into the abandoned lagoons. Electrovoice, Inc. responded immediately by having the effluent treated and removed, repairing the line, and installing a holding tank to prevent future incidents from occurring. In addition, Electrovoice, Inc. installed four monitoring wells around the lagoons. In 1980, sampling revealed groundwater contaminated with lead, xylene, and toluene, as well as trichloroethylene. In September 1983, the site was placed on the National Priorities List.

In 1987, Electrovoice, Inc. entered into an Administrative Order by Consent (AOC) with the EPA to conduct a remedial investigation/feasibility study (RI/FS). They completed the RI in 1990. However, in 1991, they failed to revise the draft FS report consistent with the requirements of the National Contingency Plan. The EPA completed the FS in 1991.

The EPA decided to divide the site work into two operable units (OUs) with OU1 consisting of on-site soils and the lagoons, and OU2 consisting of the off-site groundwater plume. The on-site soils remedy consisted of a hazardous waste landfill cap placed over the lagoon area after excavation and consolidation of contaminated soils, a soil vapor extraction (SVE) system for the contaminated soil in the drywell area, and a groundwater pump and treat system for on-site groundwater contamination. In addition, the off-site groundwater would be monitored for five years. The EPA issued the Record of Decision (ROD) for the on-site soils on June 23, 1992. In April 1993, the EPA updated that ROD in an Explanation of Significant Difference (ESD).

In March 1993, an innovative technology demonstration project began on the site using a subsurface volatilization and ventilation system (SVVS) to remediate both the soils and groundwater on the site. This system was being evaluated as a potential remedy instead of the SVE remedy required in the ROD.

In 1994, a pre-design investigation was conducted to determine the vertical and horizontal

extent of contaminated soils in the former lagoon area. Upon review of the SVVS technology performance on-site, the EPA, with state concurrence, issued another ESD to the 1992 ROD, in May 1995. This ESD selected the SVVS as the remedy for the drywell area soils, and the on-site groundwater instead of the technologies stated in the ROD. In April 1996, the EPA, with state concurrence, issued another ESD to the ROD which revised cleanup standards to incorporate changes in the Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 201).

Excavation and removal of waste fluids and contaminated soils from the former lagoon area were completed in August 1996. In 2003, review of the cumulative groundwater data from the drywell and on-site lagoons indicated the contaminant concentrations were below the current cleanup criteria and that remediation of the on-site OU was complete. The final remedial action (RA) report for the on-site OU was written in 2003 stating remediation was complete. Operation of the SVVS was discontinued and a reduction of the number of monitoring wells to be sampled was implemented.

The groundwater monitoring required in the ROD for the on-site soils and lagoons provided data to evaluate the effects of on-site RA on off-site groundwater before selecting a final remedy for the off-site groundwater plume. The off-site groundwater had been monitored since 1993. Electrovoice, Inc. conducted an investigation to evaluate the off-site groundwater in 1998. The results of quarterly and annual groundwater monitoring and the additional off-site groundwater investigation were presented in a June 1999 Technical Memorandum for the Evaluation of Off-Site Groundwater. The EPA selected a remedy for the off-site groundwater plume and published the Proposed Plan in June 1999. The ROD was signed in September 1999. The state did not concur with this remedy as it ignored the heavy metals exceedances of the groundwater/surface water interface (GSI)/mixing zone determination criteria into McCoy Creek. The components of the selected remedy were natural attenuation via stream capture and dilution with some biodegradation, institutional controls, monitoring, and contingency actions. The additional studies called for in the off-site groundwater plume ROD included: further definition of the plume in the vicinity of McCoy Creek, documentation that natural attenuation was occurring in the plume, and characterization of the inorganic component of the plume. These studies were completed in 2003. A draft Consent Decree (Decree) between the EPA and Electrovoice, Inc. and a draft Statement of Work for the Remedial Design (RD) for the off-site groundwater plume were written and reviewed in 2001. Both documents were finaled in 2002. The initial groundwater study, which included sampling all of the monitoring wells, was conducted in September 2002. The EPA completed a Five-Year Review (FYR) report in 2001. The report recommended closure for the on-site soils OU, but continued monitoring and development of the groundwater monitoring well network for the off-site groundwater plume.

The Long-Term Natural Attenuation Monitoring Plan was finaled in 2005 and implementation began in March 2005. The Long Term Natural Attenuation Monitering Plan required groundwater sampling of selected monitoring wells every six months for three years, through 2007, after which a re-evaluation of the data would determine if the selected monitored natural attenuation (MNA) remedy should continue, or if the remedy should be altered.

The Second FYR for the Electrovoice, Inc. site was completed in 2006. A revised Declaration of Restrictive Covenant was developed to restrict access to the area groundwater via private drinking water wells. Decreases in concentrations of the volatile organic compounds (VOCs) and heavy metals, specifically mercury and zinc, had been documented.

The EPA completed the Third FYR for the Electrovoice, Inc. site in 2011. As noted in the

Second FYR, there was a continued documented decrease in the concentrations of the VOCs and heavy metal contamination in the off-site groundwater. Therefore, the groundwater sampling schedule was reduced from semi-annual to annual beginning in 2012. The remedy continues to be protective of human health and the environment.

The EPA, with assistance from the MDEQ, developed the Fourth FYR which was completed in May 2016. As noted in the previous FYR report (2011), review of the groundwater data documented the continuous decrease in the concentrations of VOCs although some exceedances of criteria remain. Heavy metals concentrations were below criteria or non-detect. The remedy continues to be protective of human health and the environment.

SITE STATUS

Groundwater monitoring is currently performed on an annual basis. The MDEQ will continue to review and comment on the annual report documents.

ENFORCEMENT STATUS

Electrovoice, Inc. remains the PRP for the site and is responsible for cleanup. On October 8, 1987, an AOC was agreed to by Electrovoice, Inc. and was signed by the EPA. The AOC required Electrovoice, Inc. to conduct an RI/FS to determine the nature and extent of contamination. In September 1993, a Decree between the EPA and Electrovoice, Inc. and a Statement of Work for the RD/RA for the on-site soils and lagoons, was filed with the United States District Court. A Decree, Statement of Work, and RD/RA between the EPA and Electrovoice, Inc. for the off-site groundwater plume were filed with the United States District Court on February 25, 2001.

SPECIAL CONSIDERATIONS

The successors to the Electrovoice, Inc. liability informed the EPA of their intent to close the plant site and sell the property. Sale of the property was completed by June 2002. At the current time, the facility is unoccupied. The PRP completed negotiations with the EPA to ensure funds will be made available to continue with the RD and long-term Operation and Maintenance (O & M) monitoring requirements as specified in the ROD and in the Long-Term Remedial Action (LTRA).

OPERABLE UNITS

00	Entire Site
01	On-Site Soils/Lagoons
02	Off-Site Groundwater Plume

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The FYR report was written by the EPA. The MDEQ was responsible for reviewing and providing comments on the report. The report recommended closure of the on-site soils OU, but continued monitoring and development of the groundwater monitoring well network for the off-site groundwater plume.

Start Date: 01/01/2001 Primary Cost: $0 Source: Federal
End Date: 09/28/2001 Secondary Cost: $0 Source:

5 Year Review The Second FYR was written by the EPA. The MDEQ was responsible for reviewing and providing comments on the report. The report recommended that the current LTRA continue and included a revised Declaration of Restrictive Covenant to restrict access to the groundwater by private wells within the contamination plume boundary.

Start Date: 01/09/2006 Primary Cost: $0 Source: Federal
End Date: 09/30/2006 Secondary Cost: $0 Source:

5 Year Review The Third FYR was written by the EPA. The MDEQ was responsible for reviewing and providing comments on the report. The report recommended that the current LTRA continue under a modified sampling schedule. Beginning in 2012, and for the next five years, groundwater sampling will be conducted annually with development of one annual report per year. The remedy continues to be protective of human health and the environment.

Start Date: 01/01/2011 Primary Cost: $0 Source: Federal
End Date: 09/20/2011 Secondary Cost: $0 Source:

5 Year Review EPA began development of the Fourth FYR in September 2015. The Fourth FYR was completed in May 2016. As in the previous FYR report (2011), review of the groundwater data documented a continous decrease in the concentrations of VOCs although some exceedance of criteria remain. Heavy metals concentrations were below criteria or non-detect. The remedy coninues to be protective of human health and the environment.

Start Date: 09/01/2015 Primary Cost: $0 Source: Federal
End Date: 05/01/2016 Secondary Cost: $0 Source:

Response Accomplishments: Future Need

5 Year Review The fifth FYR, to be developed by the EPA, will be due by May 1, 2021.

Start Date: 05/01/2020 Primary Cost: $0 Source: Federal
End Date: 05/01/2021 Secondary Cost: $0 Source:

OPERABLE UNIT 01: On-Site Soils/Lagoons

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 01/23/1992**

On-site soils were to be treated by an SVE system. The 2001 FYR recommended that operation of the SVE be terminated because on-site treatment was complete.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 04/24/1993**

An ESD was signed in April 1993 proposing to modify the ROD selected remedy from a SVE to an SVVS, an innovative technology remedy.

Record of Decision *Amendment:* 0 *ESD:* 2 **Effective 05/01/1995**

A second ESD was signed in May 1995 selecting the SVVS remedy for the on-site soils and lagoons OU.

Record of Decision *Amendment:* 0 *ESD:* 3 **Effective 04/24/1996**

A third ESD was signed in April 1996 to incorporate the new Part 201 cleanup criteria into the ROD.

Response Accomplishments: Completed

Remedial Investigation The EPA conducted an RI/FS.

Start Date: 09/04/1987	Primary Cost:	$159,000	Source:	Federal
End Date: 10/08/1987	Secondary Cost:	$0	Source:	

Remedial Investigation The PRP conducted an RI/FS with federal oversight.

Start Date: 10/08/1987	Primary Cost:	$0	Source:	Private
End Date: 06/24/1992	Secondary Cost:	$228,000	Source:	Federal

Remedial Design The PRP conducted the RD with federal oversight.

Start Date: 09/29/1993	Primary Cost:	$0	Source:	Private
End Date: 05/24/1996	Secondary Cost:	$263,000	Source:	Federal

Remedial Action The PRP conducted a RA with federal oversight.

Start Date: 05/01/1996	Primary Cost:	$0	Source:	Private
End Date: 03/17/1997	Secondary Cost:	$162,000	Source:	Federal

Operation and Maintenance The SVVS system was discontinued as treatment for the on-site soils and lagoons, and was considered complete in the 2001 Five-Year Review of the site.

Start Date: 08/01/1996	Primary Cost:	$0	Source:	Private
End Date: 09/01/2001	Secondary Cost:	$0	Source:	

OPERABLE UNIT 01: On-Site Soils/Lagoons

Response Accomplishments: Completed

Operation and Maintenance Monitoring well sampling specifically for the lagoons was discontinued in 2003 as treatment for the on-site soils and lagoons was considered complete in the 2001 FYR.

Start Date: 08/01/1996	Primary Cost:	$0	Source: Private
End Date: 12/30/2003	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: Off-Site Groundwater Plume

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/21/1999**

The off-site groundwater plume, is being treated by MNA. The state did not concur with this remedy as it ignores the heavy metals exceedances of the GSI/mixing zone determination criteria into McCoy Creek.

Response Accomplishments: Completed

Remedial Investigation The EPA conducted the RI/FS.

Start Date: 09/15/1992	Primary Cost:	$79,000	Source: Federal
End Date: 09/21/1999	Secondary Cost:	$0	Source:

Remedial Design

Start Date: 04/12/2001	Primary Cost:	$0	Source: Private
End Date: 09/19/2003	Secondary Cost:	$6,000	Source: Federal

Remedial Action Install additional monitoring wells.

Start Date: 09/19/2003	Primary Cost:	$0	Source: Private
End Date: 12/30/2003	Secondary Cost:	$5,000	Source: Federal

Long Term Remedial Action The LTRA consisted of semi-annual sampling of the monitoring wells. It began in 2004 and was completed in 2011.

Start Date: 10/01/2004	Primary Cost:	$0	Source: Private
End Date: 12/31/2011	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance O & M operations began in 2012 based on the information gathered from the LTRA phase reviewed in the 2011 FYR. The MNA remedy has proven to be effective. In 2012, O & M began with annual groundwater monitoring in a reduced number of wells.

Start Date: 01/01/2012	Primary Cost:	$0	Source: Private
End Date: 12/31/2043	Secondary Cost:	$0	Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$771	$0	$771	$771	$771

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$916	$0	$0	$916	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$6,294	$0	$0	$6,294	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$35,371	$0	$0	$35,371	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$4,831	$0	$0	$4,831	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$7,426	$0	$0	$7,426	$0

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$20,000	$0	$0	$20,000	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$1,251	$0	$0	$1,251	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$3,263	$0	$0	$3,263	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$105,000	$0	$0	$104,950	$0

Cooperative Agreement Number V995339-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$9,893	$0	$0	$9,893	$0
Totals:	$195,016	$0	$771	$194,966	$771

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Bronson Reel Company
505 N. Douglas Street
Bronson , MI

County: Branch
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: B5
State Site ID#: 12000018
State Site Score: 31

LOCATION
The Bronson Reel Company site is located at 505 N. Douglas Street in Bronson, Michigan. The former facility is currently owned by Borg Warner.

SITE HISTORY
The Bronson Reel Company site is one of three former manufacturing facilities located in the city of Bronson that were considered to be part of the North Bronson Industrial Area (NBIA) Superfund site (site) at one time. The two other sites are the Scott Fetzer Corporation site and the L.A. Darling site. In September 1993, the EPA redefined the boundaries of the NBIA site and excluded a significant portion of the area, including these three former facilities and contamination emanating from them, from the site description. By this time, sufficient data had been gathered in the vicinity of these facilities during the NBIA site Remedial Investigation (RI) to determine that a strong liklihood existed that each of the former manufacturing facilities was a source of contamination. Following extensive negotiations with the potentially responsible party (PRP) for each facility, it was decided that each PRP would conduct an RI/Feasibility Study (FS) at their site. The EPA refers to these three former manufacturing facilities collectively as the North Bronson Former Facilities (NBFF). To differentiate between sites, each facility is considered an Operable Unit (OU); Numbers 1, 2, or 3. Bronson Reel is OU1. For details on the other NBFF or the NBIA site, see individual Legislative Reports.

Bronson Reel Company actually began operations in 1922 when two local residents sold stock locally to begin a small fishing reel manufacturing operation in Bronson. The firm was located at 123 North Matteson Street initially. The company outgrew this and a subsequent location until in 1929 they built a new facility at Douglas and State Streets in Bronson. Early operations included plating and machining of small parts used to make fishing reels and other precision components. The Bronson Reel Company survived the depression years and, except for the years during WWII when the company made parts for bomb sights, the company continued to be locally owned and made fishing reels. In 1946, the Higbie Manufacturing Company purchased the Bronson Reel Company. During the late 1940s, several additions were made to the original plant. The company maintained their own tool room where they produced all their own dies, tools, and fixtures. The plating department was enlarged during this time as well. In 1963, Higbie Manufacturing Company sold its Bronson Reel division including the Bronson site to Bronson Specialties, Inc. Following the sale, the production of fishing reels declined and eventually terminated in 1968. Although plating operations were discontinued in 1968, metal tooling and other manufacturing operations were continued by Bronson Specialties, Inc. and Bronson Precision Products, Inc. until at least the early 1990s. The current property owner is Borg Warner, and no manufacturing operations are reported to be conducted currently at the site, although Bronson Precision Products, Inc. has used, and may currently be using, the buildings to store a limited amount of equipment.

Bronson Reel Company discharged liquid wastes to the city-owned western lagoons via the city's industrial sewer line from 1939 until 1968. According to file records, they never

discharged to the lagoons known as the eastern lagoons. The seepage lagoons are part of the NBIA Superfund site.

On June 14, 1988, the MDEQ inspected the site and subsequently issued a list of required corrective actions. In their follow-up letter, the MDEQ instructed the company to contain waste storage drums and metal shavings properly and to remove soils affected by spilled or leaking cutting oils. Through a series of response activities, the company removed a reported 10,440 tons of soil as well as an underground oil storage tank, an oil-water separator, and a portion of the abandoned Bronson industrial sewer that was located along the northern edge of the property.

A hydrogeologic investigation was performed by the property owners in 1988 as directed by the MDEQ. This investigation included the installation of six shallow groundwater monitoring wells. It was determined that groundwater was moving in a northwesterly direction and that low levels of some volatile organic compounds and metals were present.

In 1998, during a phase of the RI being conducted at the NBIA Superfund site, significant concentrations of the solvent trichloroethylene (TCE) were detected in groundwater samples north and northwest of the former Bronson Reel Company.

The PRP for the former Bronson Reel Company site entered into an Administrative Order by Consent with the EPA to conduct a streamlined RI/Focused Feasibility Study (FFS) at the site on September 30, 2002.

The PRP retained Fletcher Driscoll and Associates to conduct a streamlined RI at the site to determine whether it was a source of TCE contamination in the groundwater. A draft streamlined RI report was submitted in November 2004. RI data indicate the former Bronson Reel Company is not currently contributing to the TCE contamination in groundwater at this site. However, it was further determined that there was no way to demonstrate that the former facility had not contributed to groundwater contamination in the past. Because of the extensive excavation work that was done in the late 1980s no significant soil contamination was detected on-site where soils were accessible. It was further determined that the Record of Decision (ROD) would address soils only to facilitate the decision process. The revised streamlined RI report was approved in 2005.

The FFS was approved in 2006. A ROD for soil only was signed in September 2006. The ROD calls for deed restrictions to ensure that, if in the future the buildings and foundations remaining on the site are removed, the soil beneath the buildings will be investigated to see if any contamination remains on-site in areas currently inaccessible. The EPA is pursuing the preparation and filing of the deed restrictions. Use of groundwater from beneath this property will be restricted due to contamination throughout the industrial area.

A draft Restrictive Covenant (RC) as stipulated in the ROD was submitted to the Agencies in 2010 and the MDEQ provided comments to the EPA. The city of Bronson has expressed interest in having the buildings on the Bronson Reel property demolished due to their state of disrepair.

In 2012, the MDEQ became aware that the concrete foundation at the Bronson Reel location may be of questionable competency. In response to this information, the EPA later indicated a potential need for modification to the ROD to address this change in site conditions. To clarify, the original ROD indicated that additional sampling and possible soil removal would only need to occur if the concrete foundation was disturbed during a future demolition. Now, because the concrete foundation may be of questionable competency, any demolition of the building may also necessitate the removal of the concrete foundation, triggering additional

foundation footprint. This means that the draft RC should wait to be finalized until the EPA determines and implements a revision to the ROD so that the final RC is consistent with the ROD and ensures adequate protection.

On March 19, 2014, the EPA agreed to do the following to resolve the RC at Bronson Reel:

1) The EPA will write a letter to the file clarifying the need to maintain the foundation;
2) The EPA will secure enforcement mechanism with the PRP to ensure the draft RC gets implemented and monitored and the foundation maintained; and
3) The EPA will follow up with the PRP to see if they will voluntarily sample under the building and evaluate vapor intrusion (VI) concerns.

Without MDEQ agreement, the EPA assisted in the execution of a RC on the former Bronson Reel property which identifies the MDEQ as the grantee and does not require foundation maintenance or protection against VI. The RC was recorded with the Branch County Register of Deeds on September 9, 2014, and prohibits (among other things): activities contrary to due care, interference with response activities, disturbance of the building foundations (with exceptions), exposure of sub-slab/foundation soils (with exceptions), consumption of on-site groundwater.

At the end of 2015, the city of Bronson expressed interest in attaining the property. MDEQ has informed them of the benefit of conducting a Baseline Environmental Assessment (state level) and securing a prospective purchaser agreement (federal level) prior to acquiring the property to limit their liability. MDEQ has also requested EPA offer services to facilitate the prospective purchaser agreement. As of December 2016, the city is no longer interested in the property because the business across the street went bankrupt.

In 2015, the property owner (Borg Warner) demolished the dilapidated buildings at the Bronson Reel property and removed the debris. Newly stained soils were observed on the property during the demolition. Borg Warner sampled the stained soils. Sample results indicated 88,000 parts per million Diesel Range Organics. This was likely due to demolition equipment hydraulic line failure. In December 2015, Borg Warner removed the stained soils and collected two soil samples to verify contaminant removal. In December 2016, Borg Warner provided sample results for one (no other sample results provided) of the December 2015 samples that indicated 33,800 parts per million Diesel Range Organics and indicated additional soils were removed in September 2016. Borg Warner did not respond to MDEQ's request for information concerning post September 2016 excavation verification samples or results.

SITE STATUS

With the 2015 building demolition complete, the piece-meal foundation is exposed to the elements with no requirement for foundation maintenance. The EPA is evaluating enforcement options that would provide for 1) enforcement of ROD (investigate/remediate contaminated soils if foundation is removed), 2) maintain foundation, 3) evaluate/address VI (both on and off property), 4) develop and implement an Institutional Control plan and Operation & Maintenance plan (to maintain the foundation). In 2017, EPA changed project managers again, resulting in no additional action at the Bronson Reel former facility.

On September 13, 2017, MDEQ requested EPA evaluate the entire site for the potential for VI. Updated criteria warrant additional investigation for this potential exposure pathway.

ENFORCEMENT STATUS

None.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/26/2006**

The ROD is for soil only. It calls for deed restrictions to ensure that, if in the future the buildings and foundations remaining on the site are removed, the soil beneath the buildings will be investigated to see if any contamination remains on-site in areas currently inaccessible.

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$34,999	$0	$0	$34,999	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$152	$0	$0	$152	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$2,724	$0	$0	$2,722	$0
Totals:	$37,876	$0	$0	$37,874	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: L.A. Darling Subarea
Matteson and E. Railroad St.
Bronson , MI

County: Branch
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: B6
State Site ID#: 12000084
State Site Score: 45

LOCATION
The L.A. Darling site is located in the city of Bronson, Branch County, Michigan. The eastern boundary of the site is a line extending north on Buchanan Street to the Conrail Railroad Tracks. The railroad tracks form the north boundary, Matteson Street is the west boundary, and the south boundary is delineated by a line running parallel to Fillmore Street on the north side of D & L Tooling.

SITE HISTORY
The former L.A. Darling Company site is one of three former manufacturing facilities located in the city of Bronson that were considered to be part of the North Bronson Industrial Area (NBIA) Superfund site at one time. The other two sites are the Scott & Fetzer Corporation and Bronson Reel Company. In September 1993, the EPA redefined the boundaries of the NBIA site and excluded a significant portion of the area, including these three former manufacturing facilities and contamination emanating from them, from the site description. By this time, sufficient data had been gathered in the vicinity of these facilities during the NBIA site Remedial Investigation (RI) to determine that a strong likelihood existed that each of the former manufacturing facilities was a source of contamination. Following extensive negotiations with the potentially responsible party (PRP) for each facility, it was decided that each PRP would conduct an RI/Feasibility Study (FS) at their site. The EPA refers to these three former manufacturing facilities collectively as the North Bronson Former Facilities (NBFF). To differentiate between sites, each facility is considered an Operable Unit; Numbers 1, 2, or 3. L.A. Darling is Operable Unit 2. For details on the other NBFF or the NBIA site, see individual Legislative Reports.

The L.A. Darling site is located in the NBIA in the city of Bronson. The site is approximately 2.2 acres in size and comprised primarily of 4 city lots; Lot numbers 45, 46, 47, and 48 at the southern end of the NBIA. Historically, Lots 45 and 46 on the northern half of the site were separated from Lots 47 and 48 by East Railroad Street. Sometime between 1938 and 1950, the block of East Railroad Street which bisected the lots was abandoned to permit expansion of L.A. Darling. Railroad Street continues to exist both east and west of the L.A. Darling site.

Commercial and manufacturing activities date back to 1897 on some of the property known as the L.A. Darling site. In 1897, the R.N. Sanderson company operated a grain mill on the northern half of Lot 45. In 1909, August Visel went into business with Charles Conover and moved the Ideal Fixture Company, manufacturers of retail display hat stands, to Lot 46 located on the northeast corner of Matteson and East Railroad Streets. The name of the company was changed to Visel-Conover Company. By 1916, the grain mill had expanded, Visel-Conover Company continued to operate and the W.A. Kipp Foundry now existed on the east end of Lot 46. By 1936, the grain mill and the foundry were apparently gone and the retail fixture company had expanded onto the property these facilities previously occupied. It was then known as L.A. Darling and their product lines consisted of a variety of commercial display fixtures and retail shelving made from a variety of materials. Operations included chromium and cadmium plating, and degreasing using trichloroethylene (TCE).

Sometime in the 1930's, the plating operations were moved to the eastern half of Lot 46. Various materials, fuels, and spent chemicals were staged on the eastern half of Lot 45. The files contain historical references to on-site lagoons for liquid waste disposal before the city of Bronson constructed an industrial sewer line to municipal lagoons located north of the L.A. Darling property. By 1950, one block of East Railroad Street had been vacated and L.A. Darling had expanded south onto Lots 47 and 48. L.A. Darling operated at this location until 1968 when the company closed and the equipment was moved to a new facility in Paragould, Arkansas.

L.A. Darling sold the lots where the company existed to Meyer and Ester Goldman. Patriark Inc. leased the property and manufactured plastic building products in 1968 and 1969. The Goldmans sold the property to Patriark, Inc. in 1969 and Patriark, Inc. subsequently sold the property to Jack R. Coleman and Alanzo Craft, Jr. In 1980, Mr. Coleman sold his interest in the property to Mr. Craft, who had the buildings demolished. Alanzo Craft, Jr. sold the property to the city of Bronson in 1982. Following demolition, the building foundations and some of the demolition rubble remained on-site. The property was not fenced so there was ready access to the site and remaining demolition materials.

The city of Bronson hoped to redevelop the site. The MDEQ conducted a Brownfield Redevelopment Assessment at the site on March 25, 1997, via a cooperative agreement with the EPA. At the same time the Michigan Department of Community Health was in the process of completing a Health Consultation Assessment of the property. Based upon the results of the Brownfield Redevelopment Assessment, the MDEQ determined that the property met the definition of a facility as defined in Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). Among the contaminants found at levels of concern were arsenic, cadmium, antimony, chromium, nickel, TCE, tetrachloroethene, and 1,2-dichloroethene.

In 1999, the MDEQ awarded a contract to Harding Lawson Associates ES of Michigan, Inc. to identify potential on-site contaminants in the soil and groundwater, and in concrete and remaining demolition debris.

The study revealed that TCE and a number of metals are present in the site soil above Industrial and Commercial Drinking Water Protection Criteria and TCE and several metals are present in groundwater above the Part 201 Drinking Water Criteria. The study further concluded that debris may be buried on the former plant property. Finally, the study concluded that additional site investigation work was necessary to adequately characterize the site.

The Kalamazoo District Office of the Remediation and Redevelopment Division, which managed the first phase of investigation, began preparations for a second phase of investigation. A representative of the Marmon Group, the PRP, contacted District personnel and advised them that their client was interested in conducting response activities, as appropriate, at the L.A. Darling site.

On June 5, 2002, the Marmon Group entered into an Administrative Order by Consent (AOC) with the EPA to conduct a streamlined RI/Focused Feasibility Study (FFS) on the L.A. Darling property. The PRP's contractors started soil and groundwater sampling in October 2001, prior to the finalization of the Order. Additional soil and groundwater sampling was performed in 2003 and 2004.

In the 2004 RI Report, the PRP proposed performing a source and contaminated soil removal. Their report contended that saturated soils and groundwater had been sufficiently characterized by the work conducted. While the MDEQ agreed that unsaturated site soils had been adequately characterized, the MDEQ could not concur that saturated soils and

groundwater had been sufficiently characterized as the report contended. The PRP had not fully characterized the extent of groundwater contamination nor groundwater flow paths leaving the site. The PRP submitted a revised RI report in 2006. This report did not adequately incorporate Agency comments. Nevertheless, in order to move the project along, the EPA gave them conditional approval on the report provided they agreed to multiple conditions designed to assure appropriate response actions at the site to address environmental contamination. A FFS was submitted by the PRP later in 2006. The FFS proposes to remove unsaturated contaminated soils and treat groundwater to Part 201 generic industrial criteria. The groundwater remedy proposed in the FFS was not supported by actual aquifer hydraulic data and, therefore, could not be assessed for adequacy. In addition, the format for the FFS was not acceptable to the EPA.

Next, the PRP submitted a proposal for an aquifer pump test to obtain the data necessary to evaluate the proposed groundwater remedy. Following revision directions from the EPA, the PRP submitted another version of the FFS in June 2007.

Instead of proceeding to conduct the pump test to support the proposed groundwater remedy at this time, the PRP elected to conduct a pre-Record of Decision (ROD) interim soil response at the L.A. Darling site. Following negotiation of a work plan, the interim response began in November 2007 and was completed in early 2008. An estimated 5,100 cubic yards of soil and concrete were removed from the site during this voluntary work. In addition to excavating and disposing of contaminated soil, at the request of the city of Bronson, the PRP reinstated the former section of Railroad Street that was removed sometime between 1938 and 1950.

In July 2008, the EPA, in consultation with the MDEQ, issued a Proposed Plan for soil and groundwater work. The Proposed Plan called for removal of contaminated soil to Part 201 industrial cleanup criteria to the depth of the groundwater; installation of an air sparging and soil vapor extraction system (AS/SVE); and construction of a groundwater (P & T) system once the AS/SVE has achieved the limits of its effectiveness. The groundwater treatment system will operate until it can be demonstrated that groundwater leaving the property meets Part 201 residential drinking water criteria.

Following public comment, the EPA issued a ROD for this response on September 22, 2008. The MDEQ concurred with the ROD.

Also in 2008, it was determined that a few buildings in the vicinity of L.A. Darling had levels of contaminants in indoor air that were above, or had the potential to rise above, screening levels. The PRP installed and maintains mitigation systems in residences where necessary, and continues to monitor soil gas.

On June 3, 2011, the EPA issued a Unilateral Administrative Order (UAO) which allowed the PRP to begin design of the remediation systems during 2011.

In early 2012, the PRP submitted the 95 percent Remedial Design Work Plan. After comments and revisions, the EPA approved the final design. The remedy design includes focused soil removal of hot spot soils above direct contact criteria to treat the soils and air sparging in combination with SVE followed by groundwater extraction and treatment to treat the on-site contaminated groundwater. Construction of the excavation portion of the remedy began in the summer of 2012. Soil samples collected during the excavation demonstrated the need for additional soil excavation which was conducted into fall 2012.

Soil excavation and installation of AS and SVE systems were completed by summer 2013. SVE and AS began in May 2013. 2015 groundwater sample results and SVE vapor

concentrations indicated the need to continue operation of the systems. Due to lack of subsequent contaminant reduction, the AS and SVE systems were shut down in May 2016. To date, the treatment systems have removed over 240 pounds of volatile organic contaminants (primarily TCE).

SITE STATUS
Updates to the 2012 draft pump test and corresponding pump and treat design were submitted to the agencies in October 2016. The pump tests occurred in the spring of 2017. The results of these tests will be used to update the proposed design of the P & T system. It is anticipated that the P & T system will be operational in summer 2018.

On September 13, 2017, MDEQ requested EPA evaluate the entire site for the potential for vapor intrusion. Updated criteria warrant additional investigation for this potential exposure pathway.

ENFORCEMENT STATUS
The PRPs for the L.A. Darling site entered into an AOC with the EPA on June 5, 2002, to conduct a streamlined RI and focused FS at the site. A ROD was signed in September 2008.

On June 3, 2011, the EPA issued a UAO which allowed the PRP to begin design of the remediation systems during 2011 and subsequent construction and operation.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site
02	NBFF OU2 RI/FS

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/22/2008**

Remaining contaminated soil will be excavated to the water table. If source material is detected at water table, the PRP will attempt to remove source. Groundwater treatment will be AS/SVE. When effectiveness of AS/SVE is shown to be dropping, P & T will be employed.

Response Accomplishments: Completed

Interim Response Determine the horizontal and vertical extent of the soil contamination.

Start Date: 10/29/1998	Primary Cost:	$97,821	Source: State
End Date: 10/22/2000	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Interim Response Prior to the issuance of a ROD, the PRP implemented an interim response at the L.A. Darling site beginning in November 2007. It was completed in early 2008. The interim response consisted of soil excavation, concrete removal, and off-site disposal.

Start Date: 11/01/2007	Primary Cost:	$0	Source:
End Date: 02/28/2008	Secondary Cost:	$0	Source:

Remedial Design Design included focused hot spot excavation, AS/SVE followed by groundwater P & T once the AS/SVE effectiveness declines.

Start Date: 08/17/2011	Primary Cost:	$0	Source:
End Date: 06/05/2012	Secondary Cost:	$0	Source:

Response Accomplishments: In Progress

Remedial Action Hot spot excavation (2012) and construction (summer 2013) and operation (summer 2013-May 10, 2016) of the AS/SVE system until no longer effective. In 2018, there will be construction of a P & T containment system to contain remaining contaminated groundwater on-site. Operation of the P & T system will be considered Operation & Maintenance.

Start Date: 06/05/2012	Primary Cost:	$0	Source:
End Date: 04/01/2018	Secondary Cost:	$0	Source:

Remedial Design Redesigning the pump test (original draft reviewed in 2012) that will be used to design the P & T system. Pump test occured in spring 2017 followed by submittal of P & T design with anticipated operation of P & T system starting in summer of 2018 (under "operation and maintenance").

Start Date: 10/10/2016	Primary Cost:	$0	Source:
End Date: 06/01/2018	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

Operation and Maintenance Upon completion of the pump tests (spring 2017), the design of the pump and treat system are being updated. It is anticipated that the groundwater P & T system will be operational in September 2018.

Start Date: 09/01/2018	Primary Cost:	$0	Source:
End Date: 09/01/2048	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: NBFF OU2 RI/FS

Response Accomplishments: Completed

Remedial Investigation	Pursuant to the Order between the PRP for L.A. Darling and the EPA, the PRP conducted a streamlined RI/focused FS which was approved by EPA on May 7, 2008. ROD was signed in September 2008.		
Start Date: 06/30/2002	Primary Cost:	$0	Source:
End Date: 05/07/2008	Secondary Cost:	$0	Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$2,889	$0	$2,889	$2,889	$2,889

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$14,343	$0	$0	$14,343	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$307	$0	$0	$307	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$11,584	$0	$0	$11,584	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$146	$0	$0	$146	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$1,996	$0	$0	$1,996	$1,223

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$51,199	$0	$0	$51,199	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$5,508	$0	$0	$5,508	$0
Totals:	$87,973	$0	$2,889	$87,973	$4,112

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: North Bronson Industrial Area
135 Industrial Avenue
Bronson , MI

County: Branch
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: 1C
State Site ID#: 12000012
State Site Score: 41

LOCATION
The North Bronson Industrial Area Superfund site is located in the city of Bronson, Branch County, Michigan. The eastern boundary of the site is a line extending north from Lincoln Street to County Drain 30. County Drain 30 forms the north boundary, Burr Oak Road is the west boundary, and the south boundary is delineated by Fillmore and Union Streets.

SITE HISTORY
Since the early 1900s, multiple past and current manufacturing facilities have existed in a 220 acre industrial park located on the north side of the city of Bronson. The North Bronson Industrial Area (NBIA) Superfund site as defined by the EPA encompasses two series of industrial waste lagoons located at the northern edge of the industrial area, the sediment and water in County Drain 30, and groundwater under and downgradient of the lagoons. Contamination detected at the site is the result of industrial activity and waste handling practices in the industrial park since its inception. In the 1930s, cattle and fish kills were reported due to ingestion of cyanide-contaminated water from County Drain 30. The water contamination was reportedly due to direct discharge of industrial wastes to County Drain 30. To reduce the amount of contaminants entering the drain, the city of Bronson constructed seepage lagoons to retain the wastes generated by industry. An industrial sewer system was also constructed and used to convey wastes from the industries to the lagoons. Some of the former manufacturing facilities that discharged industrial wastes into the sewer system were L.A. Darling, Scott & Fetzer Corporation, and Bronson Reel Company collectively known as the North Bronson Former Facilities (NBFF). Each of these former manufacturing companies is a site of environmental contamination in their own right, as well as having contributed to the NBIA site contamination.

The site is zoned by the city of Bronson for industrial use only. Land use in the area consists of a mixture of industrial, residential, and agricultural uses. The area has a high potential for industrial redevelopment.

The western and eastern lagoons were built in 1938 and 1949, respectively, to contain metal-laden plating and other industrial wastes generated by several industries in the area. Between 1930 and 1970, the city of Bronson owned and operated both sets of lagoons. The Bronson Plating Company purchased the eastern lagoons from the city in 1970. The western lagoons, which the city still owns, were used until 1981. The Bronson Plating Company continued to discharge to the eastern lagoons until 1981.

Initial investigations in the NBIA were conducted as early as 1978, by the MDEQ. Monitoring well samples contained trichloroethylene (TCE) and elevated concentrations of cadmium, chromium, copper, nickel, zinc, and cyanide. Polychlorinated biphenyls were detected in sediment samples from County Drain 30 downstream of the western lagoons. Additional wells installed in 1981, near the eastern lagoons, revealed the presence of volatile organic compounds (VOCs) and metals.

The MDEQ sampled County Drain 30 in 1984 and found metal contamination downstream

from the Bronson Plating Company. As a result, in 1986 the Bronson Plating Company dredged County Drain 30 from its eastern outfall to the Matteson Street overpass, dewatered the sediment on-site, and had the dredged material removed for disposal.

Sludge material in the lagoons contains metals and cyanide which continue to be sources of contamination. The most obvious sources of the chlorinated organic compounds appear to be from the NBFF sites referred to above. There may be other sources as well. Chlorinated organic compounds also appear to have been released from the industrial sewer. Contaminants from these sources are leaching into the groundwater and being transported with the groundwater. Some of the groundwater vents to County Drain 30, a protected waterway of the state, which discharges to Swan Creek, a tributary of the St. Joseph River.

The NBIA was placed on the National Priorities List and became eligible for funding under the Superfund Program. Using a federal grant, the MDEQ conducted a two-phase remedial investigation (RI) to characterize contamination in the NBIA. Initially the NBIA site encompassed a 220 acre area that included the NBFF. Therefore, the RI included preliminary investigation of the NBFF sites. However, in the early 1990's the EPA redefined the boundaries of the NBIA Superfund site and defined it as the lagoons, County Drain 30, and groundwater contaminated by the lagoons. A technical memorandum was issued in 1989, followed by an RI report in 1993. The feasibility study (FS) was released in 1995. Supplementary field studies to further define contamination in the industrial area as well as a groundwater-use survey were conducted in 1996. Additional remedial alternatives were evaluated in an addendum to the FS released in the spring of 1997. These activities are known collectively as Operable Unit (OU)1, East and West Lagoons - Sludge, Soil, Associated Groundwater, Sediments, and Surface Water (East and West Lagoons). A Proposed Plan, released in 1997, recommended that the following remedy be implemented: (1) Consolidated wastes from the eastern lagoons and contaminated sediments from the County Drain into the western lagoons and cover, and (2) Install a groundwater recovery system between the western lagoons and the County Drain and construct an engineered wetland to treat the contaminated groundwater. The Record of Decision (ROD) determined that the remedy recommended in the Proposed Plan was appropriate. The ROD was signed in June 1998. The EPA and the MDEQ negotiated an agreement with the potentially responsible parties (PRPs) to design and implement the selected, or an equivalent, remedy. The MDEQ participated in these negotiations but is not a party to the agreement. The PRPs signed a Consent Decree (Decree) in 1999 agreeing to implement the remedy set forth in the ROD.

As described above, the ROD does not address the groundwater contamination or source areas upgradient of the lagoons and County Drain 30 because the EPA redefined the NBIA Superfund site boundaries. The MDEQ petitioned the EPA to include the former industrial facilities in the NBIA so that these sources of contamination could be remedied and not continue to contaminate groundwater in the industrial park. In an October 12, 1995, letter, the EPA agreed to include the industrial sewer, and any contamination associated with releases from it, in the NBIA site description, but not the former manufacturing facilities. The MDEQ conducted industrial sewer investigations in 1996 and again in 1998. These two investigations are known as Phases 1 and 2 of OU2, Industrial Sewer and Media Contaminated via Sewer (Industrial Sewer). Two technical memoranda were written summarizing the results of the Industrial Sewer OU investigations. The second report was completed in December 1999. The reports conclude that the industrial sewer is a source of soil and groundwater contamination within the industrial park. In accordance with the Superfund process, potential remedial alternatives for addressing soil and groundwater contamination from the industrial sewer will be evaluated in the FS and the Baseline Risk Assessment for this portion of the site. Following the FS, a proposed plan for the Industrial Sewer OU will be released for public comment, which will be followed by the issuance of a

second ROD.

The Decree for East and West Lagoons OU was entered into the court record on February 24, 2000. The PRPs submitted a pre-design work plan in June 2000, for further study of the hydrogeology at the site to facilitate design of the remedy. The initial pre-design study, which began in February 2001, was followed by multiple additional studies to further define the extent of groundwater contamination. The studies indicated that groundwater was not completely venting into County Drain 30 and subsequent studies were designed to determine the fate of the contamination. Also during this time, the PRPs submitted the first version of a municipal groundwater use restriction ordinance to prevent exposure to contaminated groundwater. At the request of the PRPs, the MDEQ reviewed their draft ordinance to determine whether it was consistent with the requirements of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, and program policy application. The MDEQ identified several revisions that would be necessary to be consistent with Part 201.

Discussions between the Agencies and the PRPs relative to the NBFF sites had continued throughout this time period and the PRP for each of the three sites advised the Agencies that they would voluntarily address the sites. At their request, the FS for the Industrial Sewer OU of the NBIA was placed in abeyance until they completed the RI/FS studies at each of the NBFF sites. Each NBFF RI/FS study is being performed pursuant to individual Administrative Orders by Consent.

As pre-design study data became more comprehensive, the technical and administrative complexity of addressing multiple sites within one area became more obvious, the PRP group formed a technical committee to facilitate completion of the pre-design work. The groundwater in the vicinity of the lagoons is known to be contaminated with both metals and chlorinated organic compounds, including TCE, cis 1,2-dichloroethene (DCE), and vinyl chloride (VC), and the area hydraulically upgradient from the lagoons is primarily contaminated with the chlorinated solvents. The technical work group proposed to the Agencies that they conduct a groundwater investigation throughout the NBIA to help determine whether compounds detected in groundwater in the western lagoon area are sourced entirely from the lagoons or in part from other sources in the NBIA, whether there is a plume west of the western lagoon area, and if so, whether the plume originates from the lagoons or another source(s). This additional investigation was approved because, in spite of delaying completion of the pre-design study, the information to be gained was considered instrumental in understanding the groundwater dynamics throughout the study area and would assist in selecting the appropriate final remedy selection. This groundwater investigation was completed in 2005.

In 2006, the PRPs advised the Agencies that they wanted to evaluate the efficacy of stabilizing/solidifying some or all of the lagoon sludges in place as an enhancement to the remedy selected in the ROD. To that end, utilizing the services of a new consultant, the PRP group conducted sampling of soil and plating sludge from the lagoons; berms surrounding the lagoons; and from beneath the lagoons to confirm the current chemical make-up of the material. The Agencies received preliminary analytical results in late November 2006, which indicated concentrations of inorganic materials are consistent with or greater than concentrations detected during the RI. The PRPs then performed bench-scale stabilization/solidification tests on lagoon material in April 2007, followed by a field-scale pilot study from May through July 2007.

The PRPs assumed responsibility for residential well sampling for the first time in 2007, at the direction of the EPA. Prior to this, the MDEQ had financed the annual well sampling for over 10 years.

Pursuant to volatilization to indoor air regulations, the PRPs performed initial soil gas studies to assess the vapor intrusion exposure pathway in 2007. The PRPs also submitted, to the Agencies, a proposal for alternate sediment cleanup criteria. No action was taken on this proposal before other issues relative to County Drain 30 developed.

In 2008, the Water Bureau re-evaluated the 2006 mixing zone determination for the NBIA. As a result of changes made in 2007 when the National Pollutant Discharge Elimination System permit for the Bronson Wastewater Treatment Plant was reissued, the Water Bureau issued revised acute and chronic values for all of the parameters identified for the site. In general, this resulted in more stringent allowable discharges from groundwater to surface water than were determined in 2006. There have been four previous mixing zone determinations for the NBIA. The acute and chronic values identified in 2008 are very similar to the values contained in the ROD for this site. However, they are more restrictive than those calculated in 2004 and 2006. The impact of this situation is that the PRP group is not certain that they can comply with these values for all constituents of concern in conjunction with the solidification/stabilization process.

Results from the initial soil gas sampling for evidence of vapor intrusion indicated no unacceptable levels of VOCs were detected in structures in the vicinity of the eastern lagoons. However, some elevated levels were detected near two of the NBFF.

Also in 2008, the additional extent-of-contamination groundwater sampling was conducted on the western side of the site and on the north side of County Drain 30. Methylene chloride, VC, DCE, and TCE were detected in some of these groundwater samples.

In response to the question of whether or not to pursue to stabilization/solidification remedy for the lagoons, the PRPs requested a meeting to be held in Bronson in March 2009. The PRP group spokesman presented updated proposals covering many of the issues discussed previously in this report. Included were proposals for the following:

-Confirming background concentrations of contaminants in sediments and then obtaining updated sediment data to quantify the volume of sediments that must be addressed.
-Getting the groundwater use ordinance for the city of Bronson enacted.
-Clarification of Groundwater Surface Water Interface Criteria and what is acceptable for a compliance demonstration.
-Determination of applicable cleanup criteria for the dredged sediment spoils deposited on farmland north of the county drain.
-Completion of extent of contamination characterization in groundwater.

The Agencies provided detailed comments on the proposals from the PRPs and final work plans were generated for further extent of groundwater contamination studies, and for studies to preliminarily define how much soil and sediment would have to be removed.

Beginning in August 2010, the PRPs began submitting documents summarizing the results of the studies as well as proposing alternate cleanup goals for some media. The Agencies reviewed and commented on these documents. The PRPs submitted revised documents in 2011 and the Agencies are seeking additional supporting information confirming the need to use sediment criteria for erodible soils. The EPA clarified the remediation goals in letters to the PRPS dated November 8, 2012, and December 4, 2013.

Lagoon water and sludge, surrounding sub-surface soils, and County Drain 30 surface water and sediments remain contaminated with heavy metals (cadmium, total chromium, copper, nickel, zinc, and cyanide). Groundwater is contaminated with metals and chlorinated organic compounds, such as TCE, DCE, and VC, in exceedance of allowable levels.

The PRPs submitted a draft RD work plan in the spring of 2013. The agencies have reviewed several iterations of this work plan and are working with the responsible parties to secure an acceptable work plan. The MDEQ is working to get EPA support for PRP development of data quality objectives to be used to develop a pre-design investigation. The pre-design investigation results will be used in the development of the remedy design. The submittals to date by the PRPs have not yet resulted in an approved RD work plan. The agencies and the PRPs met in April 2016 to discuss the status of the RD work plan. MDEQ provided EPA with comments on the meeting minutes and are waiting for EPA response.

SITE STATUS

In 2017, the MDEQ continued to work with the EPA as they negotiate a Statement of Work and Administrative Order of Consent for the PRPs to conduct an RI of contaminated sewers and contaminated groundwater associated with those sewers.

In 2016 and 2017, EPA changed project managers twice, resulting in not much additional action at the North Bronson Industrial Area.

ENFORCEMENT STATUS

The PRP group, which includes existing and former area manufacturers as well as the city of Bronson, entered into a Consent Decree in 1999 agreeing to implement the remedy selected in the ROD. The Decree was lodged in federal court in February 2000.

When a Special Notice of Liability was issued to the PRPs in September 2000 for the FS and Baseline Risk Assessment for the Industrial Sewer OU, the PRPs requested a meeting with the Agencies and raised the issue of upgradient contamination. Separate agreements have been negotiated by the EPA for each of the NBFF and the individual PRPs for site characterization and source remediation. The Industrial Sewer OU Special Notice of Liability and anticipated negotiations have been put in abeyance pending the outcome of the site work.

As of 2016-2017, EPA is in negotiations with the PRPs regarding conducting a remedial investigation for OU2: addressing contaminated sewers and groundwater contamination associated with those sewers.

SPECIAL CONSIDERATIONS

In December 2004, over the objection of the EPA, and in spite of direction to leave the contaminated sediments in County Drain 30 undisturbed until alternate disposal arrangements could be made, the Branch County Drain Commissioner had the sediments, known to be contaminated with high concentrations of metals, dredged from County Drain 30 and dumped along the entire length of the north side of the drain on the property of local farmers. Upon discovery that these contaminated sediments had been excavated, the MDEQ notified the EPA of the situation and the Agencies took the following actions. The Agencies met with the Drain Commissioner, as well as with the PRP group. The PRP group agreed to assist in characterizing the dredged material and explore possible response alternatives, although they are not responsible for the Drain Commissioner's actions.

In January 2005, MDEQ staff collected between 50 and 60 samples of dredged material from along the north bank of County Drain 30 to screen for metals content using X-ray Fluorescence technology. This work was done to preliminarily assess the chemical make-up of the dredged materials and to aid in development of a sampling strategy. The information was made available to the PRPs and the EPA. The EPA pursued the matter by advising the Drain Commissioner of steps needed to be taken in response to his actions. The banks were hydroseeded by the Drain Commissioner to limit erosion of the unvegetated

soil back into the drain. Silt traps were installed in the County Drain to limit migration of reentrained sediments that washed from the banks. The NBIA PRPs will remove some of the excavated material during implementation of the RA.

OPERABLE UNITS

00	Entire Site
1	East & West Lagoons-Sludge, Soil, Assoc.'d GW, Sed. & SW
2	Industrial Sewer & Media Cont.'d via Sewer

OPERABLE UNIT 1 : East & West Lagoons-Sludge, Soil, Assoc.'d GW, Sed. & S

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 06/19/1998**

Consolidation of contaminated County Drain 30 sediment and eastern lagoon soil into the western lagoons. Capping the western lagoons and capturing and treating contaminated groundwater in an engineered wetland.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 09/26/2008**

The PRPs have determined that the lagoon materials do not have sufficient strength to support the cover that is necessary for closure. This Explanation of Significant Difference (ESD) clarifies that the stabilization and solidification of materials (either in-situ or ex-situ) falls within the scope of the 1998 NBIA East and West Lagoons OU ROD. This enhancement of the remedy would serve to limit leaching of contaminants to groundwater and would provide additional stability to the sludge mass, resulting in an improved condition for the closure of the lagoons. The MDEQ concurred with this ESD.

Response Accomplishments: Completed

Remedial Investigation The RI was performed under direction of the MDEQ by Warzyn Inc.

Start Date: 06/01/1987 Primary Cost: $1,423,784 Source: Federal
End Date: 07/31/1997 Secondary Cost: $0 Source:

Negotiations Consent Decree for OU1 Pre-Design, Design, and RA lodged in Federal Court on February 24, 2000.

Start Date: 08/01/1998 Primary Cost: $0 Source:
End Date: 02/24/2000 Secondary Cost: $0 Source:

OPERABLE UNIT 1 : East & West Lagoons-Sludge, Soil, Assoc.'d GW, Sed. & S

Response Accomplishments: In Progress

Remedial Design Based on results of pilot studies, the EPA issued an ESD in 2008 to provide for lagoon stabilization. Dredging of contaminated sediments from County Drain 30 remains a component of the remedy. EPA and MDEQ are working with the PRPs in the finalization of a RD Work Plan which will be the basis of the design work. A Pre-Design Investigation work plan and Quality Assurance Project plan need to be developed, approved by the agencies, and corresponding work completed prior to development of the design.

Start Date: 03/26/2013	Primary Cost:	$0	Source: Private
End Date: 12/31/2018	Secondary Cost:	$0	Source:

OPERABLE UNIT 2 : Industrial Sewer & Media Cont.'d via Sewer

Response Accomplishments: Completed

Remedial Investigation The RI was completed and the Technical Memorandum written by the MDEQ and approved by the EPA. The EPA issued a Special Notice of Liability on September 28, 2000, for FS and Baseline Risk Assessment. The Industrial Sewer OU FS and Baseline Risk Assessment negotiations were placed in abeyance in approximately February 2001 while negotiations for the NBFF site characterizations continue. Negotiations for the FS have not resumed.

Start Date: 05/01/1998	Primary Cost:	$48,000	Source: Federal
End Date: 12/31/2000	Secondary Cost:	$0	Source:

Negotiations Notice letters were issued by the EPA for the Industrial Sewer OU FS and Baseline Risk Assessment. However, the Industrial Sewer OU negotiations have been placed in abeyance pending completion of the site characterizations of the NBFF. Groundwater will then be addressed regionally, along with the industrial sewer and impacted media and not on a site-specific basis. Negotiations have not resumed.

Start Date: 09/29/2000	Primary Cost:	$0	Source:
End Date: 12/29/2000	Secondary Cost:	$0	Source:

Response Accomplishments: In Progress

Negotiations The EPA is in negotiations with the PRPs regarding conducting an RI/FS for OU2: addressing contaminated sewers and groundwater contamination associated with those sewers.

Start Date: 05/16/2016	Primary Cost:	$0	Source:
End Date: 12/31/2017	Secondary Cost:	$0	Source:

OPERABLE UNIT 2 : Industrial Sewer & Media Cont.'d via Sewer

Response Accomplishments: Future Need

Remedial Investigation The EPA is in negotiations with the PRPs regarding conducting a RI/FS for OU2: addressing contaminated sewers and groundwater contamination associated with those sewers. Once the negotiations have been completed, estimated dates will be updated.

Start Date: 01/01/2018 Primary Cost: $0 Source:
End Date: 06/30/2019 Secondary Cost: $0 Source:

Remedial Design The EPA is in the process of negotiating an agreement to conduct a RI/FS for the Industrial Sewer OU of the NBIA site. Once the RI/FS has been completed, estimated dates will be updated.

Start Date: 07/01/2019 Primary Cost: $0 Source: Private
End Date: 06/30/2020 Secondary Cost: $0 Source:

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005934-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$1,471,784	$0	$0	$1,471,784	$0
Totals:	$1,471,784	$0	$0	$1,471,784	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$6,002	$0	$6,002	$6,002	$6,002

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$73,082	$0	$0	$71,185	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$14,971	$0	$0	$14,971	$1,444

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$13,562	$0	$0	$13,562	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$11,624	$0	$0	$11,624	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$23,371	$0	$0	$23,371	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$16,241	$0	$0	$16,241	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$25,000	$0	$0	$6,803	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$55,000	$0	$0	$52,295	$0
Totals:	$238,853	$0	$6,002	$216,054	$7,446

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Scott & Fetzer Corporation
141 W. Railroad Street
Bronson , MI

County: Branch
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: B7
State Site ID#: 12000085
State Site Score: 45

LOCATION
The former Scott & Fetzer Corporation (Scott & Fetzer) site facility is located at 141 West Railroad Street, Bronson, Michigan. Directions to the site from Coldwater, Michigan: U.S.12 west to Bronson; north on Matteson Street to Railroad Street; west on Railroad Street. The site is immediately on the south.

SITE HISTORY
The Scott & Fetzer site is one of three former manufacturing facilities located in the city of Bronson that were considered to be part of the North Bronson Industrial Area (NBIA) Superfund site at one time. The other two sites are L.A. Darling and Bronson Reel Companies. In September 1993, the EPA redefined the boundaries of the NBIA site and excluded a significant portion of the area, including these three former manufacturing facilities and contamination emanating from them, from the site description. By this time, sufficient data had been gathered in the vicinity of these facilities during the NBIA site Remedial Investigation (RI) to determine that a strong likelihood existed that each of the former manufacturing facilities was a source of contamination. Following extensive negotiations with the potentially responsible party (PRP) for each facility, it was decided that each PRP would conduct a RI/Feasibility Study (FS) at their site. The EPA refers to these three former manufacturing facilities collectively as the North Bronson Former Facilities (NBFF). To differentiate between sites, each facility is considered an Operable Unit (OU); Numbers 1, 2, or 3. The Scott & Fetzer site is OU3. For details on the other two NBFF or the NBIA site, refer to individual Legislative Reports.

This facility, commonly known as Scott & Fetzer Plant #1, started as a small specialty manufacturing operation circa 1910, and grew to employ at least 500 people at one time. Harry A. Douglas began a company called Warner Douglas along with several other men on April 12, 1912, designing and manufacturing automobile electrical parts. The company grew until it encompassed the entire block bounded by Matteson, West Railroad, State, and North Walker Streets on the north side of Bronson. Metal plating operations that included cadmium, chromium, silver, tin, and zinc were part of the manufacturing process. In addition to electroplating, the manufacturing process included associated cleaning and degreasing processes using trichloroethylene (TCE). Although ownership and company names changed several times during the facility's history, and additional products were added to the product lines, the processes stayed essentially the same from the company's inception until it was shutdown in 1986.

The company name changed in 1915 to Douglas & Rudd, and in 1922, the company name changed again, this time, to H.A. Douglas Manufacturing Company. The Kingston Products Division of Kokomo, Indiana purchased H.A. Douglas Manufacturing Company in 1942, and the name changed again, to Douglas Manufacturing Division, Kingston Products. The product lines now included vacuum cleaners. The Scott & Fetzer Corporation purchased Kingston and Douglas in 1968 by means of an agreement of merger, and the Bronson plants became Douglas Division of Scott & Fetzer. Sometime during 1984, a lot located across State Street from the plant was purchased and a small waste treatment plant, known

as the cyanide destruction facility, was constructed. Also in 1984, the Orion Planning Group of Westport, Connecticut purchased the Douglas Division and Kingston from Scott & Fetzer and the company name changed yet again to Douglas Components Corporation. Sometime after 1984 Universal Components Corporation purchased the company. This was the company's name when all manufacturing ceased at the facility sometime in 1986. The buildings were used as a warehouse following the shutdown of the manufacturing processes. When manufacturing ceased at this location, wastes and residuals from the manufacturing operations were apparently left in place.

From 1986 to the early 1990s, concerns escalated regarding the deteriorating Scott & Fetzer building, the hazardous materials and conditions remaining in the building and on plant property and inadequate security at both the plant and the cyanide destruction facility. The MDEQ District Office conducted a site inspection in 1992 and subsequently requested Universal Components to clean up the site and remove hazardous materials and physical hazards. The EPA became involved when the MDEQ notified them that the company had taken little or no action to clean up the immediate threats within the main building and in the cyanide destruction area. On April 28, 1993, the EPA Emergency and Enforcement Response Branch made the following observations of the Scott & Fetzer facility while at the site for NBIA site activities. Numerous drums, tanks, and a roll-off container could be seen inside the building through an open doorway. Two children were observed peering through the open door. Many large windows had been broken or were missing glass and access was not adequately restricted.

The EPA obtained consent to enter the Scott & Fetzer buildings on May 10, 1993. Approximately fifty 55-gallon open and deteriorating drums and small containers were observed inside one of the buildings. Labels on some of the drums indicated the contents consisted of acids, caustics, solvent degreaser, and roofing-type materials. An open vat containing approximately 100 gallons of a green-colored liquid with a pH of 1.0 was found in an area where plating operations took place. Several pits were also observed containing unknown liquids with pH values ranging between 6 and 7. Near the vat, a bermed concrete area was observed containing sand and absorbent material. An additional 100 open drums were staged west of the plating area and two polyethylene storage tanks containing approximately 1,500 and 1,000 gallons of unknown liquids, respectively, were staged east of the drums.

A tarp-covered roll-off container was located near the loading dock door and contained approximately 15 cubic yards of unknown solid materials. A vast network of insulated piping was observed throughout the building. Much of the insulation was hanging from the pipes or lying on the ground, and appeared to be of the friable asbestos type. Samples taken from the various containers revealed elevated levels of heavy metals such as arsenic, cadmium, chromium, lead, selenium, and silver above regulatory levels. Samples also exhibited pH values ranging between 0.8 and 13. The analytical results of the liquid and solid material indicated the presence of characteristic corrosive, reactive, and toxicity characteristic wastes under the Resource Conservation and Recovery Act, 1976 PL 94-580, as amended. The roof was observed to be partially collapsed, allowing precipitation to enter.

The EPA entered into an Administrative Order by Consent with the Universal Components Corporation, the last private owner of record to conduct specified cleanup activities on March 8, 1994. However, the EPA assumed control of the removal activities at the site in September 1994 when Universal Components Corporation did not complete the removal activities they had initiated due to financial problems. In 1994 and 1995, the EPA containerized and removed waste materials and took steps to mitigate some of the safety and physical hazards. Left for the State to address were all remaining contaminated materials in the building, contaminated material and soil beneath the building, the indoor

plating trench and pit system, and the asbestos insulation scattered throughout the buildings. In addition, a badly deteriorated structure on the cyanide destruction facility lot remained.

The State became the owners of the property in 1995 through the tax reversion process. The MDEQ supervised a two-day cleanup of the cyanide destruction facility site on May 1 and 2, 1996.

As the building continued to deteriorate and become a greater physical and chemical hazard it was determined that the building would have to be demolished. In addition, historical records in the MDEQ files and more current groundwater data from the NBIA site RI/FS indicated that the property on which the building stood was contaminated and continued to be a source of environmental contamination. In order to address the contaminated soil, it was necessary to demolish the building.

The MDEQ awarded a contract to Pitsch Companies for the demolition and DLZ Michigan, Inc. for Project Management in 2000. The State's purpose for the project was to abate the asbestos-containing materials; to characterize all of the waste and building materials to determine the appropriate disposal methods; and to complete demolition of all existing buildings, slabs, foundations, in-ground concrete pits and footings to at least three feet below grade as well as to remove and dispose of all demolition debris, liquids, and underground storage tanks according to character of the material.

Pitsch Companies' asbestos crew mobilized to the site on April 20, 2000, to begin asbestos abatement activities and to characterize the liquid wastes in the pits. Following completion of these activities, Pitsch Companies mobilized demolition equipment to the site to commence building demolition and site cleanup activities on May 24, 2000. Activities included the demolition and removal of all building debris, disposal of all non-hazardous liquids, removal and disposal of the concrete slab and pits and the disposal of polychlorinated-biphenyl-impacted concrete, disposal of non-hazardous and hazardous concrete, the removal of three underground storage tanks and the removal of non-hazardous and hazardous soil. Following demolition and disposal activities, Pitsch Companies performed site restoration activities including backfilling and grading and hydroseeding. A six-foot chain-link fence was constructed around the grounds of the Scott & Fetzer site.

The PRP for Scott & Fetzer and the EPA entered into an Order, signed on June 5, 2002, committing the PRPs to conduct a streamlined RI/Focused Feasibility Study (FFS) at the Scott & Fetzer site.

Three phases of RI began in July 2003 and September 2004 and January 2006. The second event consisted of installing and sampling permanent monitoring wells. The third event focused on vertical aquifer sampling. All field investigations occurred after the Agencies worked with the PRP on the scope of work.

The soil gas investigation, begun in 2007, to assess the vapor intrusion (VI) pathway into residences and other inhabited buildings has been completed. Three residences were equipped with vapor abatement systems as a result of the investigations.

The PRP-submitted FFS was approved by the EPA in June 2009, with several conditions identified to assure compliance with State and Federal statutes. A Proposed Plan was issued in July 2009, outlining the recommended remedy for the Scott & Fetzer site. A public meeting was held on July 21, 2009, in Bronson during which the remedy was explained to attendees and oral public comment on the proposal was taken. Following public input, the EPA, with support from the MDEQ, issued a Record of Decision (ROD) for the site in

September 2009, which outlined the response actions to be implemented by the PRP.

The site remedy consists of several methods of cleanup. Soils will be excavated from both former plant properties and from publicly owned sewers beneath city streets that have been contaminated by discharges from the plant. Soil vapor extraction (SVE) and air sparging (AS) will be employed to remove volatile contaminants from soil and groundwater. Groundwater extraction wells will control the migration of contaminated groundwater. The PRP will continue to maintain the air vapor control systems installed on the impacted residences. Additional activities will be implemented to assure cleanup of site contamination and prevention of unacceptable exposure to site contaminants.

In June 2013, the EPA issued a Unilateral Administrataive Order (Order) directing the PRPs to perform the following: implement a deed restriction on the contaminated property; excavate and dispose of contaminated soils; construct, install, and operate AS/SVE systems; design and implement a remedial action operation and maintenance plan.

The PRPs submitted a remedial design work plan for which MDEQ reviewed and provided the EPA comments in December 2013. The EPA submitted comments in September 2014. In October 2014, the PRPs submitted a response to comments followed by a November 2014 remedial design work plan-revision 1. The MDEQ drafted comments in December and submitted to the EPA in the beginning of January 2015. There are several key concepts that need to be addressed in this work plan. The MDEQ has facilitated several conference calls to work toward resolution.

SITE STATUS

The EPA and MDEQ reviewed and provided comments on several different versions of the draft work plan that outlines the proposed work laid out in the 2013 Unilateral Administrative Order. There are several key concepts that need to be resolved in this work plan. MDEQ provided EPA comments on the latest version in January 2017. The EPA plans to respond to the PRPs letter outlining their positions and clarify EPA's positions. If the PRPs agree to EPA's positions, the EPA will work with the PRPs regarding the details of the draft work plan. The MDEQ has facilitated several conference calls to work toward resolution. EPA subsequently allowed responsible parties to place the work plan on hold and develop a pre-design investigation work plan. MDEQ commented on this work plan. In a September 2017 email, EPA told the responsible party "The PDI work plan is on a temporary hold while we decide on the path forward from here."

In 2017, EPA changed project managers again, resulting in not much additional action at the Scott & Fetzer former facility.

On June 12 and September 13, 2017, MDEQ requested EPA evaluate the entire site for the potential for VI. Updated criteria warrant additional investigation for this potential exposure pathway.

ENFORCEMENT STATUS

The PRP for the Scott & Fetzer site, one of three former facilities known collectively as the NBFF, entered into an Order with the EPA on June 5, 2002 to conduct a streamlined RI/FFS at the Scott & Fetzer site in Bronson, Michigan. The RI was approved in May 2008. The FFS was approved in June 2009. The EPA selected a remedy for the site in September 2009.

In June 2013, the EPA issued an Order directing the PRPs to perform the following: implement a deed restriction on the contaminated property; excavate and dispose of contaminated soils; construct, install, and operate AS/SVE systems; design and implement a

remedial action operation and maintenance (O & M) plan.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/2009**

The remedy consists of soil excavation and disposal, AS/SVE, groundwater extraction, and maintenance of vapor control systems in residential homes.

Response Accomplishments: Completed

Interim Response

This project includes building demolition; removal and disposal of underground water storage tanks; disposal of contaminated soil; and determination of further response actions needed.

Start Date: 06/17/1997 Primary Cost: $130,613 Source: State
End Date: 08/31/2002 Secondary Cost: $0 Source:

Interim Response

Services performed under this contract included sampling the potential asbestos containing material in the Annex building. Sampled second floor plaster walls which were previously determined to contain asbestos containing material. These costs were to be used if it was verified that this material was non-asbestos containing material. Elimination of the second floor plaster wall asbestos abatement if analytical result showed that it was not asbestos containing material. Removal of liquids, cleaning, and backfilling of four additional pits. Abandonment of the existing well on the west side of the courtyard.

Start Date: 10/27/1997 Primary Cost: $612,574 Source: State
End Date: 08/31/2002 Secondary Cost: $0 Source:

Interim Response

Disposal of reclassified demolition materials. Materials were initially assumed to be non-contaminated but were actually contaminated. Handling and disposal costs changed.

Start Date: 05/08/2001 Primary Cost: $76,956 Source: State
End Date: 06/19/2002 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Investigation Pursuant to the Order between Scott & Fetzer and the EPA, the PRP completed an RI on May 7, 2008. The PRP submitted a revised FFS in January 2009 which was approved June 2009. A Proposed Plan was shared July 2009.

Start Date: 06/05/2002 Primary Cost: $0 Source:
End Date: 05/07/2008 Secondary Cost: $0 Source:

Response Accomplishments: In Progress

Remedial Design Agencies are working with the PRPs in the development of a Remedial Design Work Plan. This will be the basis of the design work. Anticipate design of an AS/SVE systems with a groundwater extraction system to follow once the AS/SVE systems have reached the limits of their effectiveness.

Start Date: 08/19/2013 Primary Cost: $0 Source:
End Date: 06/30/2018 Secondary Cost: $0 Source:

Response Accomplishments: Future Need

Remedial Action Anticipated construction and operation of AS/SVE system. Subsequent groundwater containment system anticipated to be installed once AS/SVE systems have reached the limits of their effectiveness. Operation of pump and treat system to be considered O & M.

Start Date: 07/01/2018 Primary Cost: $0 Source:
End Date: 06/30/2024 Secondary Cost: $0 Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$7,514	$0	$7,514	$7,514	$7,514

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$6,174	$0	$0	$6,174	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$8,897	$0	$0	$8,897	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$3,453	$0	$0	$3,453	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$10,309	$0	$0	$10,309	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$47,417	$0	$0	$45,961	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$10,768	$0	$0	$10,397	$0
Totals:	$94,531	$0	$7,514	$92,705	$7,514

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Albion-Sheridan Twp. Landfill
29951 East Erie Road
Albion , MI

County: Calhoun
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: AN
State Site ID#: 13000003
State Site Score: 40

LOCATION
The Albion-Sheridan Township Landfill site is an inactive landfill located approximately one mile east of Albion in Sheridan Township, Michigan. The landfill covers approximately 18 acres of a 33 acre property, a 20 acre lot adjacent to it was purchased as a borrow area for the cover and is used as a sedimentation basin for the landfill. The fenced area includes the entire 53 acre area. It is situated between Michigan Avenue and East Erie Road and is bordered on the east by the Calhoun/Jackson County line. The north branch of the Kalamazoo River is approximately 400 feet south of the site. Several residences are located within 1,000 feet, including the Amberton Village subdivision adjacent to the site on the east, and four residences adjacent to the site near the southwest (downgradient) corner.

SITE HISTORY
From 1966 to 1981, the Albion-Sheridan Township Landfill site accepted municipal refuse and industrial wastes from the city of Albion and nearby Sheridan Township. The landfill discontinued operation in 1981. The site reportedly accepted metal hydroxide plating sludge from a local factory prior to 1981. Tests, conducted by the MDEQ, indicate that the sludges contain various heavy metal contaminants. In 1986, the EPA discovered approximately 40 drums of waste on the surface. Some drums were filled with what appeared to be oil and grease wastes. Before the remedy was implemented, the landfill was covered with sand and gravel and there were signs that burning had occurred. There was also evidence that suggested several thousand drums of waste were disposed of at the site. The groundwater is contaminated with inorganic contaminants such as sodium, calcium, ammonia, and heavy metals including arsenic, iron, potassium, lead, and magnesium. Soils are contaminated with cyanide and heavy metals such as nickel, lead, cadmium, and chromium. The sludge is contaminated with heavy metals, chlorides, and cyanide.

A search for potentially responsible parties (PRPs) was conducted after the site was listed on the National Priorities List and six PRPs were identified. In 1990, under the supervision of the EPA, one of the PRPs conducted a removal action on the surface drums described above. Following the EPA's notification to the PRPs of their responsibility under the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, as amended, the PRPs failed to reach agreement with the EPA to conduct the Remedial Investigation/Feasibility Study (RI/FS). The EPA assumed the lead for the site investigation and early remediation efforts. Fieldwork for the RI was done in late 1992 and early 1993. Potential hot spots of buried drums were identified during geophysical surveys conducted as part of the RI. Based on this information, the MDEQ used state funding to conduct additional investigations of the potential hot spots to better determine their nature and extent. During 1994, the EPA completed the RI/FS reports for the site. The MDEQ, using state funds, conducted test pitting to determine the extent and contents of the buried drums on-site. Drums containing solvents were uncovered in one area of the landfill.

In 1995, the EPA issued a Record of Decision (ROD) for the final Remedial Action (RA) at the site. The selected remedy included removal and off-site treatment and disposal of drums containing hazardous and liquid wastes from Test Pit Area #9 and other drums

encountered during grading of the landfill surface. The remedy also required construction of a solid waste landfill cover with a flexible membrane liner over the entire landfill mass, installation of an active landfill gas collection system with flaring to treat the off-gas from the landfill, and monitoring of groundwater to ensure effectiveness of the RA in lowering site arsenic concentrations through natural oxidation. The ROD also included an option for passive gas venting. Institutional controls were to be placed on the landfill property to limit both land and groundwater use and remain in place until the cleanup standards were attained (estimated at 14 years or 2009). The EPA subsequently approved passive gas venting for landfill gases and appropriate criteria must be met at the fence boundary. The ROD also included a contingent remedy for groundwater treatment by in-situ oxidation if, five years after the landfill cap installation, the arsenic concentrations in the groundwater did not decline at a sufficient rate or contamination threatened residential wells.

A Unilateral Administrative Order (Order) for the Remedial Design (RD) and RA was signed in October 1995. The PRP group completed the predesign field studies throughout 1996. The PRP group completed the design in September 1997. In December 1997, drums of hazardous waste were removed from the site. In 1998, underground storage tanks were excavated and removed from the site and new monitoring wells were installed. The PRPs split into RA and RD groups at that time. Construction of the final cap and vegetative cover was completed on September 28, 1999. In 2000, a series of erosion concerns and control measures as well as a few elevated gas levels in the gas probes were identified. The methane level at one probe point along the eastern boundary of the site was elevated during three separate sample events in 2000. Two additional gas probes were installed and monitoring of methane continued for a total of twelve quarters, to ensure that migration was detected before possible impact to nearby residential areas. Monitoring subsequent to July 2000 revealed no unacceptable methane levels, and gas probe monitoring was terminated after the March 2002 sampling event. Significant erosion control work was undertaken at the site late in the fall of 2000. The EPA and the MDEQ approved the landfill vegetative cap in June 2002, after it withstood a winter without erosion problems.

The final RA close-out inspection was performed on May 31, 2001. Quarterly gas probe readings, taken subsequent to the elevated levels detected in July 2000, did not reveal any additional unacceptable gas levels; however, PRPs have not taken any readings since March 2002. The MDEQ took readings from the gas probes in 2006 along with the site inspection. The operation and maintenance (O & M) activities for this site include sampling of monitoring and residential wells. There is also a contingency plan in the event the groundwater concentrations reach unacceptable levels. The EPA completed a Five-Year Review (FYR) of the remedy in August 2002. The 2002 FYR noted that the maximum contaminant level for arsenic would be lowered from 50 to 10 parts per billion (ppb) by 2006 which requires a more careful analysis of site data. Manganese, aluminum, and ammonia concentrations in groundwater have exceeded Michigan residential drinking water criteria in some on-site monitoring wells since 2002 and continue to be monitored.

The second FYR for this site was completed on August 15, 2007, and noted manganese and arsenic in groundwater being concerns to watch. A reduction in the maximum concentration limit for arsenic has resulted in a larger portion of the plume being above criteria than originally determined. Two additional properties are now encompassed in the area over the plume and need restrictive covenants (RCs) regarding contaminated groundwater. The status of the contaminant conentrations is not clear due to the outdated sampling techniques previously used at this site (including bailers and filtered samples) until recently. Arsenic groundwater trend analysis and institutional controls (ICs) analysis were evaluated. A multi-year trend analysis was performed to take into account the updated sampling techniques. The MDEQ recommended additional updates to site technologies and expressed other concerns at this site to EPA in 2009. The 2008 groundwater data included only filtered

dissolved) metals samples and elevated reporting limits, so it cannot be compared to the unfiltered (total) metals samples collected since that time.

The south branch of the Kalamazoo River is directly south of the site and near some off-site wells. Many of the wells located on site maps in that area are not sampled. That part of the river is potentially at risk. MDEQ staff suggested that the PRPs perform additional evaluation and analytical work to assess the release of arsenic and manganese to the wetland and surface water immediately south of the site. The EPA has not required follow-up to date.

The groundwater is sampled each fall and an annual report is submitted each March. The current ROD requires that five years from the date on which construction of the landfill cap is complete, a statistical test be performed on wells in which the arsenic concentration exceeds 50 ppb. This statistical test is designed to determine whether arsenic in the well or wells is declining sufficiently fast to fall below 50 ppb within 15 years of completion of landfill cap construction. If any well failed this test, the contingent remedy was to be implemented. The EPA has declined to enforce the appropriate evaluation of this requirement and noted an extended evaluation period in the 2007 FYR to allow for contamination to attain compliance.

MDEQ staff discontinued project management activities on this site in 2011 due to budgetary and staffing constraints. Superfund staff have arranged for MDEQ drinking water staff to sample a limited number of residential wells located immediately downgradient of the landfill. The South Branch of the Kalamazoo River is not being monitored.

The third FYR was completed on August 3, 2012. It noted the previous arsenic criteria maximum contaminant level (MCL) modification to 10 ppb in drinking water (prior to the 2007 FYR). The EPA determined in 2007, that the PRPs should be given additional time (in addition to the 15 years stated in the ROD) to comply with the more stringent criteria requirement.

The MDEQ Project Manager arranged for the Department to collect drinking water samples from a limited number of the downgradient residences in 2013. Sample results indicate elevated arsenic, manganese, and iron in some wells. This information led the Project Manager to perform a focused data review. The following information was noted: the data from November 2012 reflect reduced concentrations in some wells, however, exceedances of Michigan groundwater criteria for arsenic, ammonia, aluminum, and manganese were observed in other wells. Two wells exceed the arsenic MCL and remain the primary wells of concern for both arsenic and manganese.

The fourth FYR for this site was completed on May 16, 2017. Prior to finalizing the fourth FYR, MDEQ recommended following as follow-up actions to EPA: the Mann Kendall or similar statistical analysis and trend analysis, landfill gas monitoring for the next five years, determination of off-site migration of arsenic in groundwater.

From 2014-2017, drinking water samples were collected annually from residential wells located site-gradient of the Site and analyzed for presence/absence of arsenic compound. These samples were collected by County Health Department as part of a long-term groundwater contamination investigation being conducted by the MDEQ. The laboratory did not detected the presence of arsenic above the MCLs of 10 ppb.

SITE STATUS

It has been determined that the existing RC lack necessary language to ensure protectiveness of the remedy. Progress on the replacement/updated RC has been slowed by tax-reversion-related delays. Calhoun County Landbank holds an updated title for one of the two parcels containing the actual landfill waste; ownership of the other title remains

under scrutiny. It is anticipated that this will be addressed prior to the 2022 FYR.

EPA recommended the PRP group continues the trend analysis to monitor reduced arsenic levels over the next five years at the Site and implement RC for property parcels owned by Calhoun County. County Health Department, on behalf of the MDEQ, will continue to collect drinking water samples from residential wells located site-gradient of the Site and analyze for presence/absence of arsenic.

ENFORCEMENT STATUS
The EPA issued an Order to the PRPs: Cooper Industries, Corning, Inc., the city of Albion, and Decker Manufacturing. Two of the PRPs, Cooper Industries and Corning, Inc., have completed the design and implemented the remedy. The EPA initiated litigation for past and future costs with the PRPs. The EPA also negotiated a Consent Decree with the PRPs for all work as well as past and future costs. Decker Manufacturing and the city of Albion are performing all O & M activities as part of this settlement.

It has been determined that the existing RC lacks required language and needs to be updated. Calhoun County Landbank has taken ownership of one of the landfill parcels, MDEQ staff continues to pursue information regarding the ownership status of the remaining parcel in order to complete the RC process.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 03/28/1995**

The remedy includes: removal and off-site treatment and disposal of drums, construction of a solid waste landfill cap, ICs, active landfill gas collection, groundwater monitoring, and treatment of groundwater by in-situ oxidation if arsenic contamination does not decline within five years of completion of the landfill cap. During the design, the EPA approved modification of the active landfill gas collection to a passive venting system.

Response Accomplishments: Completed

Interim Response In 1986, the EPA discovered approximately 40 drums of waste on the surface of the landfill. In 1990, under the supervision of the EPA, one of the PRPs conducted the removal action of the surface drums.

Start Date: 01/01/1990 Primary Cost: $100,000 Source: Private

End Date: 01/01/1991 Secondary Cost: $1,000 Source: State

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Investigation

The EPA assumed the lead for the site investigation. Fieldwork for the RI was done in late 1992 and early 1993. Potential hot spots of buried drums were identified during geophysical surveys conducted as part of the RI. Based on this information, the MDEQ used state funding to conduct additional investigations of the potential hot spots to better determine their nature and extent. The MDEQ conducted test pitting to determine the extent and contents of the buried drums on-site. The EPA completed the RI/FS reports for the site in 1994. The EPA later recovered their costs from the PRPs. These costs were developed from the ROD estimates and the EPA.

Start Date:	*01/01/1992*	Primary Cost:	$1,201,000	Source: Private
End Date:	*03/28/1995*	Secondary Cost:	$200,000	Source: State

Remedial Design

The RD was approved by the EPA in September 1997. All RD work was completed by the PRPs. Costs indicated are a rough estimate.

Start Date:	*12/11/1995*	Primary Cost:	$270,000	Source: Private
End Date:	*09/01/1997*	Secondary Cost:	$50,000	Source: Federal

5 Year Review

The 2002 FYR acknowledged that the groundwater concentrations of arsenic and manganese may be problematic due to more stringent criteria having been adopted in the updated risk based derivations.

Start Date:	*05/02/2002*	Primary Cost:	$0	Source: Federal
End Date:	*09/06/2002*	Secondary Cost:	$0	Source:

5 Year Review

The 2007 FYR contained follow-up requirements to evaluate trends including the site driver of arsenic, at the new MCL of 10 ppb, and the updated technology with use of unfiltered samples.

Start Date:	*10/11/2006*	Primary Cost:	$0	Source: Federal
End Date:	*08/15/2007*	Secondary Cost:	$0	Source:

5 Year Review

This FYR was completed on August 15, 2012. MDEQ staff did not review or comment on the document due to lack of funds and associated lack of involvement. The EPA has chosen not to enforce the ROD regarding arsenic and manganese criteria exceedances in groundwater.

Start Date:	*08/03/2011*	Primary Cost:	$0	Source:
End Date:	*08/15/2012*	Secondary Cost:	$0	Source:

5 Year Review

On November 11, 2016, MDEQ project manager participated in the FYR site visit with EPA. In May 2017, MDEQ provided a detail comment letter on the draft fourth FYR to the EPA. On May 16, 2017, EPA completed and signed fourth FYR for the Albion-Sheridan Township Landfill Site.

Start Date:	*11/16/2016*	Primary Cost:	$0	Source:
End Date:	*05/16/2017*	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Construction Complete

Remedial Action In December 1997, drums of hazardous waste were removed from the site. In 1998, underground storage tanks were excavated and removed from the site and new monitoring wells were installed. Construction of the landfill cap, including a flexible membrane liner, began in the spring of 1999 and was completed by the end of 1999. The final Construction Completion Inspection was performed on May 31, 2001.

Start Date: 09/01/1997	Primary Cost:	$2,654,734	Source:	Private
End Date: 05/31/2001	Secondary Cost:	$78,000	Source:	Federal

Response Accomplishments: Ongoing

Operation and Maintenance The landfill cap will require maintenance to remain protective. The PRP group is responsible for these activities as well as long-term sampling of monitoring and residential wells. Estimated costs were $145,000/first 5 years then $14,000/year for the following 15 years plus mowing and maintenance costs.

Start Date: 01/01/1998	Primary Cost:	$980,000	Source:	Private
End Date: 10/27/2028	Secondary Cost:	$0	Source:	

Response Accomplishments: Future Need

5 Year Review The purpose of this FYR will be to determine whether the implemented remedy at this site is actually protective of human health and the environment.

Start Date: 09/01/2021	Primary Cost:	$0	Source:	
End Date: 09/01/2022	Secondary Cost:	$0	Source:	

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$627	$0	$627	$627	$627

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$610	$0	$0	$610	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$366	$0	$0	$366	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$2,873	$0	$0	$2,873	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$2,506	$0	$0	$2,506	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$3,171	$0	$0	$3,171	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$15,015	$0	$0	$14,957	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$4,489	$0	$0	$4,489	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$65,000	$0	$0	$62,330	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995339-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$61,252	$0	$0	$61,252	$0
Totals:	$155,909	$0	$627	$153,180	$627

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: McGraw Edison Corporation
704 North Clark Street
Albion , MI

County: Calhoun
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: T9
State Site ID#: 13000090
State Site Score: 36

LOCATION
The McGraw Edison Corporation site is located at 704 North Clark Street on the east side of Albion, Michigan. The site occupies 24 acres surrounded by mixed industrial and residential properties. Approximately 1,500 feet northwest of the site are municipal wells for the city of Albion known as the Clark Street well field. The property has recently been sold and MDEQ staff are unaware of any activities in the building at this time.

SITE HISTORY
The company manufactured air conditioners, humidifiers, and similar equipment until it closed in 1980. From 1970 to 1980, "still-bottoms" (an oily waste) contaminated with trichloroethylene (TCE) were spread on the site's dirt roads to control dust. TCE was found in 2 on-site water supply wells and 45 nearby residential wells in 1980. Nearby Albion municipal wells also showed TCE contamination in the past.

The state of Michigan and McGraw Edison Corporation entered into a Consent Decree in 1984 which required McGraw Edison to address contamination at the site.

A former "fire-well" had been used to purge the bedrock aquifer of contaminants until a temporary shutdown was authorized in 2008. Restarting the deep aquifer pump has not been determined to be necessary to date. A number of shallow purge wells were installed in several phases to purge the upper contaminated aquifer. Only the shallow pumping system is in use at this time. The purged groundwater was originally treated via activated carbon and air stripping. The treatment system has been modified and currently consists of a shallow air stripper tray system. The National Pollutant Discharge Elimination System (NPDES) permit for discharge to the Kalamazoo River remains in effect.

In the spring of 1995, verification sampling of soils was conducted to monitor the effectiveness of the soil flushing system in removing TCE from site soils as required in the Consent Decree (Decree) and the stipulation and order to implement final remediation. The verification sampling indicated the soil flushing system was effective in remediating two areas to concentrations below 10 parts per billion (ppb), another area to concentrations below 100 ppb, and significantly reduced TCE concentrations in the fourth area. It was determined that soil flushing should continue in the fourth area and verification sampling should be undertaken in 1998. The groundwater purge and treatment systems continued to be operated and monitored in accordance with the Decree and the stipulation and order to implement final remediation.

In the spring of 1997, verification sampling of soils was once again conducted to monitor the effectiveness of the soil flushing system in removing TCE from soils in the remaining soil flushing area. The verification sampling and a statistical evaluation of the data indicated that the soil flushing system was effective in reducing the concentrations to acceptable levels, and closure of the soil flushing unit was approved. In addition, the MDEQ's Surface Water Quality Division and Air Quality Division approved a modification to remove the activated carbon system from the treatment system as requested by Cooper Industries. Currently,

purged groundwater is treated by air stripping and then discharged to the Kalamazoo River in accordance with the MDEQ's Air Quality Discharge and NPDES permits.

In 1997, a Baseline Environmental Assessment of the property was conducted and submitted to the MDEQ for review prior to the purchase of the property by a local development group. The property transfer was approved by the Michigan Department of Attorney General's (MDAG) office in accordance with the Decree and the stipulation and order to implement final remediation. The building at the property is vacant at this time.

In September 1999, the MDEQ completed a Five-Year Review (FYR) using federal funds assessing the groundwater contaminant levels surrounding the site and evaluating the effectiveness of the remedy. The FYR, approved by the EPA, concluded that the groundwater recovery system continues to effectively extract TCE from the contaminated groundwater and recommended installation of additional monitoring wells where data gaps exist. In 1999, Cooper Industries submitted a formal request to amend the Decree to reflect current Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, cleanup criteria. This request was evaluated and approved by the MDAG's office.

In December 2003, Cooper Industries submitted a work plan to conduct soils investigation by advancing borings under the existing building to determine the presence of potential sources of contamination to justify the installation of a treatment system that can intercept contaminants from migrating into the shallow aquifer. The MDEQ approved the work plan and the investigation was subsequently completed. The results of the investigation indicated several locations in the area that showed levels of contaminants exceeding criteria, notably the northeast corner of the building and the loading dock areas.

In October 2004, the EPA in coordination with the MDEQ, completed a Second FYR of the protectiveness of the remedy. The review concluded that the groundwater recovery system continues to effectively extract TCE from the contaminated groundwater and made the following recommendations and follow-up actions: install additional monitoring wells where data gaps exist, address elevated concentrations of TCE detected in the soils and groundwater in the northeast footprint of the building and the loading dock area, eliminate the removal of monitoring wells from the network, perform a residential well inventory in the area where residences were offered municipal water supply hook-up, and provide a regular maintenance schedule of the extraction/monitoring wells using established well cleaning procedures.

In 2005, MDEQ staff reviewed, evaluated, and approved Cooper Industries' proposed work plan for in-situ chemical oxidation test at the facility. The work plan called for conducting a pilot test to understand what effect a full scale in-situ chemical oxidation treatment program using potassium permanganate will have in reducing the mass of TCE in the shallow aquifer, and volume of groundwater being treated by the existing groundwater pump and treat (P & T) system. The pilot test was conducted and results were inconclusive as to the viability of the technology for this site.

Cooper Industries prepared a deep aquifer shutdown work plan which included updating and replacing the old treatment system with a shallow tray stripper. The shutdown was originally for a one-year period (April 2008 until April 2009), but was extended three months due to equipment failure in December 2008. The replacement system was operational in February 2009. The shutdown plan required that MDEQ be convinced that the deep aquifer was no longer contaminated and that the shallow aquifer was not negatively impacted by the shutdown or the associated shift in the vicinity groundwater levels. Additional monitoring wells were to be placed downgradient to assist in the appropriate monitoring of this system;

locations were to be determined as data was collected. The MDEQ has concurred with the assessment that additional wells are not yet necessary. There are still a few isolated locations with contamination, but the majority of the contamination in the deep aquifer appears to have been removed.

In February 2009, the potentially responsible parties (PRPs) installed a new shallow tray air stripper to replace the broken stripper system. The new system consists of two units for ease in cleaning and potential pumping volume increases.

The MDEQ, in cooperation with the PRPs, completed and placed an updated Restrictive Covenant (RC) on the property in 2013. The RC imposes institutional controls on the property to prohibit installation of water wells in the affected area and restrict digging. The RC also calls for evaluation of inhalation concerns in the building, placement of the approved permanent markers, and follow-up on the remaining contamination in the pilot study area near the loading dock area adjacent to the building. The property has recently been sold.

A draft vapor intrusion (VI) workplan was approved and sampling efforts were completed in July 2014.

It was decided on June 24, 2016, that installation of a sub-slab depressurization (SSD) system was necessary to address unacceptable exposures related to VI inside the McGraw Edison building. Consequently, the SSD system was installed on October 4, 2016.

SITE STATUS

Cooper Industries continues to operate the shallow aquifer groundwater P & T system and samples groundwater at the site on a semiannual basis with the objective of monitoring the progress of groundwater remediation by recovery/treatment systems in the shallow aquifer.

The deep aquifer groundwater quality continues to be monitored over time along with the shallow aquifer system and groundwater plume.

The PRPs have not initiated efforts regarding placement of permanent markers or evaluation and remedial action to address contamination remaining at the loading dock area.

The SSD system was installed on October 4, 2016. The installation consisited of two vent pits connected to a single fan on the roof of the building in the western part of the plant to cover the area occupied by Challenger Communications' workers. Initial air effluent sampling results were low. The PRPs will submit a report on the operation and monitoring data of the SSD system on a regular basis.

A summary of the SSD system operation and monitoring, P & T system operation and monitoring, the groundwater monitoring plan, and air permitting was discussed between MDEQ and the PRP consultant in January 2017. The MDEQ asked about the operation monitoring of the SSD system and a committment was made to submit a plan for monitoring the system and reporting the data to the State.

A summary of the planned ozone injection beneath the building and expansion of the SSD sytem was presented at the January 2017 meeting.

A submittal consisting of a Response Activity Plan Exemption Request is planned and the MDEQ Superfund Section will review and approve the plan and exemption request. The MDEQ did request that a presentation be made to the In-Situ Technical Assistance Program Support team before preparing the submittal.

The MDEQ expressed a concern regarding the potential for off-site VI downgradient of monitoring well B-45S. The PRP Consultant, in a letter dated January 18, 2017, indicated that concentrations of PCE and TCE for the four most recent groundwater sampling events are consistently below the 2013 VI Guidance residential groundwater to indoor air screening levels and therefore off-site VI downgradient of monitoring well B-45S is unwarrented. The MDEQ staff intend to reconvene with the PRP consultant in early 2018 to discuss this issue further and perhaps make a final determination.

ENFORCEMENT STATUS

A Decree between the state of Michigan and McGraw Edison Corporation was entered with the Calhoun County Circuit Court on June 11, 1984. Subsequently, this site and the rest of the McGraw Edison Corporation were purchased by Cooper Industries. Residents, whose wells were contaminated by this site, have been placed on a municipal water supply system paid for by the McGraw Edison Corporation. In accordance with the Decree, McGraw Edison Corporation paid $250,000 to the state for its costs, set up a $150,000 trust account for economic development, completed a hydrogeological study of the site, installed deep and shallow aquifer groundwater purging and treatment systems and a soil flushing system. Several additional Orders were placed after the original. The final Order was completed on March 23, 2001.

SPECIAL CONSIDERATIONS

None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Alternate Water

Residents in the vicinity of the site, whose wells were affected by contaminants from the site, were placed on a municipal water supply system paid for by the state at a cost of $250,000, which was subsequently reimbursed by McGraw Edison Corporation.

Start Date:	*09/30/1980*	Primary Cost:	$250,000	Source: Private
End Date:	*09/30/1987*	Secondary Cost:	$0	Source:

Remedial Investigation

Cooper Industries conducted the Remedial Investigation/Feasibility Study (RI/FS) from 1985 through 1986 at a cost of $2,000,000. The RI consisted of soils and hydrogeological investigation.

Start Date:	*09/30/1985*	Primary Cost:	$2,000,000	Source: Private
End Date:	*09/30/1986*	Secondary Cost:	$0	Source:

Remedial Action

The Remedial Action consisted of two parts: soils removal (about 18,980 cubic yards of contaminated soils were removed from site and disposed of at an approved facility), and soils flushing that spanned from May 1989 through October 1997.

Start Date:	*02/22/1986*	Primary Cost:	$5,000,000	Source: Private
End Date:	*10/30/1997*	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

The FYR was completed by MDEQ staff and submitted to the EPA in September 1999. The review concluded that the groundwater recovery system continues to effectively extract TCE from the contaminated groundwater and recommended installation of additional monitoring wells where data gaps existed.

Start Date: 05/30/1999	Primary Cost:	$8,528	Source: Federal
End Date: 10/29/1999	Secondary Cost:	$0	Source:

5 Year Review

The 2004 FYR was completed by the EPA in coordination with MDEQ staff. The review concluded that the groundwater recovery system continues to effectively extract TCE from the contaminated groundwater and made the following recommendations and follow-up actions: install additional monitoring wells where data gaps exist, address elevated concentrations of TCE detected in the soils and groundwater in the northeast footprint of the building and the loading dock area, eliminate the removal of monitoring wells from the network, perform a residential well inventory in the area where residences were offered municipal water supply hook-up, and provide a regular maintenance schedule of the extraction/monitoring wells using established well cleaning procedures.

Start Date: 08/09/2004	Primary Cost:	$0	Source:
End Date: 10/27/2004	Secondary Cost:	$0	Source:

Response Accomplishments: In Progress

Remedial Action

It was decided on June 24, 2016 that installation of a SSD system was necessary to address unacceptable exposures related to VI inside the McGraw Edison building.

The SSD system was installed on October 4, 2016. The installation consisited of two vent pits connected to a single fan on the roof of the building in the western part of the plant to cover the area occupied by Challenger Communications' workers. Initial air effluent sampling results were low. The PRPs will submit a report on the operation and monitoring data of the SSD system on a regular basis.

Start Date: 10/04/2016	Primary Cost:	$0	Source:
End Date: 11/27/2018	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Ongoing

Operation and Maintenance Operation and Maintenance (O & M) of the groundwater extraction and treatment system has been on-going continuously since 1990 and is projected to end in 2030. The cost of this operation was originally estimated at $700,000 per year. The current O & M estimate has been reduced to $113,500 per year due to the shutdown of the deep aquifer groundwater treatment system and other system upgrades. The PRPs continue to assess VI concerns at the site.

Start Date: 09/30/1990 Primary Cost: $28,000,000 Source: Private

End Date: 12/30/2030 Secondary Cost: $0 Source:

Response Accomplishments: Future Need

Remedial Action There is a conceptual plan in place to inject ozone underneath the building in the near future.

Start Date: 04/22/2018 Primary Cost: $0 Source:

End Date: 07/22/2018 Secondary Cost: $0 Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V985560-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$8,529	$0	$0	$8,528	$0
Totals:	$8,529	$0	$0	$8,528	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Verona Well Field
250 Brigden Drive
Battle Creek , MI

County: Calhoun
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: 51
State Site ID#: 13000006
State Site Score: 38

LOCATION
The Verona Well Field site is located in the northeast part of the city of Battle Creek, Calhoun County, Michigan. The site consists of the well field located at 250 Brigden Drive and three source areas: Thomas Solvent Raymond Road (Raymond Road), Thomas Solvent Annex (Annex), and the Grand Trunk Western Railroad Paint Shop (Paint Shop). The Raymond Road source area is located at 1194 N. Raymond Road, the southeast corner of Raymond Road and Emmett Street. The Annex is located on the south side of Emmett Street, approximately one-half mile west of the Raymond Road source area. The Paint Shop is located at the north end of Raymond Road by the Grand Trunk Western/Canadian National Railroad marshalling yard. The area surrounding the well field includes three residential areas and pockets of light and heavy industry. The largest of the residential areas borders the well field to the south, between the well field and the Raymond Road and the Annex source areas. The Grand Trunk Western/Canadian National Railroad marshalling yard borders the well field to the east. A large undeveloped wetland area is located north of the well field.

SITE HISTORY
In 1981, as a result of routine monitoring, several volatile organic solvent contaminants were found in the city of Battle Creek's municipal water system. Between 1981 and early 1984, 27 of the 30 municipal wells in the Verona Well Field became contaminated as the groundwater contaminant plume progressed northward. The same contaminants were also found in a number of private residential wells in an adjacent residential area. In 1983, the municipal water system was extended to this neighborhood.

The MDEQ initiated investigations into the source of contamination to the well field in 1981 and the EPA began remedial investigation/feasibility study (RI/FS) work in 1983. In accordance with the May 1, 1984, Record of Decision (ROD), the EPA implemented an interim measure wherein 12 municipal wells were converted into blocking wells of which approximately 6 would operate at any given time. This system helped to minimize the migration of the contaminated plume into northern municipal wells. Additionally, to help supplement well field capacity lost due to the contamination and the implementation of the blocking wells, three additional municipal water supply wells were installed at the far downgradient end of the Verona Well Field. Since this blocking system became operational, contaminant concentrations in the north part of the well field have fallen dramatically.

The EPA's investigation identified three source areas: Raymond Road, the Annex, and the Paint Shop. Raymond Road has tax-reverted to the state while the latter two source areas are owned by the Canadian National (formerly Grand Trunk Western) Railroad. Raymond Road was owned and operated by the Thomas Solvent Company, a solvent recycling, blending, and packaging company that had poor housekeeping practices as well as 21 underground storage tanks. The Annex was a transfer station operated by the Thomas Solvent Company that also had poor housekeeping practices during its operation. The Paint Shop contamination resulted from disposal of degreasers into a dirt pit. Site contaminants are primarily solvents and volatile organic compounds (VOCs). Some of the site indicator

compounds include: trichloroethylene, tetrachloroethene, cis-1,2-dichloroethene, carbon tetrachloride, 1,1-dichloroethane, trichloroethane, benzene, toluene, ethylbenzene, and xylenes.

In 1987, a groundwater extraction well system was installed at Raymond Road to begin groundwater remediation at this source area. The state operated this system until 2012 when it was shut down to optimize other treatment systems. Soil vapor extraction (SVE) was also installed and operated from 1988 to 1992. With the possible exception of one hotspot location, 1991/1992 soil sampling indicated that VOC levels in the soils at this source area had reached Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 201) generic residential cleanup criteria. 2005 hotspot soil sampling indicated exceedences of cleanup criteria for tetrachloroethene and trichloroethene. The detection of higher contaminant concentrations was likely due to improved sample preservation methods.

The final site-wide ROD was signed in June 1991 and consists of operation and maintenance (O & M) of the existing northern blocking wells and treatment systems; the installation and O & M of a southern line of blocking wells between the existing blocking wells and the source areas; installation and O & M of groundwater extraction and treatment systems at the remaining source areas; and installation and O & M of SVE systems at the remaining source areas.

The participating potentially responsible parties (PRPs) completed the construction of the final remedy in December 1996. The constructed groundwater remedy varies from the 1991 ROD in the following ways: the Annex groundwater system was only constructed to provide containment and not active remediation, a groundwater extraction system was not installed at the Paint Shop, and a second air stripper was not constructed at the well field to treat the additional extracted groundwater. Since construction completion, samples have been, and are being, collected to help evaluate the effectiveness of the blocking well, extraction well, and treatment systems.

In the early 1990s, the PRPs installed SVE systems at the two remaining source areas. These systems were operated for less than a year. In response to MDEQ incentives, in November 2004 and May 2005, the PRP group initiated groundwater sparging at the Annex and Paint Shop source areas, respectively, to augment source area contaminant removal; and have seen a significant reduction in contamination at these locations. The 365 days of operation required in the Scope of Work was completed in November 2005. The PRPs continued sparging after said date.

There were several outstanding issues regarding the implementation of the final remedy, whether or not the final remedy was effective and provided adequate capture, as well as the methods used to demonstrate that the remedy was effective and operating properly. In order to address these important issues, representatives of the PRP group, the city of Battle Creek, the EPA, and the MDEQ participated in a process to develop a Verona Well Field Management Plan. Toward this end, the participating parties developed an Interim Commitment, signed September 26, 2000, that spelled out the future of the remedial actions (RAs) at the site. Design documents for the proposed upgrades to the well field blocking well and treatment systems and for the Annex extraction system were submitted by the PRP group, reviewed by the MDEQ, and implemented in 2003. The PRP group worked with the MDEQ on evaluating source area enhancements at the Paint Shop and/or the Annex to augment contaminant mass removal at these source areas as a part of a draft state Judicial Consent Decree (Decree).

The EPA issued an Explanation of Significant Differenct (ESD) on September 29, 2003,

identifying the following modifications to the 1991 ROD remedy: reduction in the scope of the Annex groundwater extraction well system, elimination of on-site groundwater extraction at the Paint Shop in favor of downgradient treatment at the second (southern) line of blocking wells, elimination of the second air stripper in the well field, elimination of installation of additional extraction well(s) downgradient of the Raymond Road source area, and modification of the cleanup criteria specified in the 1991 ROD. The MDEQ did not concur with the ESD because the ESD failed to identify three compounds (aluminum, iron, and sodium) exceeding Part 201 generic residential cleanup criteria as contaminants of concern with corresponding cleanup criteria.

While the draft Decree was being negotiated, the PRPs completed several tasks in 2004 that were listed within the Decree, including completion of the construction of the Bypass and Blocking Well System, and installation and operation of an air sparging (AS) treatment system in the Annex Source Area. The enhancements to the Bypass and Blocking Well System were completed in mid-2004 and began operation shortly thereafter. The Annex Sparge System was installed in the fall of 2004 and began operation in October 2004. The Decree was signed and filed in February 2006.

With input from all of the Verona Well Field Management Plan parties, the Verona Well Field Management Plan was approved with modification on December 20, 2007. The purpose of this plan is to coordinate and manage the operation, maintenance, inspection, monitoring, performance evaluation, communication, reporting, and contingency corrective measures for the entire site and the corresponding source areas.

In 2005, the MDEQ conducted a soil investigation at the Thomas Solvent Raymond Road site. Results indicated exceedences of cleanup criteria for tetrachloroethene and trichloroethene. The investigation was required to determine how much contamination remained in the on-site soils and to complete a requirement listed in the 2002 Five Year Review (FYR). The results of this investigation led the EPA and the MDEQ to implement AS and/or SVE at Thomas Solvent Raymond Road, Davis Oil, and the "northwest area" (located at the northwest corner of Raymond Road and Emmett Street) with the intent of remediating residual vadose zone soils (Thomas Solvent Raymond Road) and reducing contaminant mass in the smear zone soils (Thomas Solvent Raymond Road and downgradient).

A 2008 ESD supported these recommendations and documented the following significant differences from the EPA's originally selected remedy:

*Performance of a second phase of SVE treatment to reduce VOCs in vadose zone soils at Thomas Solvent Raymond Road to below the cleanup objectives, and to control AS emissions as needed;

*Performance of AS to improve SVE performance in achieving soil cleanup objectives in smear zone and shallow saturated zone soils at Thomas Solvent Raymond Road.

In July 2008, the PRPs conducted limited soil sampling at the Annex and Paint Shop source areas to evaluate current contaminant concentrations in the soils. The soil sample results from two borings at the Paint Shop indicated soils above the site-specific cleanup criteria and only one sample result from three borings at the Annex indicated concentrations above the site-specific cleanup criteria.

The MDEQ began construction of the AS/SVE systems in November 2009 and operation began June 8, 2010. Adjustments were being made to the extraction wells to accommodate the influence of the AS system.

In 2009, the PRPs expanded the sparge systems at the Annex and the Paint Shop and turned off the two deep groundwater extraction wells at the Annex leaving only the two shallow extraction wells on. Because this scenario did not provide complete capture, it was

understood that the AS system would continue to operate to optimize contaminant removal. In the spring of 2010, the PRPs petitioned the Agencies to shut down the two remaining Annex extraction wells and convert them to air sparge points. In the fall of 2010, the MDEQ responded to the PRPs stating that site conditions do not yet meet the requirements specified in the Decree that would allow complete extraction well shut down.

In late 2008, the PRPs petitioned the EPA and the MDEQ to shut down all or a portion of the northern blocking well line. In 2009, the Agencies tentatively agreed to allow the shut down of three additional northern line blocking wells (leaving two northern line blocking wells operating) with the understanding that modifications to the system be made should the need arise. In the fall of 2010, the PRPs requested shutting down the remaining northern blocking wells. The MDEQ responded that site conditions did not yet meet the Decree requirements for shutting down the remaining northern blocking wells. In 2012, the MDEQ and the PRPs modified the Decree to allow these wells to be shut down while the southern blocking wells continue to operate. In May 2012, the PRPs shut down the two remaining northern blocking wells and continue to operate the southern blocking wells.

As of December 1, 2010, the PRPs shut down the Annex AS system and began evaluating when to begin soil verification sampling. To date, Annex soil verification sampling has not occurred. Since the Annex December 2010 AS shut down, the PRPs noticed a rebound in groundwater contaminant concentrations. In May 2013, the PRPs shut down the Annex extraction wells and restarted the AS system.

In 2012, the MDEQ and the PRPs modified the Decree to allow temporary AS without extraction well operation at both the Thomas Solvent Raymond Road and Annex source areas and the MDEQ turned off the Thomas Solvent Raymond Road extraction wells at the end of May 2012. Prior to this, the MDEQ had been able to operate both the AS/SVE systems and the extraction wells while still demonstrating a backward gradient. The Thomas Solvent Raymond Road groundwater concentrations have reduced substantially since the AS/SVE systems implementation.

In late fall of 2011, the EPA drafted an ESD. After several iterations, the EPA finalized this ESD in December 2013. This ESD changed the source area cleanup criteria from one in one million cancer risk to the Michigan generic residential criteria for soils and groundwater and also allowed for AS operation at Thomas Solvent Raymond Road without extraction well operation.

The PRPs also operate the southern blocking well line. In 2013, the PRPs requested that two of the southern blocking wells be shut down. Due to the potential impact to the municipal water supply and the presence of contaminants above cleanup criteria downgradient of the southern blocking wells, the MDEQ and the city indicated this request was premature. In 2015, the PRPs later made a second request to shut down select southern blocking wells and also change the source area remedy to monitored natural attenuation (the PRPs subsequently rescinded the latter request). The EPA's technical consultant determined that, with appropriate field demonstration, the PRPs could potentially shut down the two proposed blocking wells. The PRPs determined they would not pursue shutdown of the two blocking wells due to the level of effort for the demonstration needed.

In 2015, the PRPs requested decommissioning of the Verona Well Field blocking well treatment systems and the Annex SVE system which has not operated since the mid-1990s. Based on the EPA's technical consultant's recommendations, the MDEQ responded to these requests by 1) approving the blocking well treatment system shutdown conditioned upon a better contingency treatment should wellhead treatment be necessary (the PRPs have not agreed to provide this), 2) requesting the PRPs retain the Annex SVE system, indicating the

fairly high unsaturated soil concentrations that existed at the time the system was shut down. The PRPs declined to provide a better contingency plan for wellhead treatment of the blocking wells and removed the SVE system when they decommissioned the blocking well treatment systems in 2016.

In May 2016, the PRPs resumed operation of northern blocking well V27 due to confirmed detections of contaminants in dormant northern blocking wells (all northern blocking wells had been off) and the influent to the city's water plant tap. The operation of this well provides better protection of the municipal water supply and helps capture residual contamination present north of the influence of the Southern Blocking Wells. The PRPs have agreed to notify the agencies prior to terminating operation of this well.

In the fall of 2016, the MDEQ conducted vertical aquifer sampling at several locations at the Thomas Solvent Raymond Road source area. This data was used to place additional monitoring wells to ensure representative samples for groundwater remediation verification sampling. In the fall of 2016, the MDEQ abandoned the groundwater extraction wells; any future groundwater treatment needs would be addressed through the AS/SVE system.

SITE STATUS

Work continues to address the risks to the well field through the southern blocking well system and remediation efforts at the Annex source area.

The MDEQ terminated operation of the AS/SVE system at the Thomas Solvent Raymond Road source area on June 15, 2016, due to groundwater concentrations being below criteria. After a nine month post-sparge aquifer stabilization period, MDEQ began quarterly groundwater monitoring in March 2017 to evaluate achievement of groundwater cleanup criteria. Once the groundwater appears that it will meet criteria, soil verification sampling will occur.

The PRPs stopped the operation of the air sparge system at the Paint Shop Source Area (June 2015) and the Annex Source Area (April 2015). After extensive evaluation by EPA and MDEQ, MDEQ determined that the Annex AS system needed to resume operation in order to protect the municipal well field and meet the requirements in the consent decree. The PRPs resumed operation of the Annex AS system in January 2017. The Paint Shop groundwater treatment occurs at the southern blocking wells and EPA historically approved PRP shutdown of the Paint Shop source area SVE soil treatment system.

The Fourth FYR was completed in September 2017. The FYR concluded that the remedies are protective in the short term. To be protective in the long term, the following recommendations need to be implemented: develop and implement long-term stewardship procedures for monitoring and tracking compliance with existing institutional controls (IC), conduct a site-wide vapor intrusion (VI) investigation (starting with existing information), evaluate need to conduct additional 1,4-dioxane sampling, continue monitoring and operation of northern blocking well V27 for one year, evaluate capture at southern blocking well BW-9, optimize blocking wells hydraulic capture zone, install an additional monitoring well location, determine if Per- and Polyfluoroalkyl Substances (PFAS) are potential contaminants of concern.

ENFORCEMENT STATUS

Enforcement actions were taken against the Thomas Solvent Company and the Grand Trunk Western Railroad. The Thomas Solvent Company subsequently filed for bankruptcy. A partial Consent Decree and judgment was entered by the Federal District Court in November 1991. Under that settlement, the state obtained judgments against Dick Thomas and all of the Thomas Solvent Companies. Pursuant to that judgment, those parties have paid the state more than $611,000. This partial settlement covered state costs incurred

through November 30, 1989. Approximately $200,000 of this amount was set aside for a natural resource damage assessment. In 1989, the state and the EPA received a partial settlement of $607,490 for state costs incurred through June 1988 associated with the Grand Trunk Western Railroad's contribution to the contamination problem. The state entered into an Administrative Order by Consent with the Grand Trunk Western Railroad and other non-de minimis PRPs covering state claims for past state costs incurred after June 1988 to August 31,1994, in the amount of $425,000.

In the fall of 1992, there was a $3 million de minimis settlement with the state and the EPA for past and future costs at the Well Field, the Annex, and the Paint Shop. Approximately $150,000 of this amount went to the state. In October 1993, the Michigan Department of Natural Resources and the EPA initiated enforcement actions against four companies who are liable for costs incurred at the Raymond Road facility. The EPA, the state, and the defendants entered a Consent Decree on April 17, 1998, under which the settling parties agreed to reimburse the state $300,000.

The PRPs for the Annex, the Paint Shop, and Well Field operated the final remedy under a Unilateral Administrative Order issued by the EPA until the PRPs entered into a Consent Decree with the EPA, an agreement with the city of Battle Creek (both entered in January 2006), and a Judicial Consent Decree with the state (entered in February 2006). The state Judicial Consent Decree addresses future remedial actions at the site and settlement of the natural resources damage claim. The settlement includes source area enhancements (for contaminant mass removal) at the Paint Shop and/or the Annex and enhanced remedial actions at the Annex and the Well Field. The Judicial Consent Decree provides for reimbursement of state oversight costs. The MDEQ submitted the first reimbursement request in 2007. This request was disputed by the PRPs and subsequently settled. The second reimbursement request was submitted in 2008, was disputed by the PRPs and settled.

SPECIAL CONSIDERATIONS

It is important to continue the groundwater extraction and treatment system at this site because the contaminants from this source area, if not controlled, will enter the capture zone of the Verona Well Field, the primary water supply for the city of Battle Creek and several surrounding communities.

OPERABLE UNITS

00	Entire Site
01	Thomas Solvent Raymond Rd Source Area GW/Soil Remediation
02	Verona Well Field Interim Action

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 06/28/1991**

The ROD remedy consists of: continued O & M of the existing (northern) blocking well line, installation and O & M of a second line of blocking wells to the south, continued O & M of the existing air stripper/vapor phase carbon treatment system, installation and O & M of a second air stripper/vapor phase carbon treatment system, installation and O & M of groundwater extraction and remediation systems at the Annex and Paint Shop source areas, installation and O & M of SVE systems at the Annex and Paint Shop source areas, implementation of comprehensive monitoring systems site-wide, continued O & M of the Raymond Road source area groundwater extraction system, installation of an on-site air stripper/vapor phase carbon treatment system at the Raymond Road source area, and installation of additional extraction well(s) near Raymond Road.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 09/29/2003**

The EPA issued an ESD on September 29, 2003, identifying the following modifications to the 1991 ROD remedy: reduction in the scope of the Annex groundwater extraction well system, the elimination of on-site groundwater extraction at the Paint Shop in favor of downgradient treatment at the second (southern) line of blocking wells, the elimination of the second air stripper in the well field, elimination of installation of additional extraction well(s) at the Raymond Road source area, and modification of the cleanup criteria specified in the 1991 ROD. The MDEQ did not concur with the ESD because the ESD failed to identify three compounds (aluminum, iron, and sodium) exceeding Part 201 generic residential cleanup criteria as contaminants of concern with corresponding cleanup criteria.

Record of Decision *Amendment:* 0 *ESD:* 3 **Effective 12/11/2013**

This ESD changed the source area (Annex, Paint Shop, Thomas Solvent Raymond Road) cleanup criteria from one in one million cancer risk to the Michigan generic residential criteria for soils and groundwater (generally one in one hundred thousand cancer risk) and also allowed for air sparge operation at Thomas Solvent Raymond Road without extraction well operation. The rest of the contaminated aquifer retains the 2003 ESD one in one million cancer risk criteria.

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Alternate Water Extended municipal water supply to residents whose wells had been affected by the groundwater contaminant plume. Housing & Urban Development spent $1,000,000; the federal government (likely the EPA) spent $475,000, and the city of Battle Creek spent $35,000.

Start Date:	*01/01/1983*	Primary Cost:	$1,475,000	Source: Federal
End Date:	*12/31/1984*	Secondary Cost:	$35,000	Source: Private

Remedial Investigation RI of the Annex and Paint Shop source areas, other potential source areas, the area between the source areas and the Verona Well Field, culminated in the June 28, 1991, site-wide ROD.

Start Date:	*06/15/1983*	Primary Cost:	$2,085,000	Source: Federal
End Date:	*06/28/1991*	Secondary Cost:	$0	Source:

Bottled Water Bottled water was provided to residents whose wells had been impacted by the groundwater plume.

Start Date:	*01/01/1984*	Primary Cost:	$150,000	Source: State
End Date:	*01/01/1989*	Secondary Cost:	$0	Source:

Remedial Design Design of the final remedy for the site: Annex source area groundwater extraction wells, southern blocking well line, modifications to the existing northern blocking well line, and capture of the Paint Shop source area groundwater at the southern blocking well line.

Start Date:	*01/01/1992*	Primary Cost:	$0	Source: Private
End Date:	*01/01/1994*	Secondary Cost:	$0	Source:

Remedial Action Construction of the southern line of blocking wells, the Annex groundwater extraction system, and the construction and limited operation (<1 year) of the Annex and Paint Shop SVE systems.

Start Date:	*01/01/1994*	Primary Cost:	$0	Source: Private
End Date:	*12/01/1996*	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

Per the Executive Summary, "The remedies for the entire Site are protective in the short-term because there is no evidence that there is current significant exposure. In order for the remedy to remain protective in the long term, the following actions are needed, which are not already provided for in enforceable documents or agreements: implementation of measures to provide protection to the city water supply in case demand increases; incorporation of certain SVOCs [semi-volatile organic compounds] and metals into the source area monitoring and cleanup requirements; implementation of screening-level sampling of source area soils for SVOC, pesticide/PCB [polychlorinated biphenyl], and metals contamination, and any significant risks from these parameters need to be addressed prior to release of control over these properties; implementation of actions to comply with 40 CFR 264.193 [sic: actual citation is 40 CFR 265.193] for the portion of the Annex force main going through the storm sewer."

Start Date: 11/07/2001	Primary Cost:	$0	Source: Federal
End Date: 09/30/2002	Secondary Cost:	$0	Source:

5 Year Review

Per the Executive Summary, "The selected remedy is considered protective in the short term; however, in order to assure that it is protective in the long-term, follow up actions need to be implemented." The recommended follow-up actions include: 1) Installation and operation of a replacement extraction well and new free product recovery system and investigation of other technologies to clean up the free product near Raymond Road, 2) evaluation of further treatment options for Raymond Road soil, 3) for the Annex, add dieldrin and benzo(a)pyrene to the final soil sampling and change the remedy to either adjust the cleanup objectives or require permanent usage restrictions, 4) for the Annex and Paint Shop, evaluate effectiveness of the deed notice and, if necessary, propose a restrictive covenant, 5) notify nearby businesses and property owners of the potential for vapor intrusion. The MDEQ does not support all of the recommendations.

Start Date: 12/18/2006	Primary Cost:	$0	Source: Federal
End Date: 09/20/2007	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

The FYR site visit occurred July 3, 2012. The MDEQ received the first draft of the FYR on July 31, 2012, with the EPA issuing the final version on September 18, 2012. Per the Executive Summary, the remedies for the entire site are "protective of human health and the environment in the short-term. [The remedies] are expected to be protective of human health and the environment in the long-term upon attainment of all cleanup standards. Long-term stewardship requires monitoring and evaluating institutional controls. An IC [Institutional Controls] study was performed for the Site by the PRPs and ICs were put in place. However, some ICs at the Site may not be protective in the long-term. Therefore, the ICs for the Site will be re-evaluated to determine whether additional ICs are needed or whether modifications are necessary."

Start Date: 07/03/2012	Primary Cost:	$0	Source:
End Date: 09/18/2012	Secondary Cost:	$0	Source:

5 Year Review

The final fourth FYR included the following recommendations: develop and implement long-term stewardship procedures for monitoring and tracking compliance with existing institutional controls, conduct a site-wide VI investigation (starting with existing information), evaluate need to conduct additional 1,4-dioxane sampling, continue monitoring and operation of northern blocking well V27 for one year, evaluate capture at southern blocking well BW-9, optimize blocking wells hydraulic capture zone, install an additional monitoring well location, determine if Per- and Polyfluoroalkyl Substances (PFAS) are potential contaminants of concern.

Start Date: 09/26/2016	Primary Cost:	$0	Source:
End Date: 09/13/2017	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance

Responsible Parties estimate annual expenditures of $350,000-$400,000 for 2016 and 2017.

PRP operation of the final remedy for the site. This consists of: O & M of one northern well and the southern blocking well lines, O & M of the Annex AS system, and monitoring and evaluation of those systems. In April 2015, the PRPs stopped operating the AS system. After careful consideration including a technical evaluation by EPA's contractor, the MDEQ determined the AS system needed to resume operation (this occurred in January 2017).

Start Date: 06/01/1996	Primary Cost:	$400,000	Source: Private
End Date: 12/31/2040	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Future Need

5 Year Review Estimated dates based on prior FYR.

Start Date: 09/13/2021	Primary Cost:	$0	Source:
End Date: 09/13/2022	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Thomas Solvent Raymond Rd Source Area GW/Soil Reme

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 08/12/1985**

The remedy consists of installation of 9 groundwater extraction wells at Raymond Road with air stripper treatment at the Verona Well Field and 22 SVE wells with carbon/catalytic oxidation off-gas treatment.

Record of Decision *Amendment:* 0 *ESD:* 2 **Effective 09/29/2008**

The ESD provides for the following modifications to the Thomas Solvent Raymond Road remedy: 1) perform a second phase of SVE in combination with AS to try to achieve soil cleanup objectives, 2) allow a temporary shutdown during AS operation if it is demonstrated that AS by itself achieves groundwater Cleanup Objectives at select monitoring wells and groundwater contamination is not spreading, and 3) updated the air emissions Applicable or Relevant and Appropriate Requirements reference.

Please note that the EPA identified this ESD as ESD#2 because this is the second ESD for the site but the first ESD for Operable Unit 1, Thomas Solvent Raymond Road Source Area Groundwater/Soil Remediation.

Response Accomplishments: Completed

Remedial Investigation RI/FS for Raymond Road source area groundwater and soils.

Start Date: 01/01/1983	Primary Cost:	$1,130,000	Source: Federal
End Date: 01/01/1985	Secondary Cost:	$0	Source:

Remedial Action The Raymond Road groundwater extraction system was constructed in late 1986 and began operation in late February 1987. The Thomas Solvent Raymond Road SVE system was installed in 1987/1988 and operated from 1988 to 1992. Approximately $5,930,000 was spent in design and construction of the groundwater extraction system and the SVE system and the operation of the SVE system. Approximately, $1,818,000 was spent for construction of the on-site Raymond Road air stripper.

Start Date: 09/01/1986	Primary Cost:	$6,973,200	Source: Federal
End Date: 06/01/1996	Secondary Cost:	$774,800	Source: State

OPERABLE UNIT 01: Thomas Solvent Raymond Rd Source Area GW/Soil Reme

Response Accomplishments: Completed

Long Term Remedial Action

The MDEQ began operation of the Raymond Road groundwater extraction system (for the EPA) in March 1987 and continued operation under a Cooperative Agreement with the EPA (90/10 split funding) until May 6, 2002, at which time the funding became 100 percent state responsibility.

Start Date:	*02/28/1987*	Primary Cost:	$1,373,400	Source: Federal
End Date:	*05/06/2002*	Secondary Cost:	$152,600	Source: State

Remedial Investigation

The MDEQ undertook a soil investigation in 2005. The investigation was conducted to determine how much contamination remained in the on-site soils and to complete a recommendation in the 2002 FYR.

Start Date:	*04/01/2005*	Primary Cost:	$20,000	Source: State
End Date:	*12/30/2005*	Secondary Cost:	$0	Source:

Remedial Action

The MDEQ replaced extraction well EW3. Petroleum product from the adjacent Davis Oil Underground Storage Tank site was found in EW3 in May 2005.

Start Date:	*12/01/2005*	Primary Cost:	$100,000	Source: State
End Date:	*11/13/2007*	Secondary Cost:	$0	Source:

Remedial Design

MDEQ contractors designed an AS and SVE system to address residual contamination at the Thomas Solvent Raymond Road source area and address the nearby Davis Oil and livestock yard that had historically become impacted by Thomas Solvent Raymond Road-related contamination due to migration.

Start Date:	*10/01/2007*	Primary Cost:	$128,000	Source: State
End Date:	*07/09/2008*	Secondary Cost:	$0	Source:

Response Accomplishments: In Progress

Remedial Action

Thomas Solvent Raymond Road/Davis Oil/Northwest Area AS/SVE construction, operation, verification sampling, and decommissioning. The AS/SVE system was turned off in June 2016. After a nine month post-sparge aquifer stabilization period, MDEQ began quarterly groundwater monitoring in March 2017 to evaluate achievement of groundwater cleanup criteria. Once the groundwater appears that it will meet criteria, soil verification sampling will occur.
Contingent operation of the AS/SVE (6/2017-6/2018) has been budgeted if groundwater sampling indicates rebound.

Start Date:	*11/01/2009*	Primary Cost:	$2,555,420	Source: Federal
End Date:	*12/31/2021*	Secondary Cost:	$283,935	Source: State

OPERABLE UNIT 01: Thomas Solvent Raymond Rd Source Area GW/Soil Reme

Response Accomplishments: Ongoing

Operation and Maintenance

The state assumed 100 percent of the costs associated with long-term O & M at the Raymond Road Source Area on May 6, 2002. O & M is estimated to continue for 35 years, costs to be funded by the state, approximate total $15 million. Costs shown are for one year. As of May 2012, the extraction wells were turned off to allow optimized operation of the AS/SVE systems. The extraction wells were subsequently abandoned in the fall of 2016 with the understanding that any needed groundwater treatment would come from the more effective air sparge system. Estimated end date based on AS/SVE end date when all extraction system equipment will have been disposed.

Start Date: *05/06/2002*	Primary Cost:	$425,000	Source:	State
End Date: *12/31/2021*	Secondary Cost:	$0	Source:	

OPERABLE UNIT 02: Verona Well Field Interim Action

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 05/01/1984**

The remedy consists of 12 municipal wells being converted to blocking wells to protect the municipal well field. Water is to be treated through an on-site air stripper with vapor phase carbon. The remedy also included installation of three additional municipal wells to provide 6 million gallons per day toward replacement of lost municipal water capacity due to the municipal wells being converted to blocking wells.

Response Accomplishments: Completed

Remedial Investigation

The RI to determine how to address contamination in the Verona Well Field municipal water supply.

Start Date: *01/01/1983*	Primary Cost:	$1,000,000	Source:	Federal
End Date: *05/01/1984*	Secondary Cost:	$0	Source:	

Remedial Design

Designing the northern blocking well and groundwater treatment system (air stripper/vapor phase carbon).

Start Date: *01/01/1984*	Primary Cost:	$210,900	Source:	Federal
End Date: *01/01/1984*	Secondary Cost:	$0	Source:	

Interim Response

Conversion of municipal wells to the northern blocking well line and construction of the air stripper treatment system.

Start Date: *01/01/1984*	Primary Cost:	$2,039,000	Source:	Federal
End Date: *09/01/1984*	Secondary Cost:	$226,000	Source:	State

OPERABLE UNIT 02: Verona Well Field Interim Action

Response Accomplishments: Completed

Long Term Remedial Action Long-term operation of the Interim Action blocking well line (northern blocking well line) from initiation of operation in approximately September 1984 until the PRP group assumed operation of the extraction and remediation system in June 1996. By December 1996, the PRP group completed construction of the 1991 ROD remedy (includes upgrades to the northern blocking wells and construction of a southern blocking well line) when the interim action became part of the final remedy outlined in the 1991 ROD. Costs shown are from Cooperative Agreement expenditures. Additional related costs are included with the interim response construction and may also be included in the Raymond Road Superfund State Contracts.

Start Date: 09/01/1984	Primary Cost:	$492,000	Source: Federal
End Date: 06/01/1996	Secondary Cost:	$54,600	Source: State

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005793-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Long Term Remedial Action	$3,710,712	$371,072	$0	$2,485,381	$0
Remedial Design	$210,900	$0	$0	$210,900	$0

Cooperative Agreement Number V00E82601 : Open

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$2,828,197	$272,777	$0	$1,831,662	$63,248
Totals:	$6,749,809	$643,849	$0	$4,527,943	$63,248

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995260-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$25,903	$0	$0	$25,902	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$303,590	$0	$0	$229,301	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$108,582	$0	$0	$107,895	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$3,858	$0	$0	$3,839	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$305,000	$0	$0	$304,926	$0
Totals:	$746,933	$0	$0	$671,864	$0

STATE SUPERFUND CONTRACTS

For Operable Unit 01 : Thomas Solvent Raymond Rd Source Area GW/S : Open

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Action	$6,147,887	$736,378	$736,378	$0
Long Term Remedial Action	$3,886,100	$388,610	$181,800	$0

For Operable Unit 02 : Verona Well Field Interim Action : Closed

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Interim Response	$2,300,000	$230,000	$226,000	$0
Totals:	$12,333,987	$1,354,988	$1,144,178	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: U.S. Aviex
1056 Huntly Road
Niles , MI

County: Cass
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: T8
State Site ID#: 14000017
State Site Score: 40

LOCATION
The U.S. Aviex Superfund site covers about six acres in Howard Township, Cass County. The area surrounding the site is primarily residential with farmland to the east. The Jerry Tyler Memorial Airport is located approximately 1.5 miles west and in the direction of groundwater flow from the site. The groundwater contamination plume from the site is located within, and east of, the 10-year time of travel capture zone of the city of Niles municipal water supply wells.

SITE HISTORY
U.S. Aviex was the former owner of the property located at 1056 Huntly Road in Niles. The company produced various non-lubricating automobile solvents. In July 1972, an underground pipeline containing diethyl ether was ruptured and nearby residential wells became contaminated within three to four months. In November 1978, fire destroyed most of the facility resulting in the release of a number of other organic compounds into the soil and groundwater.

The site was placed on the National Priorities List in September 1983 and U.S. Aviex began purging and treating groundwater from two extraction wells later that year. U.S. Aviex also began a remedial investigation/feasibility study (RI/FS) to determine the extent and nature of the contamination; however, it was completed in August 1986 by the EPA. The RI identified impacted groundwater moving west-southwest toward the intersection of Almaugas Road and Blanchard Drive. The residents of Howard Township, in the area of the impacted groundwater, were connected to the city of Niles water supply in September 1987.

In 1988, U.S. Aviex declared Chapter 11 Bankruptcy and the EPA assumed the cleanup responsibilities. Later in 1988, an FS was completed and the Record of Decision (ROD) was signed with the selection of an on-site soil flushing treatment with groundwater purging and treatment remedy. The state concurred with the ROD and in September 1991 the MDEQ entered into a Superfund State Contract (SSC) with the EPA for the state's share of capital costs of the remedial action (RA). In October 1991, the design of the groundwater extraction and treatment system was completed and construction was completed in September 1993. Based on the EPA initial assessment, it was determined that additional soil treatment was not warranted and an Explanation of Significant Differences (ESD) was issued eliminating soil flushing from the remedy. The final RA construction report was completed in October 1993. The MDEQ assumed the operation and maintenance of the treatment system from the EPA in October 1994, and in October 1995, the site changed status to a fund-financed state lead (90 percent federal funding and 10 percent state funding) for operation and maintenance (O & M) costs over ten years.

In October 1997, Tetra Tech Environmental Management, Inc. mobilized under authorization of the EPA to define the horizontal and vertical extent of contaminated groundwater bypassing capture by the current extraction system. The investigation discovered 1,2-dichloroethane and diethyl ether above cleanup levels beyond the capture zone of the extraction system. In 1999, the MDEQ received a $367,000 grant from the EPA for

state-lead work to determine how to best capture and clean up the escaping plume. An additional extraction well (EW-6) was installed in 2000 to prevent further downgradient migration of contaminated groundwater until the extent of contaminated groundwater could be fully defined.

The MDEQ conducted several additional groundwater investigations between 2002 and 2003 to better define the extent of the downgradient plume, the effectiveness of the installed pump and treat (P & T) system, and to evaluate the concentrations of impacted groundwater still migrating from the site. These investigations identified higher concentrations of contaminants, including the presence of light non-aqueous phase liquid (LNAPL), remaining in the source areas on the plant property than had previously been identified.

Based upon the results from these investigations, the MDEQ and the EPA installed a series of additional monitoring wells downgradient of the contaminated areas to further monitor the groundwater concentrations and monitor the migration of impacted groundwater into two separate well-head protection areas. In addition, due to the age of the groundwater P & T system, and the amount of volatile organics remaining at the site, the MDEQ, with the EPA's concurrence, performed two separate expanded pilot tests in 2003 and 2004 at the site to address the contamination remaining at the plant property. The pilot studies consisted of ozone sparging of the groundwater and enhanced bioattenuation of the groundwater using a product known as BIOX. The P & T system was temporarily shut down in late 2003, during the pilot testing.

The EPA issued a ROD Amendment on September 29, 2004, that modified the remedy and included the shutdown of the groundwater P & T system, continued operation of the ozone sparging system, and monitored natural attenuation (MNA) for the remaining low level groundwater contamination off the U.S. Aviex property.

Based on the results of the ozone sparge pilot test at the site, the MDEQ operated the sparge system thru 2007 to continue to reduce contaminant levels at the property. In the fall of 2007, contaminant levels had been significantly reduced at the site. In many of the on-site wells, the values were below residential criteria. The sparge system was subsequently shut down and underwent an evaluation and monitoring period to detect any potential rebound of contaminant levels. The remaining contamination located downgradient of the site continues to be monitored on a regular basis to ensure that natural attenuation is occurring.

The other pilot test that was performed was conducted over a small area at the site that was documented to contain free phase toluene. BIOX, a chemical that enhances bioremediation, was applied in two applications, the last application occurred in March 2004. The BIOX pilot test was successful in removing the LNAPL in the wells; however, later monitoring showed a return of the LNAPL, indicating that the source of the LNAPL was not being addressed. In the fall of 2007, excavation of the LNAPL and off-site disposal began. Excavation activities were completed in 2008.

A Five-Year Review (FYR) was completed by the EPA in 2009. The FYR concluded that the remedy is currently protective of human health and the environment. Previous FYRs were completed in 1999 and 2004.

The site continues to have groundwater monitored annually to evaluate: (1) any potential rebound from the response actions in 2008; (2) the progress of natural attenuation of downgradient impacted groundwater; and (3) potential migration of contaminated groundwater toward the local municipal well field. Deed restrictions were placed on the site in 2011 and a private party has purchased the property and it currently is being used as a storage facility.

In 2014, the MDEQ completed a downgradient assessment. This assessment has shown that the extent of impacted groundwater has not left the airport property even though it does appear to be migrating. Additional downgradient wells were installed by the MDEQ in 2015 to evaluate the extent of the diethyl ether (DEE) groundwater contamination near the City's airport property. The 2015-2016 bi-annual groundwater sampling data confirmed that the extent of groundwater contamination (related to aesthetic screening levels) has not migrated beyond the Jerry Tyler Memorial Airport. These sampling data also confirmed that groundwater concentration of volatile organic compounds (VOCs) related to human health is stable and/or steadily reducing.

Three draft technical memorandums including Annual Trend Analysis (2014-2016), Annual Groundwater Report (2012, 2014-2016), and MNA Evaluations (2013-2015) were finalized and submitted to the EPA and City of Niles for their review. The distribution of contaminants observed during the 2013, 2014, 2015, and 2016 sampling events is consistent with analytical results historically observed at the Site. Based on trend analysis, concentrations of contaminant of concern at the Site have decreased following source area remedial activities. Despite the effectiveness of the remedial activities, two areas of groundwater contamination located in the northwest (1,2-dichloroethane) and southeast (Tetrachloroethylene [PCE] and Trichloroethylene [TCE]) corners of the Site generally continue to exceed health-based criteria for one or more contaminant of concern. However, prior sampling trends indicate concentrations are variable but declining on the Site and are expected to continue to decline as a result of natural attenuation. 1,2-dichloroethane and DEE remain the primary contaminants of concerns downgradient of the Site. The 1,2-dichloroethane plume appears to be stable due to natural attenuation processes. The 1,2-dichloroethane plume is not expected to impact the City of Niles' wellhead protection areas downgradient of the Site. DEE concentrations in the Jerry Tyler Memorial Airport vicinity (Airpot Area) continue to be detected in monitoring wells below health-based criteria to the west/northwest of the Airport Area, following the prominent regional groundwater flow direction.

Berrien County Health Department collected drinking water samples from the residential drinking water wells from properties located within the vicinity of the groundwater contamination. The lab results confirmed that of the VOCs were not detected.

SITE STATUS

In 2017, bi-annual groundwater sampling events were completed. MDEQ is preparing the 2017 Annual Monitoring Report which will be submitted to the EPA and City of Nile by March 2018. Analytical results from the summer 2017 sampling indicate that the 1,2-dichloroethane plume downgradient of the Site continues to decrease in size and concentration with a few monitoring wells indicating detections slightly above health-based criteria. Concentrations of DEE detected in the Airport Area were below health-based criteria. In addition to this sampling event, the MDEQ decided to conduct groundwater sampling on a quarterly basis for the monitoring wells in proximity to the City Airport well field for analysis of VOCs. Three out of four events were conducted, and analytical results indicate DEE was not detected in any samples. However, carbon disulfide was detected in one monitoring well at a concentration significantly below the EPA ROD criteria (800 ug/L).

In 2014, MDEQ began evaluating contaminants of concern related vapors to determine if offsite migration occuring. From 2014-2017, multiple soil-gas, sub-slabs and indoor sampling events were conducted near the vicinity of the site including the residential area. MDEQ is in the process of finalizing the draft 2014-2017 Vapor Intrusion (VI) Summary Report. Based on the MDEQ Site Specific Volatilization to Indoor Air Criteria, concentrations of VOCs detected in indoor air samples and sub-slab samples at the residential property, indicate that the VI pathway is fully evaluated and do not pose an immediate risk to human health. However

concentrations of PCE and TCE detected in soil-gas samples suggest that vapors are migrating off-site in the residential area adjacent to the Site. Therefore, MDEQ has decided to install a VI mitigation system as a precautionary measure for the residence and currently working with the property owner and resident.

The former groundwater treatment facility buildings were constructed in 1993 and the groundwater treatment system was operated until 2003. These buildings have not been used since 2003 and MDEQ did not anticipate using thses buildings in the future. The MDEQ removed these buildings in June 2017. Demolition Completion Report for the former groundwater treatment facility buildings was finalized in July 2017.

ENFORCEMENT STATUS
The state received funds from the bankruptcy settlement of 1988.

SPECIAL CONSIDERATIONS
The impacted groundwater is currently being monitored and the only remediation currently occurring on the site is natural attenuation.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/1989**
The ROD calls for groundwater P & T with soil flushing at the source.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 09/30/1993**
This ESD eliminated the soil flushing component of the remedy.

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 09/30/2004**
The ROD Amendment included the shutdown of the P & T system, continued operation of the ozone sparging system, and monitored natural attenuation for the remaining low level groundwater contamination off the U.S. Aviex property.

Response Accomplishments: Completed

Remedial Investigation This was a federal-lead, fund-financed activity. The potentially responsible party began an RI/FS to determine the extent and nature of contamination. However, the EPA took over and completed the RI.

Start Date: 12/30/1983 Primary Cost: $412,176 Source: Federal
End Date: 12/30/1988 Secondary Cost: $400,000 Source: Private

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Alternate Water The MDEQ extended the water main to the municipal water system for residents.

Start Date: 12/30/1986	Primary Cost:	$992,331	Source: State
End Date: 09/30/1987	Secondary Cost:	$0	Source:

Remedial Design Remedial Design (RD) of the groundwater treatment system.

Start Date: 01/30/1991	Primary Cost:	$726,000	Source: Federal
End Date: 10/30/1991	Secondary Cost:	$0	Source:

Remedial Action In September 1991, the MDEQ entered into an SSC with the EPA for $305,110 for the state's share of capital costs of the RA.

Start Date: 04/30/1992	Primary Cost:	$2,745,990	Source: Federal
End Date: 09/21/1995	Secondary Cost:	$305,110	Source: State

Long Term Remedial Action The groundwater extraction system operated from 1993 to 2004.

Start Date: 10/13/1995	Primary Cost:	$2,459,827	Source: Federal
End Date: 03/31/2004	Secondary Cost:	$314,520	Source: State

Remedial Investigation RI downgradient plume investigation.

Start Date: 10/30/1997	Primary Cost:	$112,500	Source: Federal
End Date: 06/01/2003	Secondary Cost:	$12,500	Source: State

Remedial Design RD of all additional extraction wells.

Start Date: 02/20/1999	Primary Cost:	$319,500	Source: Federal
End Date: 03/20/2001	Secondary Cost:	$0	Source:

5 Year Review Concluded that the remedy is currently protective of human health and the environment.

Start Date: 09/30/1999	Primary Cost:	$15,000	Source: Federal
End Date: 12/30/1999	Secondary Cost:	$0	Source:

Remedial Action Pilot and expanded pilot test of Air Sparge/Ozone and BIOX injections.

Start Date: 05/01/2003	Primary Cost:	$600,000	Source: Federal
End Date: 04/01/2004	Secondary Cost:	$60,000	Source: State

Operation and Maintenance O & M for the air sparge system. Interim response action completed. Levels were significantly reduced though still remain above applicable criteria.

Start Date: 04/01/2004	Primary Cost:	$100,000	Source: State
End Date: 10/01/2007	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review Concluded that the remedy is currently protective of human health and the environment; however, for the remedy to remain protective in the long-term, O & M of the remedy must be continued.

Start Date: 09/01/2004 Primary Cost: $10,000 Source: Federal
End Date: 10/29/2004 Secondary Cost: $0 Source:

Alternate Water This action extended the municipal water line and provides hook-up to the municipal system for the remaining homes that still had their own drinking water wells.

Start Date: 01/01/2007 Primary Cost: $200,000 Source: State
End Date: 06/29/2009 Secondary Cost: $0 Source:

Operation and Maintenance This action included the excavation and off-site disposal of soils that contain non-aqueous phase liquids and was completed in the spring of 2009.

Start Date: 01/01/2007 Primary Cost: $600,000 Source: State
End Date: 06/29/2009 Secondary Cost: $0 Source:

5 Year Review The EPA completed the FYR. The FYR concluded that the remedy is currently protective of human health and the environment.

Start Date: 01/08/2009 Primary Cost: $10,000 Source: Federal
End Date: 11/24/2009 Secondary Cost: $0 Source:

5 Year Review The FYR was completed by the EPA in November 2014. The FYR concluded that the remedy is currently protective of human health and the environment.

Start Date: 01/01/2014 Primary Cost: $10,000 Source: Federal
End Date: 11/27/2014 Secondary Cost: $0 Source:

Operation and Maintenance The task objective was to remove the two former buildings and the concrete pads associated with the former groundwater treatment facility, and the capping of associated utilities below ground level. The project included restoration of the disturbed areas consistent with the surrounding area.

Start Date: 03/06/2017 Primary Cost: $23,766 Source: State
End Date: 07/28/2017 Secondary Cost: $0 Source:

Response Accomplishments: Ongoing

Operation and Maintenance Monitoring of groundwater for natural attenuation of contaminants in impacted areas. Sampling costs estimated at $125,000 per year.

Start Date: 04/01/2004 Primary Cost: $125,000 Source: State
End Date: 10/01/2024 Secondary Cost: $0 Source:

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995746-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Long Term Remedial Action	$3,145,197	$314,520	$0	$3,119,912	$0
Remedial Design	$319,500	$0	$0	$314,350	$0
Totals:	$3,464,697	$314,520	$0	$3,434,263	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V985560-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$9,555	$0	$0	$9,555	$0

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$60,000	$0	$0	$31,429	$0

Cooperative Agreement Number V995261-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$78,222	$7,822	$0	$66,422	$0
Totals:	$147,777	$7,822	$0	$107,406	$0

STATE SUPERFUND CONTRACTS

For Operable Unit 00 : Entire Site : Closed

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Action	$2,598,032	$259,803	$259,803	$0
Totals:	$2,598,032	$259,803	$259,803	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Charlevoix Municipal Well Field
Lake Shore Drive
Charlevoix , MI

County: Charlevoix
MDEQ District Location: Gaylord
Managed By: RRD-Superfund

Federal Site Code: 53
State Site ID#: 15000008
State Site Score: 23

LOCATION
The city of Charlevoix is located on an isthmus between Lake Michigan and Round Lake, expanding along the shore of Lake Charlevoix. The population of about 3,000 residents increases to an estimated 30,000 people during the summer months. The Charlevoix Municipal Well site is on the shore of Lake Michigan and consists of a municipal well system made of a shallow well connected to a horizontal plume, buried beneath the beach. This well is no longer in use.

SITE HISTORY
In 1981, the city was notified by the Michigan Department of Public Health that its groundwater was contaminated with high concentrations of trichloroethylene (TCE) and was impacting the municipal water supply. In response, the city installed four monitoring wells near its municipal well with the assistance of the Michigan Department of Natural Resources. During this investigation, a portion of an adjacent tetrachloroethylene (PCE) plume was discovered to be overlapping the location of the TCE plume.

The EPA investigated the contamination and selected an initial cleanup remedy to address the TCE plume in a Record of Decision (ROD) dated June 12, 1984 (1984 ROD). In 1985, the EPA constructed a new water intake system and filtration plant using water from Lake Michigan as its source. A buried intake pipe was constructed that connects to the existing city pump house. A chlorine diffuser, anchored inside and running the entire length of the intake pipe, disinfects the water. Due to capacity issues, the EPA constructed a new water intake structure in 1992. The new intake system and water treatment plant successfully provided safe drinking water.

On September 30, 1985, after completing an investigation of site contamination, the EPA issued a second ROD (1985 ROD) that selected a remedy which included groundwater monitoring and restrictions on groundwater use. The selected alternative allows the contaminated groundwater plumes to naturally migrate and disperse into Lake Michigan. The 1985 ROD estimated that the contaminated groundwater will be purged in approximately 50 years.

Because of the EPA's decision not to pursue the PCE plume, on January 30, 1986, the state scored and listed the PCE plume as a state cleanup site known as the Charlevoix Municipal Well Field (PCE) Site (which was listed separately from the Charlevoix Municipal Well Field Superfund Site, which is also on the state's list of contaminated sites). The state conducted a remedial investigation (RI) on the Charlevoix Municipal Well Field (PCE) Site and issued an RI report dated August 1989. The Charlevoix Municipal Well Field (PCE) Site includes three adjacent source areas: PCE sources at 204 W. Lincoln and 207 W. Garfield, and a petroleum source at 206 W. Lincoln.

The state also listed Hooker Dry Cleaners and Art's Dry Cleaners on the state list of contaminated sites. These sites are also sources of PCE groundwater contamination. The groundwater contamination from these two sites is east and west of the main PCE plume.

Groundwater flow direction is from these source areas toward the north, and west toward Lake Michigan and Round Lake.

Beginning in 1994, state funds were used to install and operate soil vapor extraction (SVE) and groundwater sparge systems in all aforementioned source areas. The goal of the treatment systems was to reduce the contaminants in the source area soil and groundwater so that concentrations in the groundwater were no longer a threat to surface water resources. The systems, source area, and duration are as follows: SVE and Air Sparging (AS) (Art's, October 1994-November 1995); SVE and AS PCE Site (1997-July 2003); SVE and AS (Hookers Dry Cleaners, August 2001-September 2002). All systems have been decommissioned and annual groundwater monitoring has taken place since 1996.

An EPA Close-out Report was signed by the state of Michigan on August 6, 1993, and the site was deleted from the National Priorities List (NPL) on December 2, 1993.

In 2006, while evaluating whether the site met the criteria for site-wide readiness for anticipated use, the EPA became aware that contaminants remained in the groundwater at concentrations higher than the levels considered protective for unrestricted use. The Comprehensive Environmental Response, Compensation, and Liability Act, (CERCLA) 1980 PL 96-510 and the National Oil and Hazardous Substances Pollution Contingency Plan require that periodic reviews be conducted for sites where hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use or unrestricted exposure following the completion for all remedial actions (RA) for the site. Thus, it was determined another Five-Year Review (FYR) should be conducted.

The Third FYR report was signed by the EPA in September 2011. In this Five-Year Review, the EPA concluded that "...the interim remedy at OU1 [Operable Unit 1] is protective of human health and the environment because the alternate water supply provided by construction of a lake water intake line to the water treatment plant prevents human health exposure to contaminated groundwater...." "However, PCE contamination that remains in the soil and groundwater could potentially pose vapor intrusion risks via the indoor airway pathway and may result in a longer period of time for groundwater to return to a useable state. Additional evaluation of the source area will be necessary to confirm the determination of the protectiveness of this pathway and whether groundwater will return to useable state within a reasonable period of time." The EPA has deferred a site-wide protectiveness determination until vapor intrusion (VI) risks via the indoor pathway are addressed.

In August 2012, the EPA contractor conducted soil borings in parts of the city checking for potentially hazardous vapors released from chemicals left behind from closed dry cleaners and industries. On November 19, 2012, the EPA hosted two open house sessions to discuss the VI investigation currently underway in the community. The EPA continued this investigation through the summer of 2013.

Another round of groundwater sampling was conducted in early fall 2012 by the MDEQ. Monitoring wells sampled during this event included wells from the Charlevoix PCE sites and remaining Superfund site wells. Results from this sampling event indicated that the TCE groundwater plume has discharged to Lake Michigan and no longer exceeds drinking water standards. The PCE groundwater levels in the majority of the wells sampled still exceed drinking water standards. Ongoing groundwater sampling is needed to monitor the PCE levels.

In June 2013, a public availability session was held to discuss the vapor intrusion work that was completed in the latter part of June and beginning of July. Results for indoor air samples during June-July 2013 did not exceed numbers for a removal action. The sub-slab

and soil gas points sampled did, however, indicate numbers above indoor air risks. The EPA completed 70 of the soil gas points to permanent monitoring locations in November 2013. Additional sampling was planned for indoor air and sub-slab points at the three identified source area locations on the site. This sampling was completed in March 2014.

A geophysical survey was also completed by the EPA in November 2013. The results of this survey were the discovery of two orphan underground storage tanks: one located west of the former Art's Dry Cleaners and one located to the north of Whitley's Floor Covering. These underground storage tanks were confirmed with exploratory borings on December 5, 2013, and sampled March 27, 2014. The analytical results for the underground storage tank located to the west of the former Art’s Dry Cleaners indicated high levels of dry cleaning constituents.

Results from a March 2014 VI sampling event showed an immediate risk to human health and the environment, prompting the involvement of the EPA Removal Branch. Further VI investigations resulted in the installation of sub-slab depressurization systems at two residences where sub-slab results exceeded indoor air numbers. The investigation continued through early 2015 and results were evaluated to determine the next course of the investigation and/or mitigation remedies.

Another round of groundwater sampling was conducted in early fall 2014 by the MDEQ. Monitoring wells sampled during this event included wells from the Charlevoix PCE sites and remaining Superfund site wells. Results from this sampling event indicated that the TCE groundwater plume has discharged to Lake Michigan and no longer exceeds drinking water standards. The PCE groundwater levels in the majority of the wells sampled still exceed drinking water standards and are comparable to results from 2013. Ongoing groundwater sampling is needed to monitor the PCE levels.

On October 29, 2014, a public availability session was held to discuss the current and upcoming VI work and removal actions being completed by the EPA and its contractors.

In November 2014, EPA contractors uncovered three underground storage tanks at the former Art’s Dry Cleaners and sampled each to determine the contents. The analytical results indicated high levels of dry cleaning constituents were present in each underground storage tank. The underground storage tanks were emptied and cleaned of all contaminants and filled in place. Additional work included exploratory borings that confirmed soil conditions below the underground storage tanks were not contaminated. The removal of the underground storage tanks had been considered but was not ideal due to the proximity of the underground storage tanks to the older residence. With analytical data that showed no contaminants, the need for removal was deemed unnecessary.

During 2015, the EPA Removal Branch continued their VI investigation through September. Additional sampling was completed at a number of residences and a total of 16 sub-slab depressurization systems have been installed over this time period. The EPA Removal Branch has since demobilized from the site and the Remedial Branch has again taken over actions on the site. The EPA continued investigations into the VI issue in the late spring of 2016. The MDEQ continues to serve as the support agency to the EPA.

Another round of groundwater sampling was conducted in early fall 2015 by the MDEQ.

During 2016, EPA completed and signed the fourth FYR in April. The EPA also started a new RI/Feasability Study (FS) in August with the United States Army Corps of Engineers (USACE) as the primary contractor for all investigations on the site. Another round of groundwater sampling was conducted in early fall 2016 by the MDEQ. Monitoring wells sampled during this event included wells from the Charlevoix PCE sites and remaining

Superfund site wells. Results from this sampling event indicated that the TCE groundwater plume has discharged to Lake Michigan and no longer exceeds drinking water standards. The PCE groundwater levels in the majority of the wells sampled still exceed drinking water standards and are comparable to results from 2015. Ongoing groundwater sampling is needed to monitor the PCE levels.

SITE STATUS
The EPA's primary contractor the USACE, completed the RI/FS field activities in October 2017. The MDEQ's site contractor assisted the USACE in VI sampling and groundwater sampling during the spring thru fall of 2017. The annual groundwater sampling event was completed in October 2017 by the USACE and MDEQ with results from that event pending. Monitoring wells sampled during this event included wells from the Charlevoix PCE sites and remaining Superfund site wells. Ongoing groundwater sampling is needed to monitor the PCE levels. EPA and MDEQ are expecting a final report from USACE on RI/FS activities in the spring of 2018.

ENFORCEMENT STATUS
None.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The EPA conducted the First FYR in 1994 to evaluate whether the RA remains protective of public health and the environment. This review concluded that all recommendations given in the September 1985 ROD have been met.

Start Date: 05/22/1994	Primary Cost:	$0	Source:
End Date: 09/20/1994	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

The 2001 Five-Year Review concluded that "...groundwater samples have been collected annually from monitoring wells starting in 1988 and based on the Reconciliation and Termination Agreement dated January 27, 1997, all remedial activities were completed. No further activities have been conducted at this site. Analysis of data from past sampling activities has shown a gradual decrease in contamination. Sampling has verified that the two plumes were discharged to Lake Michigan and diluted." It further stated that "...the remedies selected for this site remain protective of human health and the environment. Specifically, confirmatory sampling has verified that the ROD cleanup objectives have been achieved and all cleanup actions specified in the ROD have been implemented."

Start Date: 01/15/2001	Primary Cost:	$0	Source:
End Date: 05/15/2001	Secondary Cost:	$0	Source:

5 Year Review

The Third FYR report was signed by the EPA in September 2011. In this Five-Year Review the EPA concluded that "...the interim remedy at OU1 [Operable Unit 1] is protective of human health and the environment because the alternate water supply provided by construction of a lake water intake line to the water treatment plant prevents human health exposure to contaminated groundwater...." "However, PCE contamination that remains in the soil and groundwater could potentially pose vapor intrusion risks via the indoor airway pathway and may result in a longer period of time for groundwater to return to a useable state. Additional evaluation of the source area will be necessary to confirm the determination of the protectiveness of this pathway and whether groundwater will return to a useable state within a reasonable period of time." The EPA has deferred a site-wide protectiveness determination until vapor intrusion risks via the indoor pathway are addressed.

Start Date: 02/17/2008	Primary Cost:	$10,000	Source: Federal
End Date: 09/23/2011	Secondary Cost:	$0	Source:

5 Year Review

The fourth FYR was completed by EPA in April 2016. This site has contaminants remaining in the groundwater at concentrations higher than the levels considered protective for unrestricted use. The next Five-Year Review is due in 2021.

Start Date: 07/15/2015	Primary Cost:	$0	Source:
End Date: 06/01/2016	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: In Progress

Remedial Investigation

Based on the last FYR, the EPA has determined that the PCE contamination remaining in the soil and groundwater could potentially pose VI risks via the indoor airway pathway and that additional evaluation of the source area will be necessary. In August 2012, the EPA contractor conducted soil borings in part of the city checking for potentially hazardous vapors released from chemicals left behind from closed dry cleaners and industries. On November 19, 2012, the EPA hosted two open house sessions to discuss a VI investigation currently underway in the community. The EPA has held additional community engagement sessions and continues its VI investigation field work.

Start Date: 10/01/2012	Primary Cost:	$0	Source:
End Date: 04/30/2018	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

Interim Response

Removal action/mitigation determined by the findings of the RI/FS.

Start Date:	Primary Cost:	$0	Source:
End Date:	Secondary Cost:	$0	Source:

5 Year Review

Start Date: 06/27/2020	Primary Cost:	$0	Source:
End Date: 06/27/2021	Secondary Cost:	$0	Source:

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005931-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Long Term Remedial Action	$150,240	$15,024	$0	$0	$0
Totals:	$150,240	$15,024	$0	$0	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$1,864	$0	$1,864	$1,864	$1,864

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E192-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$10,000	$0	$0	$10,000	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$7,178	$0	$0	$7,178	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$13,966	$0	$0	$13,966	$0

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$34,340	$0	$0	$34,340	$0
Totals:	$67,348	$0	$1,864	$67,348	$1,864

STATE SUPERFUND CONTRACTS

For Operable Unit 00 : Entire Site : Closed

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Action	$600,000	$60,000	$0	$0
Totals:	$600,000	$60,000	$0	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Cannelton Industries, Inc.
South St. between 12th & 18th
Sault Ste. Marie , MI

County: Chippewa
MDEQ District Location: Upper Peninsula
Managed By: RRD-Superfund

Federal Site Code: 8R
State Site ID#: 17000001
State Site Score: 46

LOCATION
The Cannelton Industries, Inc. site (the site) is located in Sault Ste. Marie, Michigan, on the shore of the Saint Mary's River, Chippewa County. The site is bounded on the south by 4th Avenue West, 16th Street, and South Street, to the west by 18th Street West, to the east by 12th Street West and a coal dock, and to the north by the Saint Mary's River.

SITE HISTORY
The site is a former leather tannery, the Northwest Leather Company, which operated from 1900 to 1958. The company dumped solid waste materials and piped liquid wastes from the tanning operations into a riverine wetland on the Saint Mary's River. High concentrations of chromium and mercury and significant concentrations of other heavy metals and polynuclear aromatic hydrocarbons have contaminated site soils and river sediments.

The site includes the former tannery plant site (now demolished), waste disposal areas along the river, and portions of the river where eroded shoreline wastes settled into the sediment. An approximately two-acre portion of the disposal area, referred to as the barren zone because of the stressed vegetation and blue-green soils/wastes, had the highest levels of soil contamination on-site and had experienced spontaneous periodic fires during dry summer months. Some disposal of drums was also evident along a portion of the shoreline several hundred yards west of the barren zone.

The EPA conducted a fund-lead remedial investigation/feasibility study (RI/FS) from 1989 through 1992. Actions were taken by the potentially responsible parties (PRPs) to isolate the highly contaminated barren zone including construction of a fence and seawall. In 1990, the PRPs also installed a temporary sprinkler system in the barren zone, and dug trenches for aeration. Since then, no fires have occurred. In the fall of 1991 and the spring of 1992, the PRPs fenced most of the site and extended the seawall. The EPA conducted ecotoxicological studies and an ecological inventory. The MDEQ conducted several contaminant leachability studies on site soils and sediments to assist in the establishment of cleanup criteria.

The Record of Decision (ROD) was issued by the EPA on September 30, 1992, calling for removal and disposal of debris, waste, soils, and sediments in an on-site landfill, treatment of groundwater collected during the dewatering activities as part of construction, groundwater monitoring, and land-use restrictions for the landfilled area. The state withheld concurrence on the ROD pending completion of pre-design studies.

In April 1993, the EPA and the PRPs signed an Administrative Order by Consent (Order) for the remedial design (RD). In the beginning phases of RD, the PRPs completed the pre-design studies and used the findings to propose significant amendments to the ROD. The EPA accepted the PRP's proposal, and amended the ROD in September 1996 to reduce the volume of soil to be excavated, about 35,000 cubic yards, based on documentation of the chemical stability of the waste. The state of Michigan concurred with the amended ROD since it included adequate ROD-reopener language with contingencies

based on planned sediment bio-uptake and storm-induced sediment erosion studies. The preliminary design was also completed at that time. Though the preliminary design had been written for the original ROD, most of it was usable for the amended ROD. The remedial action (RA) was completed in early 1999 with 32,000 tons or 35,000 cubic yards removed. The PRPs, in conjunction with the National Oceanic and Atmospheric Administration, also completed studies on the erodibility of contaminated sediments and bioavailability of sediment contaminants. The RA construction was completed in the summer of 1999, including the removal of barren zone and shoreline wastes, some fence removal, well abandonment, new well installation, and additional shoreline stabilization. The groundwater monitoring wells were removed upon completion of post dredging verification sampling requirements. The 2010 Explanation of Significant Differences (ESD) formalized the removal of biomonitoring from the long-term Operation and Maintenance (O & M) requirements.

High concentrations of mercury and chromium remained in site sediments and soils, and questions remained as to the bioavailability of these metals. Post-remedial baseline and year-one sediment contaminant bio-uptake studies were done during 2000 and 2001. Further bio-uptake studies would be necessary in future years if sediments were left in place.

Instead of having the PRPs continue to conduct bio-uptake studies, the MDEQ advocated for a cost-shared sediment removal, to improve upon the EPA's preferred remedy. Another biomonitoring study was planned for 2004, but this was put on hold pending the outcome of an application for Great Lakes Legacy Act funding, which would be used to dredge the contaminated sediments, thus obviating the need to do ongoing biomonitoring studies. Soon thereafter the EPA Great Lakes National Program Office began using Great Lakes Legacy Act funds to cost-share sediment removals in Areas of Concern, and this site qualified. A three-party cost-share project agreement between the MDEQ, the EPA-Great Lakes National Program Office, and the property owner Phelps Dodge, was agreed to and signed in 2006; and the work of removing sediments began in 2006 and was completed in September 2007. The EPA Superfund Program was not involved in the agreement, but supported the work.

The First Five-Year Review (FYR) was conducted by the EPA and signed on July 30, 2004. The EPA concluded that the RA is functioning as intended and is protective in the short term. Long-term monitoring is being conducted to insure proof of remediation in the long term.

The Second FYR was completed by the EPA on September 11, 2009. The EPA concluded that the remedy is functioning as designed and is protective, although some long-term monitoring will be necessary.

An ESD document was signed on March 23, 2010. The purpose of this document was to modify the remedy that had been selected in the September 27,1996, ROD Amendment by eliminating the requirement for biological monitoring. The parties agreed that the biological monitoring was no longer necessary because of the sediment removal project that was completed in 2007.

MDEQ staff completed work with the PRP group and implemented appropriate Restrictive Covenants on the property in 2013.

Discussions of deleting the site from the National Priorities List (NPL) between the site owner and the Agencies were initiated in early 2013. In 2013, the EPA Remedial Project Manager (RPM) also started work on a Final Close Out Report for the site.

The Agencies met on-site with the PRPs in August 2013 for a pre-FYR Site Inspection. The MDEQ Project Manager (PM) addressed some outstanding loose ends regarding two small unrestored wetland excavation areas shortly thereafter. Although no restoration actions were called for in the Remedial Action, the MDEQ PM provided the PRPs with suggestions of optional follow-up actions for faster recovery.

Additional O & M sampling was completed in 2013. EPA Headquarters staff also determined that modifications to the O & M Plan were needed in order to monitor the areas with contamination remaining in place, particularly the wetland area.

In the process of gathering details for the Final Close Out Report, the EPA RPM, in consultation with the MDEQ PM, determined that the required post-dredging confirmation sampling and long-term monitoring work had not been executed after the dredging was completed. Numerous communications between the Agencies and the PRPs took place early in 2014 and resulted in completion of the post-dredging sample collection and reporting.

In late 2015, EPA Headquarters staff determined that the existing O & M Plan needs modification and expansion in order to adequately monitor areas where contaminated media remain in place. NPL deletion has been delayed in order to modify the O & M Plan and collect additional data.

Throughout 2016, the Agencies continued to work in cooperation with the PRPs to modify the O & M Plan to monitor the areas where contaminated media remains in place and to address outstanding ROD amendment items in order to develop a reasonable path toward deletion of the site from the NPL.

SITE STATUS

In early 2017, the Agencies reviewed and provided comments on the September 2016 Surface Water and Sediment Sampling Event for the Tannery Bay. Review of the data indicated the majority of the site contamination concentrations were either non- detect or below site cleanup criteria. However, mercury was detected in five of the bay surface water samples above the cleanup criteria.

Throughout 2017, the Agencies continued to work with the PRPs to determine what sampling will be required to be included in the revised O & M Plan. It is anticipated once the revised O & M Plan is approved, sampling will begin in 2018.

MDEQ and EPA also continue to work with Sault Ste. Marie city officials to return completed portions of the site to productive use. Key portions of the site are ready for reuse at this time.

ENFORCEMENT STATUS

Cyprus-Amax Minerals Company was the lead PRP at this site during the RD and construction. Under the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, as amended (CERCLA), they funded the interim response, RD, RA, additional studies, shoreline stabilization, and all other action beginning with their purchase of the site in 1992 and ending with their sale of the site in December 1999 to the Phelps Dodge Company. The Phelps Dodge Company did not provide a Baseline Environmental Assessment upon purchase of the site, and may have thereby assumed state liability for the site, in addition to their pre-existing liability under CERCLA. The MDEQ continues to serve as a liaison to the EPA regarding consistency of the federally required activities with state statutes.

In efforts to complete site closure activities and assess outstanding site issues, Agency staff

sorted through existing legal and routine site correspondence. Additional efforts were made to bring the PRPs up-to-date regarding overlooked post- dredging requirements and monitoring. Data results are being evaluated in order to develop an updated path forward; modification of the O & M Plan is necessary. An additional ROD Amendment will be needed in order to take into account the dredging efforts and current site status.

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SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/1992**
The state did not concur with the ROD.

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 09/27/1996**
The state concurred with the ROD Amendment, but with the contingency that the sediment remedy would be based on agreeable interpretations of sufficient bio-uptake studies.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 03/23/2010**
The purpose of this document was to modify the remedy that had been selected in the September 27, 1996, ROD Amendment by elimitating the requirement for biological monitoring. The parties agreed that the biological monitoring was no longer necessary because of the sediment removal project that was completed in 2007.

Response Accomplishments: Completed

Interim Response
Start Date: 06/11/1988 Primary Cost: $50,000 Source: Federal
End Date: 07/01/1988 Secondary Cost: $0 Source:

Negotiations RI/FS negotiations.
Start Date: 06/28/1988 Primary Cost: $0 Source: Federal
End Date: 09/27/1988 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Investigation

Start Date: 09/27/1988	Primary Cost:	$1,080,000	Source: Federal
End Date: 09/30/1992	Secondary Cost:	$0	Source:

Negotiations RD/RA negotiations.

Start Date: 02/05/1993	Primary Cost:	$35,000	Source: Federal
End Date: 04/12/1993	Secondary Cost:	$0	Source:

Remedial Design The PRP conducted the RA with EPA oversight.

Start Date: 05/10/1993	Primary Cost:	$0	Source: Private
End Date: 07/01/2007	Secondary Cost:	$324,000	Source: Federal

Operation and Maintenance The 1992 ROD called for long term monitoring including biological monitoring. The 1996 ROD Amendment and sediment removal action included excavation and off-site disposal of contaminated soils and tannery waste materials from the former Barren Zone, Southern Shoreline, and Western Shoreline. Challenges associated with organism survival and obtaining of mercury free native species proved to be unreasonable; this fact, in combination with the completion of removal efforts, led MDEQ staff to support discontinuation of the long-term biological monitoring. An ESD that was signed on March 23, 2010, and officially released in July 2010, stated that the biological monitoring was to be eliminated from the remedy selected in the September 27, 1996 ROD.

Start Date: 09/28/1999	Primary Cost:	$0	Source: Private
End Date: 03/23/2010	Secondary Cost:	$0	Source:

Remedial Action The soil remediation was completed in the summer of 1999, including the removal of barren zone and shoreline wastes (32,000 tons or 35,000 cubic yards), fence removal, well abandonment, new well installation, and additional shoreline stabilization. Private party costs of this activity are unknown. The dredging was successfully completed in 2007. Sediment dredging was performed under a three-party agreement including EPA-Great Lakes National Program Office using Great Lakes Legacy Act funds, the site owner Phelps Dodge, and the state of Michigan, which contributed $600,000. The result was an improved, much more permanent remedy for the sediments than the in-situ stabilization remedy previously favored by EPA-Superfund.

Start Date: 12/31/1999	Primary Cost:	$3,500,000	Source: Federal
End Date: 09/30/2007	Secondary Cost:	$3,500,000	Source: Private

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The EPA concluded that the RA was functioning as intended and was protective of human health and the environment in the short term. Long-term monitoring was undertaken to ensure that long-term protectiveness was maintained at the site.

Start Date: *02/01/2004*	Primary Cost:	$35,000	Source:	Federal
End Date: *07/30/2004*	Secondary Cost:	$0	Source:	

5 Year Review The EPA concluded that the RA was functioning as designed and remained protective. Some long-term monitoring was required since some low-level waste was left in place.

Start Date: *08/27/2008*	Primary Cost:	$35,000	Source:	Federal
End Date: *08/11/2009*	Secondary Cost:	$0	Source:	

5 Year Review The 2014 FYR determined that the remedy was functioning as intended and remained protective in the short term. A Restrictive Covenant and Environmental Easement has been placed on the property. A long term stewardship plan is being developed for use along with the required site O & M activities to ensure that the procedures to properly maintain, monitor, and enforce Institutional Controls are adhered to that ensure long-term success of the remedy and long-term protection of human health and the environment.

Start Date: *08/11/2013*	Primary Cost:	$25,000	Source:	Federal
End Date: *08/08/2014*	Secondary Cost:	$0	Source:	

Response Accomplishments: In Progress

Monitoring Post-Excavation confirmation sampling was required as part of the dredging agreement. The first sampling event was performed in 2008 and a second sampling event was completed in 2014. The agencies are in the process of evaluating that data to determine next steps.

Start Date: *09/30/2007*	Primary Cost:	$0	Source:	
End Date: *09/30/2018*	Secondary Cost:	$0	Source:	

Response Accomplishments: Future Need

5 Year Review The 2019 FYR, if needed, will be written by the EPA.

Start Date: *08/08/2018*	Primary Cost:	$0	Source:	
End Date: *08/08/2019*	Secondary Cost:	$0	Source:	

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$3,025	$0	$3,025	$3,025	$3,025

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$84,500	$0	$0	$84,500	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$49,791	$0	$0	$48,845	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$68	$0	$0	$67	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$8,230	$0	$0	$8,230	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$17,146	$0	$0	$17,146	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$115,000	$0	$0	$106,550	$0
Totals:	$277,760	$0	$3,025	$268,362	$3,025

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Clare Water Supply
Clare Industrial Park
Clare , MI

County: Clare
MDEQ District Location: Saginaw Bay
Managed By: RRD-Superfund

Federal Site Code: 55
State Site ID#: 18000006
State Site Score: 39

LOCATION
The site is centered in the Clare Industrial Park area on the southwestern side of the city of Clare. The site is bounded on the north by US 10/Business Route (Main Street), on the east by Maple Street, on the south by Dunlop Road, and near the western limits of the city by the Mitchell property. The land-use around the site is a mix of industrial, residential, and commercial.

SITE HISTORY
The Michigan Department of Public Health (now the Michigan Department of Health and Human Services) discovered contamination in some of Clare's public water supply wells. This occurred in 1981 as the result of a statewide effort to sample public water supplies for volatile organic contaminants (VOCs). There are four municipal production wells. Sampling revealed VOCs in two of the four wells: Municipal Well #2 (MW-2) and Municipal Well #5 (MW-5) (now Municipal Well #8 (MW-8) and Municipal Well #9 (MW-9) [replacement wells]). This was due to releases of waste solvents and other hazardous materials to soils and groundwater in the city's industrial park. Concentrations of VOC contamination up to 48 parts per billion (ppb) were also found in two monitoring wells located in the northeastern portion of the site. However, these high concentrations were not found in the city water supply due to volatilization that occurred within the system prior to distribution.

The city of Clare (city) reduced the levels of contaminants in its water distribution system by increasing the production of uncontaminated wells and reducing the use of the contaminated wells. The city also aerated the supply water to remove VOCs. These steps usually kept the concentrations of contaminants from exceeding federal drinking water standards. However, during peak demand periods the increased use of the contaminated municipal wells caused the levels of trichloroethylene to reach the maximum concentration limit of 5 ppb allowed under the Michigan Safe Drinking Water Act, 1976 PA 399, as amended.

Initial actions to address the contamination were completed from 1983 to 1988. The MDEQ, conducted a preliminary assessment in 1983. In 1984, the EPA conducted a site inspection, listed the Clare Water Supply site (Site) on its National Priorities List, and identified potentially responsible parties (PRPs). At the request of the MDEQ, the PRPs agreed to remove some of the contaminated soils that were serving as a source of contamination in groundwater and ultimately the municipal wells. The PRPs completed these actions during May 1987 and January 1988.

The EPA instituted remedies for two separate operable units (OUs). OU1, the interim remedial action to protect the public water supply, began in 1990. The EPA established a final remedy for contaminated soil and groundwater in source areas that contributed to contamination in the municipal supply. This remedy is called OU2. Both of these OUs are described in their own sections below.

A remedial investigation/feasibility study (RI/FS) was completed in February 1992.

In September 2001, the EPA completed its first Five-Year Review of the Site. It concluded that remedial actions were still effective and that the remedies protected the municipal water supply.

In 2003, the MDEQ began evaluating the presence of 1,4-dioxane in public water supplies around the state. It found concentrations of 3 and 5 ppb in both of Clare's impacted MW-2 and MW-5. At the MDEQ's urging, the EPA asked Clare to begin monitoring for this chemical of concern. For further details, see the section below on the first OU.

A Five-Year Review (FYR) was conducted in 2006. The EPA concluded that the remedy is protective in both the short and long term. Long-term protectiveness of the overall groundwater remedial action relies upon the continued operation and maintenance of the air strippers for flow from MW-2 and MW-5 until water quality at those wells is generally below Maximum Contaminant Levels (MCLs) and effective Institutional Controls (ICs).

OU1 remedy: interim action to protect the public water supply.

The EPA decided to address the problem in a more comprehensive manner after the PRPs completed initial actions. In August 1990, the EPA issued an interim action Record of Decision (ROD) for the interim action operable unit to protect the public water supply. This action was funded by the PRPs, and required treatment of the groundwater before distribution to the public water supply system. The ROD also required monthly sampling and analysis of the water before and after treatment. The treatment utilized two air stripping treatment towers. This system began operating in March 1991 and continues to operate today.

The EPA later modified the groundwater remedy for this interim action. This was described in an Explanation of Significant Difference (ESD) in August 1995. The modified groundwater extraction and treatment system was constructed and went on-line in August 1996. This modified system utilized the two existing air strippers, along with an additional extraction well, PRP-1, which had its own separate air stripper. PRP-1 was installed to increase groundwater capture and treatment capacity. The treated water was then piped into the municipal water distribution system.

The MDEQ evaluated the need for adding a new chemical of concern – 1,4-dioxane – to the regular analysis of Clare's municipal water supply. The MDEQ suggested to the EPA that this be done, and the EPA then communicated this to the city in 2005. The city added this parameter to their water supply sampling and is now sampling quarterly for this toxic chemical. Concentrations to date have ranged from less than 1.0 to 5.0 ppb.

In Fiscal Year (FY) 2005, the city notified the EPA that MW-2, which is a part of the interim action OU remedy, was failing. This issue was evaluated and the PRPs agreed to pay for its replacement. The city installed the replacement well (MW-8) and began operating it in September 2006. Both the old well and the new one have been part of the required remedy for this OU. This installation was described in a 2004 ESD.

Concentrations of chemicals of concern in the treated public water supply have shown concentrations mostly below detection, at less than 1 ppb. Occasionally, a monthly sample has shown levels between 1 and 2 ppb, but all below drinking water standards.

OU2 remedy: final remedy to clean up remaining soil and groundwater contamination acting as source areas.

A second ROD was signed on September 16, 1992, for OU2, the final response to address

remaining soil and groundwater contamination (soil and groundwater remedy operable unit). It called for in-situ soil vapor extraction (SVE) to treat the remaining contaminated soils and sediments. Contaminated groundwater was to be treated using ultraviolet photochemical oxidation.

The original SVE soils remedy was revised in several actions beginning in 1997. In May 1997, a ROD amendment was completed. The amended ROD called for actions to excavate and consolidate contaminated soils into an on-site containment cell at the Ex-Cell-O facility along Main Street in the northwest part of the Site. The change was made because the contaminated soils in the industrial park were not conducive to SVE treatment. The construction of the containment cell, including the cap, was completed in June 1999. The removal of the contaminated soils from exposed areas of the Site and disposal into the containment cell significantly reduced the soils as a source of the groundwater contamination. Potential residual contamination likely remained, especially in deeper soils near the water table. The city's water supply continues to be monitored to ensure that its drinking water continues to be safe for human consumption.

In FY 2003, the PRPs and the EPA completed an Engineering Evaluation/Cost Analysis for a proposed revision to the soil and groundwater remedy OU. Its purpose was to evaluate alternatives for managing high levels of vinyl chloride found in unconfined, shallow groundwater near the former Mitchell facility (now the Filcon facility). This contamination posed a potential risk to at least one of Clare's municipal wells.

In FY 2004, the EPA drafted another ESD document to describe the reason for changing the remedy.

In FY 2005, an addition to the final remedy was constructed at the Filcon facility, known as a permeable reactive barrier (barrier). This barrier is designed to passively treat shallow groundwater contaminated with VOCs. The PRPs installed the barrier in December 2004. It consisted of two approximately parallel trenches in the ground that were 175 feet long and 16-20 feet below ground. The trenches were backfilled with an iron-impregnated, carbon-coated silica sand material that provides the treatment media. A public meeting was held in Clare in April 2005 to discuss issues related to the barrier. In order to evaluate the effectiveness of the barrier, a network of monitoring wells were installed in May 2005.

In April 2009, the PRP Group installed four pneumatic pumps in existing dual vapor extraction wells at the Ex-Cell-O source area. This has resulted in reduced groundwater elevations and increased contaminant removal from this location.

In the fall of 2009, aging MW-5 was replaced with MW-9.

The EPA had the Third FYR signed September 20, 2011. The MDEQ did not agree with many of the statements and conclusions reached in this FYR and had the EPA attach the MDEQ comments to the final FYR. Key unaddressed issues the MDEQ identified included: 1) more effort needs to be placed on source remediation instead of relying on the municipal wells to "contain" the contaminant plume, 2) 1,4-dioxane needs to be included as a contaminant of concern, cleanup criteria established, and effort placed on identifying the source, 3) the need to make Stage Right a part of the remedy and require source area remediation, not trying to modify an ineffective 12 year old "time critical" removal action, 4) the contamination at Standard Oil needs to be addressed.

The Stage Right source area began a time critical removal action in 1999 with the goal being for the trichloroethene groundwater contaminant concentrations to be reduced to 300 ppb within one year of operation and, ultimately achieve the site-wide cleanup criteria of 5 ppb in order to protect the adjacent municipal wells. Because neither goal had been

achieved after twelve years of operation, the EPA requested and, in January 2010, the MDEQ provided the EPA with a technical evaluation of the 1999 "time critical" removal action at the Stage Right source area that indicated the remedy is not functioning as designed and has not met the cleanup objective. The MDEQ evaluation also recommended "Proper data collection to verify the remedial action is protective of human health, and that no unacceptable exposures are occurring." The EPA subsequently provided this evaluation to the PRPs who subsequently submitted its own evaluation with a different conclusion. In 2012, the PRPs installed limited modifications (additional sparge well clusters, a new ozone delivery system) to the existing system and refused to implement the EPA and the MDEQ recommended actions. The MDEQ continues to be concerned that the ongoing actions at Stage Right will not achieve removal action cleanup goals due to system design issues.

In 2013, MDEQ staff began working with the city to secure an ordinance to protect against exposures associated with the site. The ordinance was finalized in June 2014. The ordinance, in the interest of the public health, safety, and welfare, essentially establishes restricted zones in which certain uses of groundwater are prohibited. The MDEQ provided a copy to the EPA.

In the fall of 2015, management from the MDEQ and EPA met twice to discuss the direction of the site and the ability of the remedy (as it is currently operating) to meet the remedial objectives of aquifer restoration within a reasonable time. The 1992 ROD called for an expedited remedy and anticipated no more than 30 years to achieve aquifer restoration. It is apparent that the aquifer will not achieve restoration by 2022. Late in 2015, the EPA agreed to have a technical evaluation of the site and the remedies conducted by EPA's technical group from its Washington D.C. headquarters. This technical evaluation was conducted in 2016 and the draft report submitted to all parties in December 2016.

SITE STATUS

City production wells continue to operate and serve as groundwater contamination extraction wells. The extracted water continues to be treated by air stripping prior to being pumped to the city's distribution system. The PRPs continue to sparge at the Stage Right 1999 Time Critical Removal Action and operate the Ex-Cell-O treatment cell.

In 2017, the Optimization Report was finalized and the agencies discussed the following report recommendations with the responsible parties: evaluate potential vapor intrusion at Stage Right, additional characterization for 1,4-dioxane, analyze groundwater for emerging contaminants, specific recommendations to provide enhanced site characterization, consider other treatment options for the Soil Remedy Area, develop a remedial strategy for the Stage Right treatment area, evaluate options for continued use of municipal wells for the groundwater remedy, improved data management and analysis.

In June 2017, MDEQ requested EPA require prompt site-wide vapor intrusion investigation due to new vapor intrusion (VI) screening values being developed. In particular, the Stage Right source area should be immediately investigated due to likely source material underneath the Stage Right building and high trichloroethene groundwater concentrations at that location. EPA has yet to require a VI investigation.

ENFORCEMENT STATUS

The group of four PRPs continues to undertake required response actions at the Clare Water Supply site under a Unilateral Administrative Order issued by the EPA in 1990. The group owned and operated facilities, either directly or through successor acquisition, that were source areas of the contamination. The group is comprised of Coltec Industries, Inc., Textron, Inc. (formerly Ex-Cell-O), United Technologies Automotive Corporation, and Illinois Tool Works.

Several on-site source areas are on properties owned by entities responsible for cleanup actions under state programs. The Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, and Part 213, Leaking Underground Storage Tanks, as amended (NREPA) programs have oversight responsibilities for the Stanley Oil source area, the American Dry Cleaners source area, and the former Standard Oil source area. MDEQ Saginaw Bay District Office staff is working with the EPA and the MDEQ Superfund Section staff in this regard.

SPECIAL CONSIDERATIONS
Several source areas at the site are being handled by the Part 201 and Part 213 State Programs. Some coordination between State Program staff and Superfund Program staff is on-going and expected to continue.

OPERABLE UNITS

00	Entire Site
01	Interim Action - Wellhead Treatment
02	Final Remedial Actions for groundwater and source soils

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The EPA prepared the FYR with State assistance. The EPA concluded that the Site remains protective although specific areas within the Site are still under active remedial actions.

Start Date: 09/03/2001	Primary Cost:	$3,000	Source:	Federal
End Date: 09/30/2001	Secondary Cost:	$0	Source:	

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

This Second FYR was completed by the EPA with the MDEQ's assistance. EPA's report concludes the following:

"The imminent threats at the site have been addressed and the remedy provides both short and long term protection of human health and the environment because impacted drinking water is being treated via air stripping prior to mixing with unimpacted drinking water for further treatment in the City's public water supply system prior to distribution. Exposure pathways that could result in unacceptable risk are being controlled and are preventing exposure to and ingestion of contaminated groundwater. Long-term protectiveness of the overall groundwater remedial action relies upon the continued operation and maintenance of the air strippers for flow from MW-2 and MW-5 until water quality at those wells is generally below MCLs, after which the City may opt to maintain the air strippers for long term use until all groundwater within the City's Wellhead Protection Area exhibits concentrations generally below MCLs. Long term protectiveness is also dependant upon effective Institutional Controls that are maintained and monitored."

Start Date: 06/23/2005	Primary Cost:	$20,000	Source: Federal
End Date: 09/28/2006	Secondary Cost:	$0	Source:

5 Year Review

The EPA signed the Third FYR on September 20, 2011. The MDEQ did not agree with many of the statements and conclusions reached in the FYR and had the EPA attach MDEQ's comments to the final FYR report. Key issues the MDEQ identified as not being adequately addressed at the site or in the FYR: 1) more effort needs to be placed on source remediation instead of relying on the municipal wells to "contain" the contaminant plume, 2) 1,4-dioxane needs to be included as a contaminant of concern, cleanup criteria established, and effort placed on identifying the source, 3) the need to make Stage Right a part of the remedy and require source area remediation, 4) the contamination at Standard Oil needs to be evaluated and addressed.

Start Date: 06/29/2011	Primary Cost:	$0	Source:
End Date: 09/20/2011	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The EPA signed the Fourth FYR on September 16, 2016. EPA's review concluded that the remedy is protective in the short-term. In order for the remedy to be protective in the long-term, "the following actions need to be taken to ensure protectiveness: evaluate VI at the site (including, at a minimum under the StageRight building and Fostoria Screw) based on the new regulation/guidelines; complete the site-wide Remedy Optimization Review to evaluate TCE under the StageRight building and provide recommendations to address continued high concentrations of TCE in groundwater; and provide annual written notification to MDOT to ensure the road workers are aware of site-related contamination in the US 10 ROW."

Start Date: *04/29/2015*	Primary Cost:	$0	Source:
End Date: *09/16/2016*	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

5 Year Review Estimated end date based on five years from the 9/16/16 FYR.

Start Date: *09/16/2020*	Primary Cost:	$0	Source:
End Date: *09/16/2021*	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Interim Action - Wellhead Treatment

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 08/18/1990**

Interim action ROD to treat municipal water.

Response Accomplishments: Completed

Remedial Investigation RI/FS conducted by PRP group. Costs unknown.

Start Date: *04/12/1985*	Primary Cost:	$0	Source: Private
End Date: *09/27/1985*	Secondary Cost:	$25,000	Source: Federal

Remedial Design

Start Date: *09/14/1990*	Primary Cost:	$0	Source: Private
End Date: *03/07/1991*	Secondary Cost:	$0	Source:

Remedial Action Construction of air stripping towers to treat municipal water supply.

Start Date: *03/07/1991*	Primary Cost:	$530,000	Source: Private
End Date: *03/07/1992*	Secondary Cost:	$105,000	Source: Federal

OPERABLE UNIT 02: Final Remedial Actions for groundwater and source soils

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/16/1992**

The ROD selected a combined remedy calling for use of deed and/or access restrictions as necessary; SVE; and a groundwater extraction and treatment system using ultraviolet photochemical oxidation.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 08/04/1995**

Groundwater remedy was changed to continue to utilize the air stripping towers that were installed as part of an emergency action. One additional extraction well and one additional air stripper were added to increase the capture and treatment capacity.

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 05/15/1997**

The ROD was amended to change soil remedy to excavation and encapsulation in an on-site containment cell.

Record of Decision *Amendment:* 0 *ESD:* 2 **Effective 09/29/2004**

An ESD was issued to:

1. Construct a permeable reactive barrier at the Mitchell facility;
2. Replace a city municipal/extraction well;
3. Adoption of new Groundwater Surface Water Interface Criteria for xylene and ethylbenzene.

Response Accomplishments: Completed

Interim Response Contaminated soil excavation and off-site disposal of Site hot spots conducted under State request and oversight. Costs unknown.

Start Date: 05/01/1987	Primary Cost:	$0	Source: Private
End Date: 01/29/1988	Secondary Cost:	$0	Source:

Remedial Design Design of groundwater remedy by PRP group. Costs unknown.

Start Date: 09/17/1993	Primary Cost:	$0	Source: Private
End Date: 10/03/1995	Secondary Cost:	$200,000	Source: Federal

Remedial Action Construction of enhanced groundwater capture and treatment via air stripping.

Start Date: 10/03/1995	Primary Cost:	$220,000	Source: Private
End Date: 08/26/1996	Secondary Cost:	$180,000	Source: Federal

Remedial Design Design of soil containment cell by PRP group. Cost unknown.

Start Date: 05/15/1997	Primary Cost:	$0	Source: Private
End Date: 04/28/1998	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: Final Remedial Actions for groundwater and source soils

Response Accomplishments: Completed

Remedial Action Excavation of contaminated soils into an on-site containment cell constructed by the PRP group.

Start Date: 04/28/1998 Primary Cost: $1,361,200 Source: Private

End Date: 06/15/1999 Secondary Cost: $55,000 Source: Federal

Remedial Design Remedial Design for the installation of a permeable reactive barrier to treat contaminated groundwater at the Filcon facility, formerly known as the Mitchell facility, was completed in FY05.

Start Date: 06/15/2001 Primary Cost: $20,000 Source: Private

End Date: 11/30/2004 Secondary Cost: $0 Source:

Remedial Action A permeable reactive barrier was installed along with a monitoring well network in FY 2005. The estimated cost to the PRP Group was $300,000. The completion date was in May 2005.

Start Date: 12/13/2004 Primary Cost: $300,000 Source: Private

End Date: 05/31/2005 Secondary Cost: $0 Source:

Response Accomplishments: Ongoing

Operation and Maintenance This is for operating and maintaining the pump and treat air strippers, and for monitoring the water quality at the extraction wells, which include a municipal supply well. Aquifer restoration is not achievable by the estimated end date. EPA technical group evaluated the site and remedy in 2016 and submitted a draft report in December 2016. Estimated end date is based on 30 years from the ROD and will likely have to be extended.

Start Date: 03/07/1992 Primary Cost: $540,000 Source: Private

End Date: 03/07/2022 Secondary Cost: $0 Source:

Operation and Maintenance O & M and monitoring of the permeable reactive barrier and soil containment cell remedy. Estimated end date will likely change based on site conditions and which (if any) of the 2017 technical recommendations are implemented.

Start Date: 07/01/1999 Primary Cost: $2,634,000 Source: Private

End Date: 12/21/2022 Secondary Cost: $0 Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$7,898	$0	$7,898	$7,898	$7,898

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$125,000	$0	$0	$113,660	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$8,521	$0	$0	$8,521	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$40,876	$0	$0	$40,876	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$19,490	$0	$0	$19,490	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$26,459	$0	$0	$26,459	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$93,114	$0	$0	$92,645	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$22,106	$0	$0	$22,106	$241

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$24,231	$0	$0	$24,231	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$141,619	$0	$0	$141,618	$0
Totals:	$509,315	$0	$7,898	$497,504	$8,139

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Parsons Chemical Works, Inc.
3562 W. Jefferson Street
Grand Ledge , MI

County: Eaton
MDEQ District Location: Lansing
Managed By: RRD-Superfund

Federal Site Code: DX
State Site ID#: 23000010
State Site Score: 35

LOCATION
The Parsons Chemical Works, Inc., (Parsons) Superfund site, also known as ETM Enterprises, Inc., occupies approximately six acres on West Jefferson Street west of the city of Grand Ledge, approximately 1/4 of a mile east of the intersection of M-43 and Jefferson Street, Oneida Township. In the immediate vicinity of the former Parsons plant, Millbrook Printing is located on the south, the Church of the Nazarene and its associated parsonage are located immediately to the west, and commercial operations are located on the north side of Jefferson Street. Two residential subdivisions, Russell Subdivision and Fairview Subdivision, are located immediately east of the site across Oneida Street. The Grand River is located approximately 3/4 of a mile north of the plant.

SITE HISTORY
Parsons Chemical Works, Inc., which operated from 1945 through mid-1979, mixed, manufactured, and packaged agricultural chemicals including pesticides, herbicides, solvents, and mercury-based compounds. During operations, Parsons apparently discharged manufacturing liquid waste through the floor drains in the Parsons plant, leading to a septic tank and leach field, which were connected to a catch basin connected to a county drain system. The drainage system discharged into an unnamed stream northwest of the plant and the stream ultimately discharged into the Grand River. Eventually, the drainage tiles on the steep bank above the unnamed stream washed out, and the liquid discharged onto the bank, contaminating the ground. In addition to the discharge of liquid wastes, activities at the plant resulted in the deposition of chemicals on soil primarily around the perimeter of the building, particularly the south side, impacting approximately one acre. In 1979, ETM Enterprises, Inc. purchased the facility and began operating a fiberglass parts manufacturing facility at this location. The connection between the septic system and the county drain was discovered during one of several investigations performed by ETM Enterprises, Inc., in response to environmental concerns about the property. The company had the septic system and tile field removed, and connected into the Grand Ledge municipal water and sanitary waste systems.

The EPA conducted the first of two Non Time-Critical Removal actions at the site from October 1990 until June 1994. During this removal, 3,000 cubic yards of contaminated soil were remediated utilizing In-Situ Vitrification, an innovative soil remediation technology. At the conclusion of removal number one, an estimated 2,000 cubic yards of contaminated soil remained on-site awaiting a second removal. The contaminated area was fenced and posted to prevent accidental exposure until the EPA conducted a second Non Time-Critical Removal.

A remedial investigation/feasibility study (RI/FS), conducted between 1993 and 1995, consisted of a hydrogeologic investigation, surface water and sediment sampling, assessment of the drainage system, and further assessment of the remaining site soil conditions. The RI revealed that, with the exception of the previously identified contaminated soil (described above), the chemicals detected in soil on the plant site pose no acute public health concern. However, a shallow soil sample collected from a boring on the

north side of Jefferson Street, off-plant property, contained a concentration of 408 parts per million for arsenic, which could pose an acute public health problem via ingestion or direct contact. The RI revealed that shallow groundwater contained the pesticide dieldrin as well as elevated concentrations of several metals related to the former plant operations. These metals include manganese, lead, and arsenic. The shallow groundwater was not an aquifer, and the likelihood of it or the groundwater in the weathered portions of the bedrock being ingested or used for watering was deemed low. However, in the unlikely event that someone consumed groundwater from the shallow saturated zone or the weathered bedrock, the concentrations of manganese in the water could result in an acute health problem. Samples collected 20 feet into the bedrock aquifer, the area drinking water source, complied with all applicable health-based drinking water criteria. Water supply wells in the vicinity are installed more than 100 feet deep which should assure water quality. However, the potential for chemicals of concern in the shallow groundwater and the weathered bedrock to migrate to private wells was not quantified during the RI. Because approximately 67 residences and businesses adjacent to the site rely on private wells for their water supply, a long-term monitoring response was selected in the Record of Decision (ROD) to address this unquantified potential threat. The residential wells sampled during the RI revealed no contamination. The MDEQ and the EPA signed the ROD in 1997 for long-term monitoring of groundwater.

The EPA mobilized to the site in November 1998 to begin the second Non Time-Critical Removal of contaminated soil on plant property and along the north side of Jefferson Street where elevated concentrations of arsenic were found. Prior to mobilization, the EPA conducted three sampling events to characterize and quantify the soil to determine the most appropriate response. The project technical planning document, known as the Engineering Evaluation/Cost Analysis, stipulated that the soil be excavated and disposed of in a licensed landfill. Soil excavation was completed in February 1999. During the second removal, 5,102 cubic yards of soil were excavated and disposed of in a licensed landfill. Site restoration was completed in the summer of 1999 and the final site inspection took place in November 1999.

In December 1997, the MDEQ sampled all of the private water supply wells in the vicinity of the site, where property owners granted access, to establish a baseline of residential water quality data. These samples were analyzed for pesticides and seven metals. Pesticides were not detected in the water samples, nor were metals which exceeded the generic health-based residential drinking water standards. However, manganese was detected in approximately half of the wells above the aesthetic criterion of 50 parts per billion (ppb). The aesthetic criterion was typically associated with non-health-related objectionable characteristics such as taste or staining. The MDEQ provided each well owner with a copy of the results of their well analyses and a letter explaining the results.

Using funding provided by the EPA, the MDEQ began the remedial design in 1998. Because the concentration of manganese in some wells exceeded the aesthetic criterion for manganese, the MDEQ decided to determine whether its presence could be attributed to the former Parsons' operations or if it was naturally occurring. This was accomplished through several tasks. First, all of the manganese data related to this site was combined and assessed comprehensively to determine if a historic pattern could be established. Second, all of the existing site monitoring wells and six residential wells were sampled for manganese, and a complete round of static water level measurements was taken in October 1999. These data were used to develop new groundwater elevation contour maps to aid in the third task, which consisted of drilling three borings hydraulically upgradient of the site and the adjacent subdivisions and sampling them at frequent intervals to a depth of 180 feet. In addition to manganese, the samples were analyzed for aluminum, arsenic, lead, and zinc. Arsenic and lead had been identified as chemicals of concern during the RI. Aluminum and

zinc were included because, while use of these metals at Parsons was not documented, they were detected in site monitoring wells at elevated concentrations.

Upon evaluation of the data, the MDEQ determined that, while arsenic and lead do not appear to be present at elevated levels upgradient of the Parsons site, manganese, aluminum, and zinc were all present at elevated concentrations at multiple vertical intervals in the background wells. It was concluded that the presence of elevated concentrations of these metals in site monitoring wells and some residential wells was not attributable to the former Parsons plant.

In 2001, a Baseline Environmental Assessment (BEA) was submitted to the MDEQ for the former Parsons site. The BEA was determined to be adequate for the purpose of obtaining an exemption from liability for the new owner pursuant to Section 21126(1)(c) of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 201). The state of Michigan notified the current property owner, the Shappell Corporation, in writing, that the state would not consider the new property owner liable for any contamination that was attributable to the former Parsons' operations. The EPA also determined that there were no viable responsible parties.

A Scope of Work was developed in 2002 which included annual groundwater sampling of both site monitoring wells and the adjacent residential wells for 15 years or until the data confirmed that any residual groundwater contamination was below Part 201 Drinking Water criteria. The MDEQ obtained funding from the EPA in October 2002, through a Cooperative Agreement in conjunction with the Scope of Work, to pay for 90 percent of the downgradient investigation and implementation of the long-term monitoring required by the ROD.

In March 2004, the MDEQ in consultation with the EPA, completed the First Five-Year Review (FYR) for the site. The FYR concluded that the remedy remains protective of human health and the environment.

The Second FYR, written by the MDEQ in consultation with the EPA, was completed on April 15, 2009. The FYR concluded that the remedy remains protective of human health and the environment in the short term. Long-term protectiveness would require compliance with effective Institutional Controls (ICs).

Annual groundwater sampling under the Scope of Work began in late October 2002 and was conducted through 2010. Staff of the MDEQ performed the on-site monitoring well groundwater sampling investigation while the Barry - Eaton County Health Department conducted the annual residential well sampling. Based upon the data collected, dieldrin, which was never detected in any of the monitoring or residential wells samples, was dropped from the sampling regime in 2005.

After review of the residential well data collected from 2002 through 2010, it was decided that the sampling numbers could be reduced from 34 to the 7 residential wells located along the Parsons site boundary. This reduction in residential well sampling began in 2010 and was discontinued after the 2011 sampling event.

Review of the monitoring well data from 2002 through 2010 determined there was no longer a need to continue the annual monitoring. Metals contamination concentrations in all the monitoring wells had been reduced to non-detect or below criteria. The MDEQ hired a contractor to plug and abandon the site monitoring wells. This activity was completed by early September 2011. The MDEQ began development of the site-specific Restrictive Covenant (RC) which would include a property survey and installation of a permanent marker. The legal survey of the property was performed by a Level of Effort contractor and completed in September 2012.

The site-specific Cooperative Agreement was closed out on June 30, 2013, and the remaining funds returned to the EPA. Development of the RC was completed and filed with the Eaton County Register of Deeds on August 31, 2013. The MDEQ wrote, and the EPA approved in September 2013, a Remedial Action Report on the Parsons Chemical site. Installation of the permanent marker at the site was completed on October 30, 2013. The MDEQ also began drafting the 2014 Five-Year Review and will petition the EPA to consider the Parsons Chemical site to be a candidate for deletion from the National Priorities List (NPL).

The MDEQ wrote the Third FYR for the Parsons Chemical site, which was approved and signed by EPA on April 11, 2014. The Third FYR concluded that the remedy at the site is protective of human health and the environment in the long term. All remedial action objectives have been achieved. The filed RC prevents residential use of the property and disturbance of the In-Situ Vitrification treatment area.

SITE STATUS
The MDEQ has petitioned the EPA to consider the Parsons Chemical site a candidate for deletion from the NPL The EPA has agreed. Deletion of the Parsons Chemical site is expected in 2018.

ENFORCEMENT STATUS
The state of Michigan notified the current property owner in writing that the state would not consider him liable for any contamination that was attributable to the former Parsons' operations. The EPA determined there were no viable potentially responsible parties.

The MDEQ developed the site-specific RC, which was filed with the Eaton County Register of Deeds on August 31, 2013. The permanent marker, a requirement of the RC, was installed at the site on October 30, 2013.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/1997**

Long-term monitoring with trend analysis and contingency for alternate water supply, if needed.

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Interim Response

Remediated 3,000 cubic yards of soil using In-Situ Vitrification. Conducted by the EPA Emergency Response Branch as a Non Time-Critical Removal.

Start Date: *10/31/1990*	Primary Cost:	$3,146,000	Source: Federal
End Date: *06/30/1994*	Secondary Cost:	$200,000	Source: State

Remedial Investigation

State lead RI/FS.

Start Date: *02/28/1993*	Primary Cost:	$870,957	Source: Federal
End Date: *06/30/1997*	Secondary Cost:	$0	Source:

Interim Response

5,102 cubic yards of soil, contaminated with elevated concentrations of arsenic and/or dieldrin, were excavated and disposed of at an approved landfill.

Start Date: *12/01/1997*	Primary Cost:	$1,000,000	Source: Federal
End Date: *05/21/1999*	Secondary Cost:	$6,000	Source: State

Interim Response

The MDEQ sampled 30 of the estimated 45 private water supply wells in the vicinity of Parsons Chemical Works, Inc., and analyzed for pesticides and metals. Results were sent to all residences and businesses.

Start Date: *12/01/1997*	Primary Cost:	$0	Source: Federal
End Date: *04/30/1998*	Secondary Cost:	$15,000	Source: State

Remedial Design

Conducted investigations to determine the regional background concentration of manganese in groundwater and whether the elevated concentration of manganese in some residential drinking water wells was attributable to the former Parsons Chemical Works, Inc., operations. It was determined that manganese was present in the background, along with zinc and aluminum. However, arsenic and lead were not uniformly present in the background at elevated concentrations but did detect arsenic at increased concentration in one off-plant-property monitoring well downgradient of the former plant.

Start Date: *08/31/1998*	Primary Cost:	$178,660	Source: Federal
End Date: *12/31/2002*	Secondary Cost:	$0	Source:

Remedial Action

Long-term monitoring for 15 years with trend analysis and contingency was the intended long-term remedial action. Review of both the residential and monitoring well data from 2002 through 2010 determined that the metals contamination concentration had fallen to either non-detect or below criteria and that long-term monitoring of the groundwater is no longer needed.

Start Date: *10/01/2002*	Primary Cost:	$390,921	Source: Federal
End Date: *10/01/2010*	Secondary Cost:	$43,436	Source: State

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The First FYR concluded that the remedy remains protective of human health and the environment.

Start Date: 11/30/2003 Primary Cost: $20,000 Source: Federal
End Date: 03/31/2004 Secondary Cost: $0 Source:

5 Year Review The EPA provided funding to the MDEQ to conduct the Second FYR investigation. The Second FYR was completed on April 15, 2009. The FYR concluded that the remedy remains protective of human health and the environment in the short term. Long-term protectiveness would require compliance with effective ICs.

Start Date: 03/01/2008 Primary Cost: $20,000 Source: Federal
End Date: 04/15/2009 Secondary Cost: $0 Source:

Remedial Action Funding was provided by the EPA to allow the MDEQ to hire a Level of Effort contractor to plug and abandon the site monitoring well network. This field activity was conducted and completed by early September 2011.

Start Date: 10/10/2010 Primary Cost: $100,000 Source: Federal
End Date: 09/30/2011 Secondary Cost: $0 Source:

Remedial Action A property survey, required for the RC, was completed by a Level of Effort Contractor in the second half of 2012.

Start Date: 06/01/2012 Primary Cost: $4,500 Source: Federal
End Date: 12/30/2012 Secondary Cost: $0 Source:

5 Year Review The Third FYR was completed on April 11, 2014. The Third FYR concluded the remedy at the site is protective of human health and the environment in the long term. All remedial action objectives have been achieved. The filed RC prevents residential use of the property and the disturbance of the In-Situ Vitrification treatment area.

Start Date: 07/01/2013 Primary Cost: $20,000 Source: Federal
End Date: 04/11/2014 Secondary Cost: $0 Source:

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005953-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Design	$363,212	$0	$0	$178,659	$0
Remedial Investigation	$870,958	$0	$0	$870,957	$0

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005813-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$378,801	$37,880	$0	$284,505	$0
Totals:	$1,612,971	$37,880	$0	$1,334,121	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E192-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$20,000	$0	$0	$19,941	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$7,788	$0	$0	$7,788	$0
Totals:	$27,788	$0	$0	$27,730	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Petoskey Municipal Well Field
200 West Lake Street
Petoskey , MI

County: Emmet
MDEQ District Location: Gaylord
Managed By: RRD-Superfund

Federal Site Code: 54
State Site ID#: 24000011
State Site Score: 37

LOCATION
The PMC Groundwater site, formerly known as Petoskey Manufacturing Company (PMC) is located at 200 West Lake Street in the city of Petoskey, Emmet County, Michigan. The facility is located less than 600 feet from the former Ingalls municipal water supply well (now abandoned), located adjacent to Lake Michigan. While the area is serviced with municipal water, there are several residential wells located within 1/4 mile (outside the plume area).

SITE HISTORY
A city of Petoskey water supply well was contaminated with trichloroethylene (TCE) and dichloroethene at concentrations somewhat less than 50 parts per billion (ppb) and 10 ppb, respectively. PMC, located 600 feet from this municipal well, was identified as the potentially responsible party (PRP). Solvents and paint sludges dumped outside the building contaminated the soils and groundwater. The contamination plume migrated to the municipal well where it could enter the water supply system when the well was operated.

As a result of negotiations with the MDEQ, the PRP removed the most highly contaminated soils and capped the site in 1982. The MDEQ conducted preliminary hydrogeological investigations in 1982 and 1983. In 1984, the PRP performed additional hydrogeological studies under an EPA-issued Administrative Order by Consent (AOC). In the spring of 1987, the PRP signed an AOC to perform a complete remedial investigation/feasibility study (RI/FS). RI activities were initiated during the summer of 1988, but additional fieldwork was never undertaken by the PRP.

In early 1990, because of poor management practices on the part of the PRP, hydraulic oils seeped through the walls of part of the PMC building and into the surrounding soils. The PRP proceeded to excavate some of the contaminated soils and the MDEQ and the EPA collected soil samples to assess the extent of contamination.

Due to lengthy delays in the company's RI activities, the EPA removed the PRP from further RI responsibility. The MDEQ took this site as a state lead to conduct the RI. Soil borings and monitoring wells were drilled; and soil, surface water, and groundwater samples were collected. Additional investigative work was subsequently performed in 1995. This information was compiled and evaluated in a Phase II RI report released in early 1998. The EPA issued a Focused Feasibility Study (FFS) and the Record of Decision (ROD) for the final remedy which was signed September 30, 1998. The remedy included limited soil vapor extraction (SVE) at the northwest corner of the PMC building, excavation of soils around the PMC building to a depth of five feet (to reduce the amount of contaminant leaching to the groundwater), deed restrictions to prevent consumption of contaminated groundwater and to require due care at the PMC property, and groundwater monitoring with a contingency plan to ensure compliance with groundwater/surface water interface (GSI) criteria.

Because one of the city's two municipal wells became contaminated, the MDEQ provided $500,000 in environmental protection bond monies to the city of Petoskey toward acquisition of the Bay Harbor groundwater supply system as an alternative source of municipal water.

In addition, in June 1995, the EPA provided $1,114,200 toward an alternate municipal water supply, plus $123,800 cost share from the state. Because the city of Petoskey was able to purchase an alternate water supply source several miles away from the site, the use of the contaminated well near the source facility was restricted to use during only high demand periods. According to a January 2007 communication with MDEQ Water Bureau staff, the Ingall's well was filled with layers of rock and sand from bottom to top. The piping between the Ingalls' Avenue booster station and well was cut off and plugged.

Around 1999, the EPA excavated soils. Several areas were only excavated to two feet (as opposed to the five feet identified in the ROD) and one area of concern was excavated to approximately seven feet to ensure that residential direct contact criteria were met. The MDEQ collected confirmation samples at this location, all of which were below residential direct contact criteria. The EPA also modified the pilot study SVE wells and began operation of the SVE system. The SVE system was operated on a limited, intermittent basis between November 1999 and December 2000. In accordance with the requirements of the 1998 ROD, the MDEQ requested that the EPA resume SVE operation at the site; but the EPA declined to do so.

On June 17-19, 2002, baseline monitoring well sampling activities were conducted by the MDEQ to assist in designing the long-term groundwater monitoring plan for the site. The Baseline Monitoring Program was needed because groundwater data had not been collected since the 1998 RI and because the city of Petoskey Ingalls water supply well, a major hydraulic and chemical transport influence, had been taken out of service.

Analysis of the monitoring well samples identified the presence of TCE and bis(2-ethylhexyl)phthalate at concentrations above the Residential and Nonresidential Drinking Water Criteria, of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). Additionally, aluminum, chromium, copper, lead, selenium, sodium, thallium, and zinc were detected in the monitoring well samples above both the Residential and Nonresidential Drinking Water and the GSI Criteria of the NREPA throughout the site. This data is in the 2002 Baseline Monitoring Technical Memorandum Report.

In 2004, at the EPA's request, MDEQ collected water level data and conducted a monitoring well casing elevation survey. The purpose of this event was to collect the data to determine the actual flow direction or directions and the amount of change with time caused by fluctuations in regional groundwater, the effects of Lake Michigan, and changes in barometric pressure. The May 2005 report had the following observations/recommendations: fluctuation in the elevation of Lake Michigan has a dominant influence on the water levels and flow direction of the site groundwater; additional new monitoring wells were needed; and replacement monitoring wells were needed to replace those abandoned due to redevelopment activities.

In 2004, all existing PMC buildings had been demolished. In 2005, a portion of the site was developed into condominiums. The rest of the property was developed into condominiums by 2014.

The MDEQ's review of the draft 2005 Five-Year Review (FYR) report made use of new information concerning soil contamination beneath the former building from the 2004 Due Care and Demolition Report for the former PMC by Environmental Consultants & Services, Inc., and the results of the draft MDEQ groundwater level survey. Based on this review, the MDEQ concluded that the natural attenuation remedy for the site was appropriate, but identified concerns with the remaining soil contamination, the existing monitoring system, the need for a monitoring plan for the monitored natural attenuation (MNA) remedy, the lack

of institutional controls, the lack of a ROD-required contingency plan, and the impact of these issues on the ability to make an accurate evaluation of the remedy's short- and long-term protectiveness.

The long-term remediation goal is for the groundwater to achieve generic residential (drinking water and GSI) criteria. The remediation goal for site soils is to achieve residential direct contact criteria because the property has been identified in the city's master zoning plan as multi-family residential and the property has been partially developed into condominiums.

In 2006, the EPA initiated groundwater sampling at the site to better determine current contaminant concentrations, establish a baseline, and develop the long-term groundwater monitoring plan. Ten rounds of samples were collected between 2006-2009.

In 2006, the EPA finalized a Long-Term Groundwater Monitoring Plan for the site without incorporating MDEQ's comments. The MDEQ notified the EPA that the monitoring plan does not meet all of the groundwater remedial action objectives outlined in the ROD (monitored natural attenuation, aquifer cleanup to comply with drinking water standards and meet the GSI protection criteria). At a December 2007 meeting with EPA, the MDEQ reiterated the need for the EPA to implement the following previously-made recommendations: 1) implement adequate deed restrictions and/or modify the existing groundwater ordinance to meet Part 201 requirements, 2) the EPA conduct a survey of all of the monitoring wells to obtain current and accurate x,y,z coordinates, 3) develop a monitoring well chronology/history/summary/determination of adequacy to document what has happened to each of the monitoring wells, 4) provide corrected and accurate monitoring well and well abandonment logs, 5) create a database for the groundwater monitoring results, 6) revise the Groundwater Monitoring Plan to more accurately meet the ROD objectives, and 7) develop a contingency plan in accordance with the ROD, particularly in light of continued elevated concentrations of TCE at the site. The EPA agreed that 7) needed to be done. At this point, it is unclear what the contingency might be due to the presence of new condos and buried utilities at the former PMC property. The EPA also indicated it would like to abandon two additional monitoring wells (PS-6, and MW-10A).

In December 2009, the EPA issued the Second FYR for the site. During the development stage, the MDEQ had identified and recommended several key concerns be included in the Five-Year Review as follow-up action items. These included: installation of ROD-required monitoring wells, implementation of adequate ROD-required deed restrictions (the existing ordinance the EPA is relying on is not protective), development and implementation of an adequate ROD-required groundwater monitoring plan (current plan does not monitor for natural attenuation, a key component of the remedy), development and implementation of the ROD-required contingency plan (groundwater contaminant concentrations have not dropped and a contingent remedy needs to be implemented), development of the ROD-required well abandonment plan, and further sampling and evaluation of wide-spread zinc groundwater contamination. The EPA has interpreted that all of these ROD components have been adequately implemented. None of these MDEQ recommendations were included in the issues and recommendations sections of the final FYR.

The EPA has asserted that the long-term remedial action (LTRA) period began in 2008 even though all of the components of the ROD have not been implemented. In January 2010, the MDEQ provided written confirmation of disagreement with this assertion. In April 2010, the EPA submitted a draft Superfund State Contract (SSC) (for state payment of its match contribution) to which the MDEQ responded indicating that there were too many unresolved issues to enter into an SSC at this time. The start of the LTRA period is critical because it obligates the MDEQ to 10 percent match for ten years followed by 100 percent state

funding. Further discussions with the EPA will occur. While the Agencies have yet to agree on the start date of the LTRA, the EPA did proceed with using federal funds for monitoring well maintenance in the summer of 2011.

The MDEQ reviewed the EPA's revised draft Groundwater Monitoring Plan and informed the EPA: "The offered monitoring plan is not acceptable to fulfill the 1998 ROD groundwater remedial action objectives (MNA), aquifer cleanup to comply with the drinking water standards and meet the GSI protection criteria. The offered monitoring plan also does not (and should) incorporate the 2010 FYR recommendation and monitor for zinc to verify whether the contamination is attributable to PMC.'" The EPA responded without making any substantial changes.

In May 2012, MDEQ and EPA management participated in a conference call to discuss key issues at the site (inadequate institutional controls, need for additional source remediation, need for better monitoring, GSI exceedances, clarifying source and potential remedial action for zinc contamination). Conference calls with EPA in the spring of 2014 resulted in the EPA indicating they are open to possible contingency remedies which are currently being investigated. The MDEQ has notified the EPA that the MDEQ does not believe that technical impracticability is suitable for this site at this time.

SITE STATUS

Groundwater contaminant concentrations currently exceed health based criteria; however, municipal drinking water is in place and nearby private residential wells do not appear to be threatened by the contamination. Project geologists evaluated the groundwater/surface water pathway because there was concern that zinc may be an issue. They determined that the groundwater/surface water pathway was likely incomplete and likely not an issue (subject to field verification).

The December 2014 Third FYR included many but not all of MDEQ's issues. Through management meetings between the agencies, the EPA has agreed to evaluate the vapor intrusion (VI) pathway (a concern due to the fact that condominiums were built over the original source area), evaluate a contingency remedy (the aquifer is not cleaning up as anticipated), sample for 1,4-dioxane (an emerging contaminant often found with solvents), and collect additional data to verify groundwater surface water interface understandings. Toward this end, the MDEQ worked with EPA to develop an acceptable Quality Assurance Project Plan and EPA conducted groundwater monitoring in October 2016. EPA installed sub slab points at condominiums that were built on top of the former PMC property. Spring 2017 sample results necessitated EPA Removal Branch installation of mitigation systems and additional indoor air sampling. EPA also installed portable air purifiers at a few units with mitigation systems to provide supplemental treatment. As of spring 2017, EPA began evaluating nearby buildings for VI. Additional sampling is expected by early 2018. EPA is evaluating possible treatment at 1-2 nearby buildings. MDEQ has requested EPA mitigate a few additional locations. Once the VI exposure pathway is addressed, EPA will pursue further delineation of the source of vapors and how to address the source which impacts both vapors and groundwater.

The agencies still need to resolve the start date of LTRA for the groundwater. The EPA has asserted it started in 2008 and the MDEQ has responded that it has yet to begin because there is no SSC and all of the ROD remedy components have yet to be implemented. The results of the additional investigative work will determine whether LTRA is appropriate and whether an SSC will be needed.

ENFORCEMENT STATUS

n 4 the PRP performed additional hydrogeological studies under an P -issued rder. n the spring of the PRP signed an to perform a complete R and R activities were initiated during the summer of 1988. Additional fieldwork was scheduled for the spring of 1989 yet was never undertaken by the PRP. The investigation was subsequently taken over by the EPA and then the MDEQ. It has been determined that the PMC is liable under the NREPA. On June 1, 2000, the PMC filed for protection under Chapter 11 of the Bankruptcy Code for a second time (the first time was March 8, 1990). On February 16, 2001, the Chapter 11 filing was converted to Chapter 7. The PMC property then became a part of the bankruptcy estate.

In April 2003, the former PMC facility was sold through Chapter 7 Bankruptcy Trustee to the Perazza Products, LLC, a Michigan corporation (the developer). In July 2004, the developer completely demolished and removed the existing building and foundation. According to the developer, contaminated soils that exceed MDEQ Residential Cleanup Criteria for Direct Contact, Volatilization to Indoor Air, and GSI protection were also removed. The existing building and contaminated soils were hauled off-site for disposal. As of late 2004/early 2005, the developer has begun construction of residential condominiums and limited commercial space on the property.

On May 12, 2005, the property owner and developer, Petoskey Pointe Associates, LLC, entered a Declaration of Restrictive Covenant with Emmet County restricting certain activities at the former Petoskey Manufacturing Company property. This declaration was reviewed and determined acceptable by the MDEQ Compliance & Enforcement staff.

In December 2009, the MDEQ was notified that Perazza Products, LLC, the developer, was filing for bankruptcy.

SPECIAL CONSIDERATIONS

The property was formerly zoned light industrial but has been rezoned to residential/commercial with the surrounding properties zoned as residential. Beginning in 2005, the property was being developed into condominiums with limited commercial space. The property has since been partially developed (with the rest having slab construction with no condominiums built).

OPERABLE UNITS

00	Entire Site
01	Interim Action (Ingalls Well)

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/1998**

Soils Remedy: Operation of the pilot test SVE system; excavation of contaminated soils to five feet, with one area to seven feet; excavation to eliminate residential direct contact concern and to minimize the potential for leaching to groundwater; implementation of deed restriction.

Groundwater Remedy: Installation of deed restrictions; installation of additional monitoring wells; groundwater monitoring until generic residential drinking water criteria are achieved.

Contingency Plan: This contingency plan "will be implemented to protect human health and the environment if environmental monitoring predicts or detects statistically-significant exceedances of POC [point of operational compliance] criteria that demonstrate that natural attenuation is not occurring sufficiently or at an acceptable rate." If the soils remedy fails to result in sufficient reductions in groundwater contaminant concentrations, the contingency plan will require an evaluation of the impact of the exceedances and possible implementation of active groundwater remediation, additional source controls, etc., to prevent further release of contaminants to the surface water body.

Response Accomplishments: Completed

Remedial Investigation

The five groundwater monitoring wells (PS-1, PS-4, PS-6, PS-10, and PS-11) were installed in 1982 and 1983 to evaluate the source of the Ingalls municipal well contamination.

Start Date: 01/01/1982	Primary Cost:	$0	Source: Private
End Date: 12/31/1983	Secondary Cost:	$0	Source:

Remedial Investigation

Under a 1984 EPA-issued AOC, PMC performed additional hydrogeological investigation activities and installed four monitoring well clusters (PS-A, PS-B, PS-C, and PS-D) in 1984.

Under a second EPA AOC in 1987, PMC was directed to conduct a full RI/FS. They installed four additional monitoring wells in 1988 (PS-104, PS-105S, PS-105D, PS-106). The EPA assumed responsibility for the RI in 1990 due to PMC delays in work plan development and their filing for Chapter 11 bankruptcy in 1990.

Start Date: 01/01/1984	Primary Cost:	$0	Source: Private
End Date: 12/31/1990	Secondary Cost:	$275,000	Source: Federal

Remedial Investigation

The MDEQ conducted two phases of RI focusing on soil and groundwater contamination and the extent of on-site contamination.

Start Date: 01/01/1991	Primary Cost:	$672,279	Source: Federal
End Date: 02/28/1998	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Design The EPA designed the proposed soil excavation and modification to the RI/FS SVE pilot extraction wells in 1999-2000.

Start Date: 04/01/1999	Primary Cost:	$65,000	Source: Federal
End Date: 11/30/2000	Secondary Cost:	$0	Source:

Remedial Action Excavation: In November 1999, the EPA conducted a limited excavation of contaminated soils around the building, focusing primarily on the west side of the building. The EPA elected to limit the excavation to two feet at select locations (the ROD required five feet).

SVE: The EPA operated the SVE system on a limited, intermittent basis between November 1999 and December 2000. In response to a July 2001 MDEQ letter requesting that the SVE system resume operation in accordance with the ROD requirement that the SVE system operate until non-detect, the EPA has indicated that it would not resume operation of the SVE system.

This work was done under an SSC with the EPA, ensuring the state's 10 percent cost share of the Remedial Action.

Start Date: 09/01/1999	Primary Cost:	$333,826	Source: Federal
End Date: 12/31/2000	Secondary Cost:	$37,092	Source: State

Remedial Action Work performed by the MDEQ under a Cooperative Agreement (CA) from the EPA.

Under this CA, the MDEQ conducted annual groundwater monitoring from 2001 to 2009. Results of these sampling events were to be used to determine long-term monitoring requirements for the groundwater.

Start Date: 10/01/2000	Primary Cost:	$145,080	Source: Federal
End Date: 09/30/2009	Secondary Cost:	$6,120	Source: State

5 Year Review The EPA issued the First Five-Year Review report on March 16, 2005. The report stated, "The remedy is functioning as designed. The immediate threats have been addressed and the remedy is protective in the short term. In order for the remedy to be protective in the long term, deed restrictions controlling the use of groundwater and long-term groundwater monitoring plan, need to be put in place to prevent exposure to contaminated groundwater."

Start Date: 10/18/2004	Primary Cost:	$0	Source: Federal
End Date: 03/16/2005	Secondary Cost:	$0	Source: Federal

5 Year Review The EPA concluded that the remedy is protective in the short-term and is expected to be protective in the long-term. The MDEQ did not support the EPA's conclusions due to the fact that certain remedy components have not yet been implemented.

Start Date: 10/28/2009	Primary Cost:	$0	Source:
End Date: 12/23/2009	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

On December 19, 2013, the MDEQ sent the EPA a letter identifying key issues to be evaluated as part of the FYR.

On December 26, 2013, the MDEQ received an EPA letter dated December 19, 2013, indicating that the FYR process has started and is expected to end no later than December 23, 2014.

The EPA finalized the Third FYR on December 19, 2014 and provided a copy to the MDEQ on January 15, 2015.

Start Date: 12/19/2013	Primary Cost:	$0	Source:
End Date: 12/19/2014	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

Long Term Remedial Action

Proposed LTRA and O & M funding estimated (FY 2006 dollars). EPA is in the process of re-evaluating the site remedy due to lack of progress toward achieving cleanup. This evaluation (including evaluating a new VI exposure pathway) will likely alter the ultimate remedy. The dollar amounts identified here are essentially place-holders until both agencies re-determine the future remedy(ies) at this site.

Start Date: 10/01/2018	Primary Cost:	$1,296,900	Source: Federal
End Date: 03/31/2022	Secondary Cost:	$144,100	Source: State

5 Year Review

Estimated end date based on five years from the signed Third FYR.

Start Date: 12/19/2018	Primary Cost:	$0	Source:
End Date: 12/19/2019	Secondary Cost:	$0	Source:

Operation and Maintenance

The MDEQ will conduct long-term groundwater monitoring (100 percent state funds) at this site to determine compliance with GSI criteria and to evaluate MNA of the groundwater and achieving long-term compliance with Maximum Contaminant Levels. Total cost of $3,005,315 is based on 20 years of semiannual groundwater monitoring. ($150,266/year using 2015 dollars). The EPA is currently evaluating the remedy and possible contingency remedies. The outcome of this evaluation may alter the future funding needs (dollar amount and work to be performed).

Start Date: 04/01/2022	Primary Cost:	$150,266	Source: State
End Date: 04/01/2042	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Interim Action (Ingalls Well)

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 06/14/1995**

The interim action ROD provided for either treatment of the contaminated Ingalls municipal well with air stripping or provide the capital cost equivalency of the air stripper to be used toward acquiring an alternate water supply. The MDEQ elected to have the money applied to an alternate water supply consisting of a groundwater source located in Bay Harbor, a development located approximately five miles west of Petoskey. If the air stripper were to have operated, the ROD estimated the annual operation and maintenance cost at $169,000.

Response Accomplishments: Completed

Interim Response After the MDEQ collected soil samples, PMC removed contaminated soils from the west side of the building sometime in 1982.

Start Date: 06/01/1982 Primary Cost: $50,000 Source: Private
End Date: 06/30/1982 Secondary Cost: $0 Source:

Interim Response On October 28, 1996, the state provided the city of Petoskey with $500,000 toward an alternate water supply. The EPA awarded a $0 CA amendment on July 26, 1996, approving the transfer of $1,238,000 in federal dollars to the city. This funding was to be used toward the provision of an alternate water supply (groundwater from Bay Harbor) in accordance with the June 14, 1995, interim action ROD.

Start Date: 10/28/1996 Primary Cost: $1,114,200 Source: Federal
End Date: 09/20/1999 Secondary Cost: $623,800 Source: State

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995105-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$1,375,555	$137,555	$0	$1,375,555	$0
Remedial Investigation	$840,924	$0	$0	$672,279	$0

Cooperative Agreement Number V975314-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$61,200	$6,120	$0	$50,037	$0
Totals:	$2,277,679	$143,675	$0	$2,097,870	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$23,285	$0	$23,285	$23,285	$23,285

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$63,375	$0	$0	$45,155	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$9,096	$0	$0	$9,096	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$27,349	$0	$0	$27,349	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$640	$0	$0	$638	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$7,752	$0	$0	$7,752	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$7,931	$0	$0	$7,931	$4,000

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$17,254	$0	$0	$17,254	$0

Cooperative Agreement Number V995261-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$16,667	$1,667	$0	$16,606	$0

Cooperative Agreement Number V995261-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$11,111	$1,111	$0	$11,012	$0

Cooperative Agreement Number V995259-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Design	$10,000	$0	$0	$7,881	$0
Totals:	$194,460	$2,778	$23,285	$173,959	$27,285

STATE SUPERFUND CONTRACTS

For Operable Unit 00 : Entire Site : Closed

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Action	$306,794	$30,679	$30,679	$0
Totals:	$306,794	$30,679	$30,679	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Forest Waste Products
8359 East Farrand Road
Otisville , MI

County: Genesee
MDEQ District Location: Lansing
Managed By: RRD-Superfund

Federal Site Code: D5
State Site ID#: 25000009
State Site Score: 27

LOCATION
The Forest Waste Products site is located in a rural area about two miles northwest of Otisville, Michigan. Butternut Creek is located about 1,000 feet from the eastern site boundary. A municipal water supply is not available in the area; however, private wells are nearby.

SITE HISTORY
The Forest Waste site was licensed pursuant to the Garbage and Refuse Disposal Act, 1965 PA 87, as amended, to operate as a landfill from 1972 to 1978. The site was also permitted to receive certain limited types of pre-treated liquid industrial wastes for dewatering in a system of nine lagoons. During its operation, a number of industrial wastes were disposed of in either the lagoons or landfill area including polychlorinated biphenyl contaminated roofing materials, polybrominated biphenyl (PBB) contaminated cattle feed, chemical fire debris, paint wastes, plating wastes, acid wastes, and caustic wastes. These wastes were buried in bulk form or in drums or deposited in the lagoons for dewatering. No additional wastes were received at the site since its closure in 1978.

Soil, lagoon, and surface water samples were collected in 1984. Plating waste, soil contamination and PBB disposal, particularly near the landfill area, prompted a small mammal study to be conducted in November 1985. No PBBs were detected in the small mammals sampled. Surface soils were found to be contaminated with lead, polynuclear aromatic hydrocarbons, and PBBs. The groundwater was contaminated with a variety of volatile organic compounds and cyanide. An elevated pH of 10 (normal background is 6 to 7) showed the water to be more caustic at the site. None of the 16 residential wells sampled in 1984, nor the 17 residential wells tested in 1985, showed groundwater contamination. Fish from a nearby pond were sampled to determine if hazardous substances had bioaccumulated. Only low levels of mercury were detected. The site is surrounded by a perimeter fence, which was installed in 1984.

In the spring of 1986, additional deep and shallow monitoring wells were installed to further define groundwater conditions. Additional surface water samples were collected adjacent to the site. Borings were taken in several of the waste lagoons in order to document any downward migration of the waste materials through the soil profile. A phased Feasibility Study (FS) for the lagoons was completed on April 8, 1986, which recommended removal of all waste materials and underlying contaminated soils from six of the nine lagoons. In July 1988, the EPA issued an Administrative Order requiring the potentially responsible parties (PRPs) to complete excavation and removal of the contaminated wastes and underlying soils in the lagoon areas pursuant to the Record of Decision (ROD) signed on June 30, 1986. Between the fall of 1988, and the fall of 1989, the PRPs removed 9,123 tons of waste sludges and contaminated soils and 53,922 gallons of lagoon liquids and decontamination wastes from the waste lagoons and disposed of them in an off-site hazardous waste disposal facility. The lagoon area was then backfilled, graded, and seeded.

A small-scale waste characterization of the contents of the landfill was undertaken in April

A small-scale waste characterization of the contents of the landfill was undertaken in April 1987. This study documented that there were several areas where large numbers of industrial waste drums, containing primarily paints and paint solvents, had been buried.

On August 28, 1987, the EPA released the final Remedial Investigation (RI) report for the entire site, and the final FS was released on January 20, 1988. In March 1988, the EPA issued a ROD calling for deed restrictions, a landfill cap, a sub-surface vertical barrier around the landfill, limited drum removal from the landfill, and groundwater monitoring.

The EPA (through the U.S. Army Corps of Engineers) selected a consulting firm to design the landfill remedy. Field work was conducted in April and May 1990 to identify large concentrations of drums, by test pitting, and to install borings to locate the landfill perimeter.

In the spring of 1993, the PRPs characterized and disposed of approximately 500 staged drums excavated from the landfill in 1990, pursuant to a March 1992 order issued by the EPA. Additional trenching and drum removal activities were completed during the fall of 1993 with subsequent off-site disposal/treatment of the staged drums completed in the spring of 1994.

The PRPs took over the remedial design/remedial action for final site remedy, which included additional drum removal, capping of the landfill, and groundwater monitoring. In the spring of 1993, the EPA issued an Explanation of Significant Differences (ESD), which eliminated the requirement for a vertical barrier around the landfill, as specified in the 1988 ROD. The ESD retained groundwater monitoring.

Design of the landfill cap was completed during 1995. Construction of the landfill cap was completed in September 1997, with approval of the final inspection. The approximate landfill area of 15 acres was fenced separately from the rest of the site.

A Five-Year Review (FYR) was completed for the site in March 1997 which concluded that the remediation of the lagoons remains protective of human health and the environment. It also recommended that the planned landfill remedy and further groundwater investigation continue as planned.

During routine groundwater monitoring in 1995, organic compounds were detected above action levels north of the landfill. Additional investigation was conducted by the PRPs to determine the need for additional response activities. Additional investigation activities included: construction of monitoring wells and 14 sampling events, with vertical aquifer sampling; surface water and sediment sampling; and sampling of residential wells. It was discovered that contamination had migrated beyond the property boundary. The PRPs were tasked with developing a comprehensive summary of all of the north plume investigation data so that data gaps could be identified. The Agencies received a draft Summary Report in spring 2002. Followng review and comments, the report was finalized in October 2003. The MDEQ performed additional site investigations in 2002 and into 2003, including further lake study to determine if contaminated groundwater was venting to the lake. Definitive evidence of venting was not found. A monitoring well on the south end of the lake was identified as the compliance monitoring point for groundwater venting to the surface water.

The Second FYR for Forest Waste was finalized at the end of September 2002. The FYR concluded that the remedy in place was protective in the short term because there was no evidence of exposure. However, it stipulated multiple actions were needed in order to maintain its protective status. Included in the list of actions were: the necessity to delineate and characterize the north plumes and control them; evaluate the need to monitor for PBBs in groundwater; either update the groundwater action levels in the scope of work to be protective for exposure to multiple contaminants, or impose usage restrictions on the

shallow sand, and deep sand and gravel aquifers north of the landfill property, and on the shallow sand aquifer east of the property; and evaluate the need to conduct air sampling and soil gas monitoring for landfill gas emissions, and if deemed appropriate, implement the monitoring programs to assure that landfill gas was not migrating into off-municipally-owned landfill property.

To this end, an initial version of a report detailing remedial alternatives for the contaminated groundwater north of the landfill by Conestoga-Rovers & Associates, the PRP's consultant, was received in December 2002. After receipt and review of multiple versions of this report, it was finalized in 2005.

The PRPs conducted the first landfill gas investigation in August 2005. The investigation revealed the presence of methane in samples beyond the perimeter of the landfill. Additional investigation continued through 2012 to assess the extent of landfill gas migration.

A ROD Amendment, to address the north plume of groundwater contamination also included groundwater/surface water interface criteria and redefined the site property boundaries, was signed by the EPA in September 2005. The MDEQ supported moving forward with the proposed remedy described in the ROD Amendment. However, the MDEQ did not concur with the ROD Amendment because it fell short of compliance with key elements of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). Specifically, the ROD Amendment did not comply with Sections 20120b(4) and (5) of Part 201 relative to Remedial Action Plans and the associated Administrative Rules. The Agencies continued to work together toward the successful implementation of the response actions identified in the ROD Amendment.

Pilot-scale treatability studies for in-situ chemical oxidation and in-situ submerged oxygen curtain technologies, selected by the ROD Amendment to treat contaminants in the north plume, were implemented in 2005. After multiple, unsuccessful attempts to get adequate distribution of oxygen across the contaminant plume immediately north of the landfill, it was decided that the in-situ submerged oxygen curtain technology could not be effectively utilized at the Forest Waste site. Therefore, the pilot equipment was removed and the technology abandoned but monitoring of the contamination in this area of the site continued. Beginning in 2006, multiple phases of the in-situ chemical oxidation pilot studies on both the shallow and deep aquifers were conducted. Difficulty in achieving and sustaining adequate distribution, both vertically and horizontally, of the potassium permanganate solution occurred during the pilot studies. Additional groundwater characterization investigations performed by the PRPs at the urging of the MDEQ and the EPA, facilitated refinements to the system designs to attempt to enhance groundwater treatment.

The Third FYR was completed in 2007. The conclusions of the FYR were that the remedies are currently protective and with the successful activation of the groundwater treatment, protection should be maintained. Further methane monitoring was determined to be needed, and in order to comply with Part 201 requirements, the PRPs continued to monitor the chemical oxidant near the lake to confirm it was not impacting the surface water. Landfill gas testing and residential well sampling continued through 2008. Impacts to water supply wells were not detected.

Full scale operation of the in-situ chemical oxidation treatment systems began in 2008. Monitoring was begun for evidence that potassium permanganate was moving toward the lake in the shallow aquifer treatment area and modifications were made to the injection locations if evidence of migration was observed. With each monitoring event, modifications to the treatment systems were made to improve effectiveness of treatment. A report summarizing the results of one year of treatment was submitted to the Agencies in late 2008. The Agencies determined that another year of data was needed before real

. The gencies determined that another year of data was needed before real assessments of system success could be measured.

Operation and monitoring (O & M) of the treatment continued through 2009. The annual report documented the treatment was not as successful as anticipated. The Agencies directed the PRPs to develop a proposal for modifying the systems and submit their proposal for review. If progress could not be documented in 2010, alternative treatments would be considered. During this phase, residential wells were sampled and the annual groundwater monitoring program was implemented. The in-situ chemical oxidation treatment system within the deep aquifer continued operation and monitoring through 2010. The annual report summarizing the past year's results of treatment was submitted in November 2010. Results were similar to years past. In December of 2010, the PRPs installed two new sentinel monitoring wells in the shallow aquifer.

At the request of the Agencies, the PRPs submitted a draft shallow aquifer long-term in-situ chemical oxidation design document including a pilot-scale test work plan in September 2010. After review and comments from the EPA and the MDEQ, the design document was revised and submitted in January 2011. The revised design was implemented in the spring of 2011 and continued throughout the year.

In the summer of 2011, the EPA requested a groundwater investigation for 1,4-Dioxane, which was detected in the groundwater contamination plume in concentrations exceeding criteria. At the end of 2011, the PRPs had developed and implemented an expanded 1,4-Dioxane investigation. The results of this investigation confirmed that 1,4-Dioxane was detected in the groundwater contamination plume migrating northward from the landfill.

In 2012, both Agencies agreed that the current remedy was not successful in treating the groundwater contamination plume and recommended the pilot test should be terminated. With the discovery of 1,4-Dioxane in the groundwater contamination plume, a new remedy would be required. The PRPs conducted an expanded site investigation in an attempt to delineate the extent of the 1,4-Dioxane, which was unsuccessful. Additional site investigations were planned in 2013. Both Agencies anticipate initiation of discussion for development of a ROD Amendment or ESD to address the groundwater contamination plume. Annual groundwater sampling, including residential wells, continued in 2012 and will continue into the near future.

The EPA wrote the 2012 FYR report. The report concluded that the remedies for the lagoon removal action and the landfill and groundwater were protective of human health and the environment in the short term. However, for the remedy to be protective in the long term, the following actions are needed: attainment of groundwater action levels selected in the ROD through groundwater treatment and monitored natural attenuation, and additional investigations to characterize the presence and extent of 1,4-Dioxane in the site groundwater so that a new groundwater treatment technology can be selected, if necessary.

In 2013, both Agencies continued dialogue on developing a ROD Amendment or ESD to address the groundwater contamination plume. The PRP group continued work to define the extent of 1,4-Dioxane in the site groundwater and, once defined, discussions will begin on the new groundwater treatment technology that will be selected to treat the plume. Annual groundwater sampling, including residential wells, continued in 2013 and will continue into the near future.

In 2014, the EPA and MDEQ corresponded throughout the year on what delineation efforts should be taken by the PRP group. Through these discussions, the EPA signaled that an eventual cleanup standard for 1,4-Dioxane would likely be 7.8 micrograms per liter (ug/L).

everal technical discussions with the P and the PRP group resulted in a new delineation plan to determine the extent of the plume. The delineation work is still ongoing and once the boundaries of the plume are determined, a groundwater treatment system will begin operation to treat the plume. Technical meetings have also continued during this process to ensure issues are resolved and work continues in a timely manner. Also in 2014, annual groundwater sampling, including residential wells, continued and will continue into the near future.

In 2015, the PRP group completed the delineation plan agreed upon for the 1,4-Dioxane plume. The extent of the plume was delineated to a screening level of 7.8 ug/L. Upon completion of the plume delineation effort and expanded residential well sampling, the PRP group proposed the replacement of six residential wells located in the shallow aquifer. These wells had detections of 1,4-Dioxane, far below the current drinking water criteria of 85 ug/L. The residents at four of these locations agreed to the new bedrock wells offered by the PRPs and these were completed by December 2015. Also in 2015, annual groundwater sampling, including residential wells, continued and will continue into the near future.

In 2016, the PRP group along with the EPA and MDEQ have continued technical meetings throuhout the year to address the treatment of the 1,4-Dioxane plume. A pre-remedial design plan has been developed by the PRPs consultant and is currently under review by the Agencies. The annual groundwater sampling, including residential wells, continued in 2016 and will continue into the near future. Also, another resident of the original six proposed residential wells to be replaced had a new bedrock well installed by the PRPs in December 2016. This brings the total number of residential wells replaced on site to five.

SITE STATUS

In 2017, The EPA and MDEQ met at Region 5 headquarters with the PRP group to discuss the completed remedial design plan and how to implement it. The field work for this plan is slated to begin at the end of 2017. Ongoing investigative work has been proposed by the Agencies concerning the bedrock aquifer and is is still being discussed with the PRP group. The estimated start date for this is sometime in early 2018. The annual groundwater sampling event, including residential wells was completed in July 2017 and the Agencies are awaiting the annual report which will include the data from that event. Technical phone calls between the Agencies and the PRP group have continued throughout the year.

ENFORCEMENT STATUS
In 1994, the EPA entered into a Consent Decree with the PRP (Forest Waste Coordinating Committee) to complete the RA and O & M for this site. The state entered into a 1993 Administrative Order by Consent with the Forest Waste Coordinating Committee to reimburse the state for oversight costs associated with the management of this site. The EPA considers them to be in compliance with the Order.

SPECIAL CONSIDERATIONS
Forest Township has obtained ownership of this tax-reverted property.

OPERABLE UNITS

00	Entire Site
01	Lagoons
02	Landfill

OPERABLE UNITS

03	Groundwater

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Interim Response Fence construction around site.

Start Date: 07/17/1984 Primary Cost: $0 Source: Federal
End Date: 08/28/1984 Secondary Cost: $0 Source:

5 Year Review The EPA completed a Five-Year Review. (Dates obtained from the EPA.)

Start Date: 10/31/1996 Primary Cost: $0 Source: Federal
End Date: 03/28/1997 Secondary Cost: $0 Source:

5 Year Review A Second Five-Year Review was conducted by the EPA for the entire site.

Start Date: 12/14/2001 Primary Cost: $0 Source: Federal
End Date: 09/30/2002 Secondary Cost: $0 Source:

5 Year Review The Third FYR was signed on September 21, 2007. The remedy for Operable Unit 1 (lagoon removal action) was completed in 1989 and is protective of human health and the environment from the former contents of the lagoons.
The remedy for Operable Unit 2 (landfill and groundwater) is expected to be protective of human health and the environment upon attainment of the groundwater action levels through groundwater treatment, and natural attenuation. In the interim, exposure pathways that could result in unacceptable risks are being controlled through maintenance of the fencing and landfill cap, monitoring, institutional controls, and a contingency to replace residential wells.

Because the remedial action at both Operable Units are protective, the overall Selected Remedy is protective of human health and the environment.

Start Date: 01/25/2007 Primary Cost: $0 Source: Federal
End Date: 09/21/2007 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The Fourth FYR, written by the EPA and reviewed and concurred with by the MDEQ, was signed on September 13, 2012. The report concluded that the remedies for the lagoon removal action and the landfill and groundwater were protective of human health and the environment in the short term. However, for the remedy to be protective in the long term, the following actions are needed: attainment of groundwater action levels selected in the ROD through groundwater treatment and monitored natural attenuation, and additional investigations to characterize the presence and extent of 1,4-Dioxane in the site groundwater so that new groundwater treatment technology can be selected.

Start Date: *09/13/2011*	Primary Cost:	$0	Source: Federal
End Date: *09/13/2012*	Secondary Cost:	$0	Source:

5 Year Review The Fifth FYR written by the EPA , was completed in September 2017.

Start Date: *09/27/2016*	Primary Cost:	$0	Source:
End Date: *09/27/2017*	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

5 Year Review

Start Date: *09/27/2021*	Primary Cost:	$0	Source:
End Date: *09/27/2022*	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Lagoons

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 06/30/1986**

All contaminated sediments from lagoons 2, 3, 4, 6, 7, and 8 excavated, treated on-site (solidified), and disposed of off-site at a Resource Conservation and Recovery Act, 1976 PA 94-580, as amended (RCRA)-permitted facility. Wastewater in the lagoons removed, then treated and disposed of at an off-site RCRA-permitted facility. Treatment was not specified in the ROD.

OPERABLE UNIT 01: Lagoons

Response Accomplishments: Completed

Remedial Investigation

Information is from the EPA. According to the ROD, RI field work was initiated during the fall of 1984. RI field work for the lagoons was completed during October 1984. However, the ROD for the lagoons also includes some surface soil data from samples collected during the summer of 1985. The RI for the remainder of the site was not yet complete.

Start Date:	*12/30/1983*	Primary Cost:	$545,000	Source: Federal
End Date:	*06/30/1986*	Secondary Cost:	$0	Source:

Remedial Design

Activity leads are mostly federal, but the PRPs did conduct some of the work. Dates and cost information are from the EPA.

Start Date:	*04/20/1987*	Primary Cost:	$530,000	Source: Federal
End Date:	*07/19/1988*	Secondary Cost:	$0	Source:

Remedial Action

The sediments and contaminated soils associated with the lagoons were excavated and disposed of off-site.

Start Date:	*09/21/1987*	Primary Cost:	$0	Source: Private
End Date:	*06/28/1988*	Secondary Cost:	$268,000	Source: Federal

OPERABLE UNIT 02: Landfill

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 03/31/1988**

Drum removal, construction of a landfill cap and vertical barrier wall, groundwater monitoring, and deed restrictions.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 05/04/1993**

The primary purpose of the ESD document was to eliminate the vertical barrier from the selected remedy. It was determined by the EPA that a barrier was not needed due to the detection of only low concentrations of contamination east of the landfill. The changes made in the ESD resulted in no additional costs to the remedy.

Response Accomplishments: Completed

Remedial Investigation

Most of the dates and cost were obtained from the EPA. The landfill RI overlapped and extended beyond the lagoon RI work. The PRPs conducted some of the work for this site.

Start Date:	*02/26/1986*	Primary Cost:	$519,000	Source: Federal
End Date:	*03/31/1988*	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: Landfill

Response Accomplishments: Completed

Remedial Design Dates are from the EPA. It lists the Remedial Design as performed by the PRPs.

Start Date: 06/27/1988	Primary Cost:	$0	Source: Private
End Date: 03/26/1996	Secondary Cost:	$0	Source:

Interim Response Drum removal was conducted by the PRPs. Dates are from the EPA. Costs are paid by the PRPs, so no cost information is available.

Start Date: 01/01/1990	Primary Cost:	$0	Source: Private
End Date: 05/01/1994	Secondary Cost:	$0	Source:

Response Accomplishments: Construction Complete

Remedial Action The landfill has been capped by the PRPs.

Start Date: 09/29/1989	Primary Cost:	$0	Source: Private
End Date: 06/30/1990	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance Landfill maintenance and groundwater monitoring are the responsibility of the PRPs. Costs are based on the annual operation and maintenance cost from the 1988 ROD. Investigative work and remedial alternative evaluation is taking place to address the plumes of contamination emanating from the landfill since implementation of the selected remedy.

Start Date: 04/19/1990	Primary Cost:	$6,000,000	Source: Private
End Date: 06/30/2020	Secondary Cost:	$0	Source:

OPERABLE UNIT 03: Groundwater

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 03/31/1988**

Combined with the Landfill ROD. Remedy for groundwater consists of groundwater monitoring and access restrictions only. This ROD does not address the contamination discovered in 1995 north of the landfill. This contamination addressed separately in the ROD amendment.

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 09/28/2005**

Remedy changes to address the north plume of groundwater and include groundwater/surface water interface criteria were executed for the site. The MDEQ did not fully concur with this ROD Amendment.

OPERABLE UNIT 03: Groundwater

Response Accomplishments: Completed

Remedial Investigation

December 12, 1995, was when MW95-1S and MW95-1D were installed north of the landfill. The sampling of these wells resulted in the identification of the northern groundwater plume. The 1988 ROD had addressed the landfill and groundwater monitoring east of the landfill. Another decision document addresses this newly identified contamination. This investigation is labeled as a separate RI, even though previous groundwater work around the landfill, and east of the landfill was completed for the 1988 ROD. Work being done as the separate RI, post ROD, will be included under the Long-Term Remedial Action category.

Start Date: 12/12/1995 Primary Cost: $0 Source:
End Date: 03/31/2003 Secondary Cost: $0 Source:

Long Term Remedial Action

Following pilot studies and system design modifications, full-scale treatment began in 2008. In 2011, at the request of the EPA, an additional groundwater investigation for 1,4-Dioxane was conducted. The initial investigation revealed 1,4-Dioxane concentrations exceeding criteria. An expanded 1,4-Dioxane investigation was conducted in late 2011 into 2012, which did not locate the end of the 1,4-Dioxane plume. Additional investigations were planned for 2013. Both Agencies agreed, however, the pilot remedy should be ended because it would not be effective in treating 1,4-Dioxane and a new remedy will be needed.

Start Date: 06/30/2006 Primary Cost: $0 Source:
End Date: 12/30/2012 Secondary Cost: $0 Source:

Response Accomplishments: In Progress

Remedial Investigation

Additional RI will be needed into 2018 to find the extent of the 1,4-Dioxane in the groundwater contamination plume.

Start Date: 10/01/2011 Primary Cost: $0 Source:
End Date: 08/01/2018 Secondary Cost: $0 Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$200,000	$0	$0	$128,094	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$10,939	$0	$0	$10,939	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$23,411	$0	$0	$22,926	$0
Totals:	$234,350	$0	$0	$161,959	$0

STATE SUPERFUND CONTRACTS

For Operable Unit 02 : Landfill : Closed

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Investigation	$387,353	$38,735	$38,735	$2,354
Totals:	$387,353	$38,735	$38,735	$2,354

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Gratiot County Landfill
7391 Croswell Road
St. Louis , MI

County: Gratiot
MDEQ District Location: Lansing
Managed By: RRD-Superfund

Federal Site Code: 05
State Site ID#: 29000046
State Site Score: 43

LOCATION
The Gratiot County Landfill site is a 40-acre landfill located on an 80-acre parcel of land at 7391 Croswell Road, formerly 585 East Jackson Road, St. Louis, Michigan. The land surrounding the landfill is primarily used for agricultural purposes.

SITE HISTORY
The Gratiot County Landfill was licensed in 1971 by the Gratiot County Board of Public Works to receive domestic, commercial, and industrial solid wastes. The landfill was not licensed by the MDEQ until 1974. In November 1976, because of operating violations, the MDEQ initiated proceedings to revoke the landfill's license and close the facility. Later that year, the EPA informed the MDEQ that approximately 269,000 pounds of polybromobiphenyl (PBB)-contaminated waste was disposed at the Gratiot County Landfill from 1971 to 1974 by the Michigan Chemical Company (Velsicol).

PBB became widely known in 1973 when livestock feed was inadvertently mixed with a flame retardant. The flame retardant (Firemaster) was manufactured by Velsicol at its St. Louis, Michigan facility. As a result of this mix-up, millions of Michigan's livestock were contaminated by the PBB-laden livestock feed, requiring their destruction. Tons of eggs, milk, butter, cheese, feed, and meat were also destroyed in an attempt to keep PBB out of the food chain. This incident is considered one of the most costly and disastrous events to have occurred in the United States agricultural history and is estimated to have exposed 90 percent of Michigan's residents to some level of PBB-contamination.

In 1977, an MDEQ inspection of the Gratiot County Landfill identified stockpiles of magnesium oxide (a livestock feed additive) with no surface cover along the western boundary of the landfill which apparently came from Velsicol between 1975 and 1977. Analysis of the material indicated that the material contained between 1 and 2 parts per million of PBBs. Based upon those results and due to several other apparent violations, the MDEQ initiated an extensive sampling program that included the sampling of groundwater, surface water, and soils of the landfill and surrounding area in which PBB was detected.

The MDEQ initiated remedial measures at the landfill in 1984 in order to attempt to provide containment of the groundwater and to minimize migration of contaminants from the site. The activities included installing an 8-inch pumping well; constructing a slurry wall around the perimeter of the landfill; constructing burial cells in the landfill for PBB-contaminated waste; excavating, transporting, and burying approximately 20,000 cubic yards of PBB-laden waste from property located on the other side of Jackson Road; installing a perimeter fence around the landfill; capping the landfill with a five-foot-thick compacted clay layer; constructing a lagoon to collect and discharge surface water runoff; and installing an evapotranspiration bed to dispose of water from landfill purge wells used for long-term water level control.

In 1991, an EPA-funded Five-Year Review (FYR) was completed which evaluated the effectiveness of the clay cap and slurry wall. It was concluded that the landfill cap was well

maintained and provided an effective barrier against surface water infiltration; however, gas venting through the ground surface and vegetation impacts were noted in one area. The evaluation also identified three areas of the slurry wall that were ineffective in controlling groundwater flow: the southern portion of the east wall, the western portion of the south wall, and the southern portion of the west wall. Samples taken from monitoring wells located outside the slurry wall contained volatile organic compounds (VOCs) contamination.

In 1993, the MDEQ retained Eder Associates to prepare a performance evaluation assessment consisting of a groundwater investigation to determine the geology and hydrogeology of the site and the nature and extent of any existing or potential impacts on human health and the natural environment. Eder Associates concluded that VOCs do emanate from the slurry wall leak in the southern portion of the west wall and appear to be primarily confined to the lower sands within a narrow paleo-river channel. Based on the Eder Associates report review, the MDEQ determined that a groundwater extraction system should be installed to contain contaminated groundwater southwest of the site and that the extracted groundwater would be treated prior to discharge.

In March 1995, the MDEQ contracted with ABB Environmental Services, Incorporated to design the groundwater treatment system. The groundwater treatment system was constructed by Materials Testing, Inc., and became operational in June 1998.

Harding ESE (formerly ABB Environmental Services, Incorporated) completed an engineering review of the cap and slurry wall in 2002. In that review it was determined to repair the cap, install additional methane vents and monitoring points, abandon several old and not used monitoring wells, conduct quarterly monitoring of methane, and continue to monitor the wells installed around the perimeter of the slurry wall. Work was completed in the spring of 2004.

In July 2003, methane was detected above its lower explosive limit in monitoring points recently installed outside of the perimeter of the landfill. Based on those readings, the two residential houses in the area were monitored, additional methane vents and monitoring points were installed in the landfill; in addition four vent flares with solar powered fans were placed in the areas of the highest methane readings to assist in lowering the high methane readings. By October 2003, all methane readings outside of the landfill returned to below five percent of the lower explosive limit. Readings went over the lower explosive limit in 2007 most likely due to malfunctioning flare units. The flares have since continued to undergo a regular maintenance program. Additional methane vents were installed between 2009 and 2012.

Between 1986 and 2005, the MDEQ utilized funds from the Landfill Maintenance Trust Fund to reimburse Gratiot County for various maintenance activities that were completed. However, in 2005, the MDEQ did not renew the contract as site inspections identified that the landfill had fallen into disrepair and many of the tasks that were assigned to the county were not being completed as specified in the contract.

A Fourth FYR was prepared by the state and submitted to the EPA in September 2006. The FYR concluded that "The remedy at the GCL [Gratiot County Landfill] is complete and is protective of human health and the environment at this time, and exposure pathways that could result in unacceptable risks are being controlled. However, in order for the remedy to remain protective in the long-term the landfill cap must be maintained and effective ICs [Institutional Controls] must be implemented, maintained, and monitored."

In 2008, necessary major cap repairs were completed. In addition, a new monitoring well network was completed around the perimeter of the landfill. The new monitoring system is

better suited for compliance monitoring for metals as well as VOCs. Sampling results of the metals have shown a large decrease in concentrations, as identified by the original monitoring network. This is due in part to the former monitoring well network consisting of multiple wells constructed with metal materials.

The Fifth FYR for the site was completed in September 2011 by the MDEQ. The FYR confirmed that the facility does not pose a risk as long as it continues to be maintained. The FYR suggested groundwater be monitored for metals (upgradient to confirm background metals) and PBB (due to lack of current data) through 2014. No PBB was detected in the groundwater.

In 2011, the MDEQ began the transition of the maintenance and sampling back to Gratiot County. In 2014, Gratiot County became fully responsible for all of the sampling and maintenance activities. However, the MDEQ did provide funds through the Landfill Maintence Trust Fund to cover laboratory expenses and provided additional topographic survey support in 2012 and 2013 as the cap continues to undergo settlement and erosion.

In March 2015, Gratiot County submitted their first monitoring report to the MDEQ which included data necessary for the MDEQ to complete its background evaulation of metals in groundwater. Data collected suggests that the presence of various metals in the groundwater are background and not associated with the landfilling activities on the site. A report detailing the findings and the conclusion was completed by the MDEQ's contractor at the end of 2015.

In 2015, the MDEQ completed the assessment of the venting system which determined that concentrations from the vents were below acceptable levels.

In March 2016, Gratiot County submitted their second monitoring report to the MDEQ. The MDEQ, EPA and Gratiot County met in June 2016 to discuss the status of the landfill and what tasks will need to be undertaken. The EPA has identified that future FYRs of the site are unnecessary.

SITE STATUS

In April 2017, MDEQ staff, Gratiot County officials and EPA staff met and discussed site redevelopment options. All parties met again in June 2017 and discussed the results of EPA’s research into site redevelopment options.

MDEQ staff drafted institutional controls (IC) on a parcel west of the landfill owned by the State of Michigan. Gratiot County is requesting the State of Michigan to sell the parcel to the county. Discussions on selling the property are currently under way with the county. The ICs are anticipated to be placed on the property in 2018, before the parcel is sold. Selling of the parcel is expected in 2018.

ENFORCEMENT STATUS

Through a joint Consent Judgment in 1983 between the MDEQ, the EPA, and Velsicol Chemical Company, the MDEQ received $13.5 million to investigate, remediate, and maintain the Gratiot County Landfill and the former Velsicol plant. This source of funds was depleted for the two facilities; however, the state continued to evaluate and address maintenance and other issues at the site using state funds. Currently the site is being maintained by Gratiot County, which is its owner/operator and has obligations pursuant to Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

SPECIAL CONSIDERATIONS

None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Cancelled

5 Year Review The next FYR was due September 28, 2016, but the EPA determined it was not necessary.

Start Date: Primary Cost: $20,000 Source: Federal
End Date: Secondary Cost: $0 Source:

Remedial Action Funding was determined to be unnecessary based on engineers evaluation of the cap and the potential migration of water through the cap.

Start Date: Primary Cost: $750,000 Source:
End Date: Secondary Cost: $0 Source:

Response Accomplishments: Completed

Remedial Investigation The state sampled groundwater, surface water, and soils on and around the landfill.

Start Date: 06/15/1974 Primary Cost: $500,000 Source: State
End Date: 06/15/1980 Secondary Cost: $386,000 Source: Federal

Remedial Action The state installed a landfill cap and slurry wall to contain waste. Settlement funds from Velsicol were used.

Start Date: 06/15/1984 Primary Cost: $10,000,000 Source: Private
End Date: 06/15/1986 Secondary Cost: $0 Source:

Remedial Investigation State groundwater investigation using settlement funds.

Start Date: 06/15/1991 Primary Cost: $40,000 Source: Private
End Date: 06/15/1994 Secondary Cost: $0 Source:

5 Year Review This FYR concluded that the remedy is protective of human health and the environment.

Start Date: 01/23/1992 Primary Cost: $10,000 Source: Federal
End Date: 08/04/1992 Secondary Cost: $0 Source:

5 Year Review This FYR concluded that the remedy is protective of human health and the environment.

Start Date: 05/10/1994 Primary Cost: $0 Source:
End Date: 08/27/1996 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Design The state contracted with ABB Environmental Services, Incorporated to design groundwater extraction and treatment system.

Start Date:	*06/15/1994*	Primary Cost:	$200,000	Source: Private
End Date:	*06/15/1996*	Secondary Cost:	$0	Source:

Alternate Water Bottled water was provided to one residence adjacent to the landfill where the well was susceptible to impact.

Start Date:	*06/15/1994*	Primary Cost:	$1,791	Source: State
End Date:	*02/15/1995*	Secondary Cost:	$0	Source:

Remedial Action The state contracted for installation of the groundwater extraction and treatment system to capture and treat groundwater.

Start Date:	*11/15/1997*	Primary Cost:	$384,961	Source: State
End Date:	*06/15/1998*	Secondary Cost:	$0	Source:

Remedial Investigation The state assigned Harding ESE to conduct an engineering analysis of the landfill cap, slurry wall, and methane vents; and prepare a feasibility study for possible future remedial actions. Activities include groundwater monitoring.

Start Date:	*01/26/2000*	Primary Cost:	$576,344	Source: State
End Date:	*09/02/2002*	Secondary Cost:	$0	Source:

5 Year Review The state completed a FYR for the EPA.

Start Date:	*01/15/2001*	Primary Cost:	$15,000	Source: Federal
End Date:	*09/29/2001*	Secondary Cost:	$0	Source:

Remedial Action Engineering repairs, assessment, and upgrades to the methane system and existing cap.

Start Date:	*01/13/2003*	Primary Cost:	$0	Source: State
End Date:	*10/01/2014*	Secondary Cost:	$0	Source:

5 Year Review The state prepared a FYR report, and concluded that the remedy is protective of human health and the environment.

Start Date:	*03/24/2006*	Primary Cost:	$10,000	Source: Federal
End Date:	*09/28/2006*	Secondary Cost:	$0	Source:

5 Year Review FYR funding provided by the EPA. This FYR concluded that the remedy is protective of human health and the environment.

Start Date:	*01/10/2011*	Primary Cost:	$20,000	Source: Federal
End Date:	*09/30/2011*	Secondary Cost:	$0	Source:

Operation and Maintenance Completed the background evaluation of metals and discharges to ambient air, install additional methane monitoring points and vents, and assisted in the transition to the county.

Start Date:	*01/01/2013*	Primary Cost:	$150,000	Source: Private
End Date:	*12/23/2016*	Secondary Cost:	$0	Source: <None>

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Ongoing

Operation and Maintenance

Continued Operation and Maintenance and quarterly monitoring of groundwater and methane. Gratiot County assumed these tasks in 2015. Currently through the Landfill Maintence Trust Fund the MDEQ is paying for laboratory analysis.

Start Date: 09/30/2014	Primary Cost:	$150,000	Source:	Private
End Date: 11/29/2025	Secondary Cost:	$0	Source:	

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V965855-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$10,000	$0	$0	$9,699	$0

Cooperative Agreement Number V00E192-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$20,000	$0	$0	$0	$0

Cooperative Agreement Number V995339-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$15,000	$0	$0	$14,906	$0
Totals:	$45,000	$0	$0	$24,605	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Velsicol Burn Pit
1270 W Monroe Road
St. Louis , MI

County: Gratiot
MDEQ District Location: Lansing
Managed By: RRD-Superfund

Federal Site Code: 22
State Site ID#: 29000147
State Site Score:

LOCATION
The Velsicol Burn Pit covers five acres within the east side of the Hidden Oaks Golf Course on Monroe Road in St. Louis, Gratiot County, Michigan. The Velsicol Burn Pit site was created by the disposal of solid and liquid waste from the Velsicol Chemical Corporation which is a separate National Priorities List (NPL) site known as the Velsicol Chemical Corporation Superfund site. The nearest residence to the site is less than 50 feet away. This site is located directly across the Pine River from the former Velsicol Chemical Corporation manufacturing plant where the waste was generated.

SITE HISTORY
The Velsicol Burn Pit (formerly known as the Gratiot County Golf Course site or Former Burn Pit) includes an inactive waste burning and disposal site (Dames & Moore 1980), consisting of an open dump, burn pit, brine well, and brine pond (Lockheed 1982). The site is surrounded by a golf course and, to the east, a residential area (Weston 2009).

The Former Burn Pit was a disposal site for solid and liquid waste from the former plant site and solid waste from the city of St. Louis. The Velsicol Chemical Corporation manufacturing plant burned waste liquids weekly, from approximately 1956 to 1970.

In 1963, the site expanded northwest of the original site and the area used in the 1950s was covered in vegetation (Lockheed 1982). The dump site for the plant was used for disposal of polybrominated biphenyls (PBB), tris(2,3-dibromopropyl)phosphate (Tris), dichlorodiphenyl trichloroethane (DDT), and filter cakes from bromide operations (Lockheed 1982). Records were not available on all materials burned or disposed of at this site. Additional materials that may have been disposed of include: magnesium oxide wastes, sodium chloride wastes, DDT waste, Tris, and other hydrocarbon wastes, and heavy metal residues (such as copper, cobalt, and zinc).

A gravel pit, east of the Former Burn Pit, was formerly used for disposal of general refuse and municipal materials, and possibly some general refuse and waste materials from the plant. Another pit was identified south of the Former Burn Pit. That pit was used in the 1940s to 1950s for storage of calcium chloride brine for the chemical plant. The Former Burn Pit, originally a gravel pit approximately 100 feet long and 30 feet wide, was sold in 1970. A nine-hole golf course (Edgewood Farms Golf Course) was constructed in 1972 around the Former Burn Pit and is currently part of the Hidden Oaks Golf Course. As part of the construction activities, the gravel pit was filled and graded after the 1970 purchase and was re-graded in 1978.

This area was originally proposed to the NPL in 1982, but not added to the final list before deletion. In 1983, the potentially responsible party excavated the contaminated soil to different depths depending on the extent of the contamination. The MDEQ monitored contaminant levels and requested additional excavation for an area with elevated levels of DDT. After removal of an additional 300 cubic yards, no detectable DDT was present.

A one- to four-foot layer of a substance, visually identified as magnesium oxide, was left in place and was located just below the imported fill layer. The excavated areas were filled with material from adjacent land, covered with six inches of topsoil, seeded, and mulched. All excavated material was disposed of at the Velsicol Plant site located across the river. Among the material removed was domestic refuse and industrial waste, plastic sample bags (containing magnesium oxide), 25 empty drums, and 14 drums containing material such as silica gel, hypo crystals (sodium thiosulfate), magnesium oxide, and filter cakes. Groundwater (1.2474 million gallons) was also collected and disposed of by deep well injection on the Veliscol Plant site. Levels of contaminants in groundwater were measured in three samples and one duplicate. PBB was not detected, but hexabromobenzene, DDT, and Tris were detected in the samples. The excavation and groundwater collection activities resulted in deletion of the site from the NPL in 1983. This deletion was premature because the contamination had not been adequately remediated.

Soil and groundwater contamination at the former Burn Pit was identified by the MDEQ in 2006 and the site was again proposed to the NPL in September 2009 and placed on the NPL in March 2010. Two ash piles, identified during the work in 2006, are present at the site along with an estimated 345,606 square feet of contaminated soil. Municipal and private residential wells, water supplies for about 20,000 residents, are located within three miles of this site. Since the previous work at the site, there have been two investigations conducted by the MDEQ using state funding to identify contaminants present at the Former Burn Pit. The first investigation, in 2004-2005, identified contamination remaining at the site from the disposal activities decades earlier. A more recent investigation, in 2007-2008, further characterized contamination of the Former Burn Pit and identified off-site migration of the contaminants. The contaminants listed above were detected in the soil and groundwater above a level of concern and are the same as those found at the chemical plant site. The investigation also discovered non-aqueous phase liquid in the groundwater which is considered a Principle Threat Waste by the EPA.
The EPA proposed, and the MDEQ concurred in 2014, to separate the Velsicol Burn Pit into two separate opearable units (OU). OU1 consists of the principal threat waste still remaining at the burn pit and OU2 represents the impacted groundwater remaining at the site.

The Remedial Investigation/Feasibility Study (RI/FS) was completed in October 2013. The Final Focused Feasibility Study (FFS) for the Velsicol Burn Pit, OU1, was completed in November 2014.

The Proposed Plan public meeting for the Velsicol Burn Pit OU1 was held December 3, 2014 to discuss remedial alternatives and to present the EPA's preferred alternative. The proposed plan deals exclusively with OU1 and depending upon the success of the remedial action (RA) for OU1 a Record of Decision (ROD) will eventually be required for OU2. The public comment period for the Proposed Plan for remedial actions in the Velsicol Burn Pit, OU1, ended in January 2015.

The EPA selected a cleanup plan as documented in the ROD for the Burn Pit on July 28, 2015. The EPA and MDEQ attended the June Pine River Superfund Citizen Task Force meeting to discuss elements of the site and the cleanup technology being considered. The MDEQ concurred with the ROD.

The objectives of the cleanup are to reduce and remove contaminants, minimize movement of pollutants into underground water supplies, prevent people from coming in contact with contaminants using a clean soil cover, and to connect houses to a municipal water supply.

The cleanup will protect people and the environment, provide long-term effectiveness and

comply with state and federal environmental regulations. It can be implemented and is cost-effective.

SITE STATUS
EPA is waiting for funds to implement the selected cleanup plan. Design for the in-place thermal treatment of soils is currently underway.

ENFORCEMENT STATUS
None.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site
01	Source Material, NAPL
02	Groundwater

OPERABLE UNIT 01: Source Material, NAPL

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 07/28/2015**

Selected remedy: (1) In situ thermal; (2) Soil cover; (3) Perimeter drain swales; (4) Institutional controls; (5) Nine homes near the Burn Pit will be connected to municipal water.

Response Accomplishments: Completed

Remedial Investigation The EPA has made this site a pilot RI/FS site. The MDEQ worked very closely with the EPA on this project.

Start Date: 01/05/2012 Primary Cost: $250,000 Source: Federal
End Date: 10/01/2013 Secondary Cost: $0 Source:

Response Accomplishments: In Progress

Remedial Design The EPA began the remedial design for the RA after the ROD was signed. Management assistance funding is necessary to hire contractor support to assist in the review of the design of the selected support remedy.

Start Date: 06/01/2015 Primary Cost: $1,200,000 Source: Federal
End Date: 12/01/2020 Secondary Cost: $0 Source:

OPERABLE UNIT 01: Source Material, NAPL

Response Accomplishments: Future Need

Remedial Action Complete In-situ Thermal Treatment of targeted soils'down to glacial till. Installation of a 12-inch compacted day cover overlain with a 6-inch topsoil layer

Start Date:	*06/16/2019*	Primary Cost:	$22,700,000	Source:	Federal
End Date:	*06/16/2020*	Secondary Cost:	$227,000	Source:	State

Operation and Maintenance Maintain soil cover and bi-annual groundwater monitoring. The State would pick up the full amount for operation and maintenance after ten years of operation and maintenance by EPA.

Start Date:	*02/16/2020*	Primary Cost:	$50,000	Source:	Federal
End Date:	*02/16/2025*	Secondary Cost:	$5,000	Source:	State

OPERABLE UNIT 02: Groundwater

Response Accomplishments: Future Need

Remedial Design Design of a pump-and-treat system.

Start Date:	*02/16/2020*	Primary Cost:	$0	Source:	
End Date:	*02/16/2021*	Secondary Cost:	$0	Source:	

Remedial Action The state will contribute 10 percent of the total cost of the RA and operation of the pump and treat system.

Start Date:	*01/01/2021*	Primary Cost:	$24,000,000	Source:	Federal
End Date:	*12/01/2023*	Secondary Cost:	$0	Source:	<None>

Long Term Remedial Action Funding is necessary for the state to provide the required 10 percent match to the EPA's funding of 90 percent.

Start Date:	*05/01/2023*	Primary Cost:	$24,000,000	Source:	Federal
End Date:	*10/01/2033*	Secondary Cost:	$24,000,000	Source:	State

Operation and Maintenance State funding may be necessary if operation and maintenance of the pump and treat system is required.

Start Date:	*01/01/2033*	Primary Cost:	$5,000,000	Source:	State
End Date:	*10/31/2053*	Secondary Cost:	$0	Source:	<None>

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$14,697	$0	$0	$14,697	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$2,951	$0	$0	$2,951	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$2,813	$0	$0	$2,813	$0
Totals:	$20,461	$0	$0	$20,461	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Velsicol Chemical Corp
500 Bankston Street
St. Louis , MI

County: Gratiot
MDEQ District Location: Lansing
Managed By: RRD-Superfund

Federal Site Code: 32
State Site ID#: 29000070
State Site Score: 33

LOCATION
The site consists of 52 acres, the adjacent and nearby properties, the groundwater in St. Louis, Michigan, and the adjacent Pine River. The plant site, the residential properties, and groundwater are considered Operable Unit (OU) 1. OU2 consists of contamination in sediments and fish in the St. Louis Reservoir and the Pine River. Operable Unit 3 extends from the dam in St. Louis on the Pine River downstream to the Chippewa River and is inclusive of the contamination present in river sediments, floodplain soils, and fish. The population within one mile of the former plant site is approximately 4,100. The nearest residence to the plant site is less than 50 feet away.

SITE HISTORY
From 1935 until September 1978, the Velsicol Chemical Corporation (and its predecessor, Michigan Chemical Corporation) engaged in the production of various chemical compounds and products at its plant site in St. Louis, Gratiot County, Michigan. The plant site encompasses approximately 52 acres and is bordered on three sides by the Pine River. Due to natural topographical, geological, and hydrological conditions, the Pine River and impoundment received surface drainage, soil erosion, and groundwater flow contaminated with hazardous wastes from the main plant site. The main contaminants of concern are hexabromobenzene (HBB), dichlorodiphenyltrichloroethane (DDT), polybrominated biphenyl (PBB), and tris(2,3dibromopropyl)phosphate. However, numerous other contaminants are found at concentrations that exceed human health and ecological risk-based criteria. The site was placed on the National Priorities List in September 1983. The site consists of three OUs. OU1 is the former plant site, adjacent residential area, and contaminated groundwater. OU2 is the St. Louis Impoundment and Pine River, downstream of highway M-46 to the St. Louis Dam. OU3 consists of that portion of the Pine River downstream of the St. Louis Dam to the Chippewa River.

OU1 – Plant Site, Residential Area, Groundwater

A 1982 Consent Judgment between the EPA, the Michigan Department of Natural Resources (MDNR), now the MDEQ, and the Velsicol Chemical Corporation, the potentially responsible party (PRP), provided for demolition and burial of the plant on-site, construction of a slurry wall containment system, construction of a site cap, installation of a groundwater collection system with deep well disposal, and implementation of a long-term maintenance and monitoring system. Construction of the project was completed in October 1984.

The Consent Judgment stipulates that the average water table elevation within the slurry wall is not to exceed 724.13 feet above mean sea level. In March 1989, the measured water table in some of the monitoring wells exceeded this requirement. The MDNR oversaw investigations by the PRP into the cause of these exceedances. In 1993, several of the monitoring wells were repaired/replaced by the PRP in hopes that this would resolve the non-compliance of the water table elevation. This action failed to correct the non-compliance.

In June 1994, the MDNR and the EPA agreed to allow the PRP to conduct an interim action

to lower the water levels within the slurry wall. Approximately 400,000 gallons of water were removed, transported, treated, and discharged by Inland Waters of Detroit. In December 1994, a second interim action was conducted by the PRP, removing 500,000 gallons. A third interim action was conducted in February 1995, removing 750,000 gallons.

In 1997, the PRP completed the following activities to better define current site conditions: 1) replacement of three monitoring wells and installation of two additional wells; 2) assessment of both the landfill and the slurry wall at the main plant site; and 3) completion of the necessary Underground Injection Well Permit requirements to allow them to use their deep well for non-hazardous injection. The assessment included a water balance study for the landfill and slurry wall that concluded that the containment system had lost at least 11 million gallons of water. The assessment was incomplete and did not provide a complete evaluation of the components of the containment system.

The First Five-Year Review (FYR) was completed on August 27, 1997, and found that the structural integrity of the containment system needs to be evaluated to ensure that additional contaminants are not being released to the environment. The Second FYR was completed on September 25, 2002, and found that the remedy at the Plant Site, Residential Area, Groundwater OU is not protective. The Third FYR was completed on September 29, 2007, and found that based on the Remedial Investigation (RI) conducted by the MDEQ that the remedy at the Plant Site, Residential Area, Groundwater OU is not protective because the containment system implemented under the 1982 Consent Judgment does not meet the original design specifications, is not functioning as designed, and is not preventing the migration of contaminated groundwater and non-aqueous phase liquids (NAPL) from the main plant site. Some areas in the residential neighborhood adjacent to the main plant site had soil concentrations that exceed the state of Michigan's Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, Direct Contact Criteria.

A thorough review of all the existing data for the plant site by the MDEQ in March 2000, determined that the containment system was releasing contaminants to the environment. Around this time the EPA informed the MDEQ that the federal government had been in bankruptcy negotiations with the PRPs (i.e., Fruit of the Loom, Northwest Industries, and Velsicol Chemical Corporation) for several months. Due to the insistence of the PRPs, the state of Michigan was asked to join the bankruptcy negotiations.

The MDEQ conducted Phase 1 of the RI in 2001. Phase 1 of the RI assessed the integrity of the slurry wall and concluded that the slurry wall was leaking at numerous places and that the materials used in the construction of the cap did not meet the construction specifications. In October 2001, the EPA, while conducting the contaminated sediment removal in the St. Louis Impoundment, Pine River Downstream of M-46 Operable Unit, discovered a sand seam within the till that acts as the bottom of the containment system. This sand seam contained NAPL that was 82 percent DDT. This was only one of the many sand seams in the till layer and all of them are potential pathways for the migration of contaminants from the plant site to the Pine River. Phase 2 further investigated the breaches in the slurry wall, the sand seams in the till, the groundwater movement within and between the Pine River, the upper aquifer, and the lower aquifer. Phase 3 investigated the groundwater flow, contaminant distribution, and migration on- and off-site.

The RI found that the existing containment system had failed and allowed contaminants to be released to both the Pine River and the upper and lower aquifer (which is the source of drinking water for the city of St. Louis). It also found that the existing cap fails to prevent the migration of precipitation into the containment system, that two or three NAPLs exist on-site in soils and groundwater, and that the city's drinking water production wells are contaminated with para-chlorobenzene sulfonic acid.

The MDEQ submitted the draft Feasibility Study (FS) to the EPA for review on June 30, 2010. The EPA was the lead Agency for the Proposed Plan released for public comment on February 7, 2012. The public meeting was held on February 16, 2012. The EPA, Region 5 and the MDEQ recommended that Alternative FPS-3 be selected as the preferred alternative for plant, residential area, groundwater OU of the site. Alternative FPS-3 uses a combination of technologies to address the unacceptable risks and meet the Remedial Action (RA) Objectives: including the use of a vertical barrier around the former plant site; a perimeter drain system; continued use of the NAPL collection system; installation of new NAPL collection trenches; in-situ thermal treatment of NAPL contaminated soils; in-situ chemical oxidation or excavation and off-site disposal of areas with extremely high soil and/or groundwater contaminant concentrations; a new engineered hazardous waste landfill cap; replacement of the city of St. Louis municipal water system; restoration of groundwater through extraction and treatment; long-term monitoring; and implementation of institutional controls (IC).

The Record of Decision (ROD) was signed June 2012 and the EPA selected Alternative FPS-3 from the FS. The state of Michigan concurred with the EPA's remedy selection.

A Fourth FYR was completed in September 2012 and confirmed the issues and recommendations made in the 2007 FYR.

A removal action was undertaken by the EPA Emergency Removal Branch in late 2012, removing the most severely DDT-contaminated soil in the residential neighborhood adjacent to the former plant site.

A Superfund State Contract (SSC) between the State of Michigan and the EPA for remedial activities at the adjacent and nearby properties was signed on October 21, 2013, and amended April 14, 2015. These activities involved the excavation and disposal of remaining contaminated soil in the residential neighborhood, as well as property restoration afterwards.

RAs completed during 2014 in the residential area, adjacent to the former plant, included the remediation and restoration of 52 properties and the disposal of 33,000 tons of contaminated soil. Also during 2014, EPA contractors completed 246 pre-design, roto-sonic borings to further define the vertical and lateral extent of principal threat waste in two potential source areas and two dense non-aqueous phase liquid (DNAPL) areas.

The Gratiot Area Water Authority was formed as a joint venture between the cities of Alma and St. Louis in 2013 to provide a new source of drinking water to residents of St. Louis. This was funded from multiple sources, among them the EPA. The EPA's funding was given in the form of a grant to the city of St. Louis, and an SSC was signed April 29, 2014, between the EPA and the state, to enable the state to provide EPA the statutorily required ten percent match for the grant funding. The north transmission main for drinking water from Alma to St. Louis was completed during 2014. In addition, two booster pump stations were nearly completed in 2014.

Cleanup continued in the residential neighborhood next to the former plant site in 2015. The EPA cleaned up 47 residential properties and 9 city-owned properties (three parkways, five alleys and one easement). Trees planted previously that had died were replaced with new trees. The total work completed through 2015 in the residential neighborhood was 99 properties and nearly 44,000 tons of contaminated soil removed and disposed of off-site in an approved landfill. Soil sampling was completed under Watson, Center and Bankson Streets.

Water main construction continued during the summer of 2015 and was completed. Gratiot Area Water Authority began providing water to the city of St. Louis on October 12, 2015. A ribbon cutting ceremony commemorating the founding of Gratiot Area Water Authority and the city of St. Louis's new source of water took place on October 16, 2015 in the new City Hall. Additional infrastructure is still under construction.

In May 2015, the EPA provided a presentation to the community on the in-place thermal treatment technology that will be implemented on the plant site, given the possibility of noise or other impacts to the surrounding neighborhood.

The EPA finished the residential neighborhood cleanup next to the former plant site in 2016. The EPA cleaned up 5 residential properties and a portion of an unpaved section of Center Street. The EPA began the work in early May and concluded in late May. Aeration of yards was performed to enhance growth and drainage of the sodded yards. This brings the total work complete to date in the residential neighborhood to 103 properties and nearly 45,000 tons of contaminated soil removed and disposed of off-site in an approved landfill, and 276 trees replanted.

An amendment to the SSC for water supply replacement was signed March 30, 2016, to cover cost increases. Raw water main construction from municipal wells 10 and 11 continued during the summer of 2016.

Design activities continued in 2016, including design for the in-place or "in-situ" thermal technology, for excavation and disposal, and for oxidation treatment. An amendment signed August 4, 2016, to the SSC for the adjacent and nearby properties expanded the scope to include in-situ thermal treatment at the plant site Area 1. Work included installation of new monitoring wells and collection of soil borings. Installation of access roads on the site for the two in-situ thermal areas began and will be concluded in early 2017. EPA presented the groundwater investigation report to be used to assist in the design of the groundwater treatment system.

OU2 – Pine River Downstream of M-46

In May 1996, the MDEQ and the EPA collected sediment samples from the Pine River to determine the distribution of contaminants, volume, mass, human health risk, remedial options, and potential costs associated with the river contamination. Detectable concentrations of DDT, PBB, and HBB were found in all sediment cores located downstream of the former outfalls. The maximum concentrations of total DDT, HBB, and PBB in the core samples were 1,175,000 micrograms per kilogram (µg/kg), 240,000 µg/kg, and 2,900 µg/kg, respectively. In July 1997, additional sediment samples were collected to support the risk assessment. These results were summarized in the final RI/FS documents that were released in June 1998. A draft human health risk assessment was completed, which identified potential concerns associated with people eating fish from the Pine River.

In March 1998, the Velsicol Chemical Corporation/Pine River site was reviewed by the National Remedy Review Board for funding priority. The National Remedy Review Board approved the site for the RA. A ROD was signed in February 1999 outlining the remedy, which consists of dredging sediments from the Pine River with DDT concentrations greater than 5 parts per million; dewatering the sediment; disposing of the sediments off-site at an appropriate landfill; treating the water from the dewatering process; and returning the water to the Pine River.

From May 1998 to October 1999, the EPA conducted a removal action at the site. The state

provided a ten percent cost share for this action, approximately $750,000, which had a total cost of $7.5 million, through a SSC. During this action, 36,000 cubic yards of DDT-contaminated sediments were removed and treated for off-site disposal. Additional sheet piling was installed in 1999 to separate the impoundment into sections in preparation for the remainder of the RA work. The state signed a second SSC with the EPA in April 1999, committing to provide a ten percent cost share for the RA. Based on amendments to the RA SSC in 2002 and 2004, the cost for the RA was estimated to be $97.3 million, of which $9.73 million is the state share.

From 2000 to 2006, the EPA removed 670,000 cubic yards of DDT-contaminated sediments from the Pine River. During the construction season of 2004, the EPA began the removal of DDT-contaminated sediments on the north side of the river. In 2005, the sediment removal work continued on the north side of the river and included the mill pond. The EPA completed the sediment removal at the end of 2006.

While conducting the sediment removal, the EPA encountered three distinct dense and light NAPLs migrating from the plant site into the Pine River excavation. The migration pathways of the NAPL and dissolved contaminants are through the slurry wall, under the slurry wall, and in the sand seams and fractures within the till. As an interim response, the EPA elected to construct an interceptor trench with a sub-aqueous clay cap over the trench. This interim action will not be sufficient in the long term to prevent the ongoing migration of NAPL and dissolved constituents to the Pine River in the area that the EPA remediated with the sediment removal. However, removal and treatment of about 20,000 gallons per week of contaminated groundwater continues under the Pine River SSC for remediation of contaminated sediments. Contaminated groundwater is transported for treatment at a facility near Detroit. Eventually, this water will be treated in the on-site groundwater treatment plant that is also under design. The Plant Site, Residential Area, Groundwater OU remedy will address this contaminant pathway on a long-term basis. Two other distinct NAPL plumes are also migrating from the Velsicol Chemical Plant site. One is characterized by the high concentrations of chlorobenzene and the other is characterized by the high concentrations of carbon tetrachloride.

The 1,400 lineal feet of sheet pile wall, which has been in the center of the Pine River since the sediment RA, was removed during the fall of 2014.

Long-term monitoring to assess the effectiveness of the sediment removal in the St. Louis Impoundment continues. Fish for the contaminant monitoring program were collected during 2015 by staff from the Water Resources Division for chemical analyses. MDEQ staff presented the results of the fish tissue data to the public in December 2016. Results continue to show low levels of DDT in fish tissue.

OU3 – Pine River Downstream of the St. Louis Dam

The MDEQ has completed investigations downstream of the St. Louis Dam to characterize the vertical and lateral extent of contamination in sediments, floodplain soils, fish, and other biota. The EPA has recognized the downstream impacts from the former plant site and has conducted additional investigation of the sediments, floodplain soils (including high school athletic fields), and fish in OU3 to supplement the data previously collected by the MDEQ. The Pine River Ecological Risk Assessment was completed by the MDEQ, with EPA concurrence, in December 2014.

The Removal Program of the EPA conducted a removal of soil from the St. Louis Schools football practice field, and other areas due to unacceptable ecological risks, primarily to the American Robin. The Removal Program of the EPA does not require a match. Therefore,

this removal work did not require MDEQ funding.

After examining the soil samples collected from the high school athletic fields, the EPA Emergency Removal Branch found a few areas that contained levels of DDT that posed a risk to wildlife, especially robins. As a result, the EPA removed approximately 6,000 cubic yards of contaminated soil. Work began in May 2015 and was completed in April 2016. After excavation, the athletic fields were backfilled with clean soil. Work crews re-installed the outfield fence in the baseball field and watered the sod on the practice football field and grass seed with mulch in the remaining areas to keep it green. The EPA coordinated with the city and the school district before, during, and after the work.

The RI for the Pine River was designed to determine the nature and extent of the contamination in soil, sediments, biota, and surface water of the Pine River downstream of the St. Louis Dam. It also provides baseline data with which to compare the performance of the sediment removal in the impoundment against, and provide additional data for the long-term monitoring of the sediment removal. This work supported the planned development of an FS and ROD during 2016. Additional sampling of the school athletic fields was completed in early 2015 to further delineate the area of contamination. Soil located in the athletic field complex with DDT concentrations greater than 5 ppm was removed in June 2015 to mitigate ecological risks.

The ecological study downstream of the former plant site commenced in 2016 and is expected to be completed in 2017. This study examines animals and other organisms and their relationship to the environment to see if there are any impacts from site contaminants.

SITE STATUS

OU1 - Plant Site, Residential Area, Groundwater

EPA awarded $9.7 million in funding for the in situ thermal treatment for Area 1 in June 2017. Site preparation was completed including the installation of on-site roads, installation of a new gate onto M-46, and concrete pads. A new high-voltage circuit constructed to the site from the City of St. Louis' substation was completed in August 2017. This will be used to bring electricity to the site to power the in situ thermal treatment system. Construction of the in situ thermal treatment system began in August and is anticipated to be completed in February 2018. During construction, a site perimeter air monitoring program was implemented. This program was finalized after presenting the draft perimeter air monitoring plan to the public. EPA began development of a website that will display monitoring information of the in situ thermal treatment system. The web site is expected to be completed in February 2018. In situ thermal design for Area 2 began in August 2017. EPA hosted a public meeting to update the public of the site's activities on September 21, 2017. Additional public meetings are scheduled to occur in 2018.

OU2 - Pine River Downstream from M-46 to the dam

Long-term monitoring to assess the effectiveness of the sediment removal in the St. Louis Impoundment continues. Removal and treatment of about 20,000 gallons per week of contaminated groundwater from the site also continues. Contaminated groundwater is transported for treatment at a facility near Detroit. Eventually, this water will be treated in the on-site groundwater treatment plant that is also under design.

OU3 - Pine River Downstream of the St. Louis Dam

The second year of the downstream toxicological studies were completed in August 2017. This included American Robin nest surveys, small mammal trapping at multiple downstream

floodplain locations, insect collection, bird box nesting success surveys, wood duck nesting success surveys and collection of biological samples. Data results from these studies are expected in early 2018.

ENFORCEMENT STATUS
Entire Site

A Consent Judgment was signed between the MDNR, the EPA, and the Velsicol Chemical Corporation in 1982. This document defines the responsibilities and extent of cleanup that will be completed at this site.

The federal government and the states of Michigan, Tennessee, and New Jersey have negotiated a settlement with the Velsicol Chemical Corporation and bankruptcy/settlement with Fruit of the Loom. Both are PRPs for this site. The federal government and the state governments have also reached a settlement with Fruit of the Loom's insurance carrier, AIG, for $42.5 million. The St. Louis Velsicol Chemical site received $12.5 million from this settlement.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site
01	Plant, residential area, groundwater, till
02	Pine R. from 46/St.Louis contamination
03	Pine River downstream St. Louis dam

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

The First FYR concluded that the containment system needed to be evaluated to assess its effectiveness.

Start Date: 01/01/1997	Primary Cost:	$15,000	Source: Federal
End Date: 08/27/1997	Secondary Cost:	$0	Source:

Remedial Investigation

From review of PRP documents and existing data, the MDEQ determined that the 1983 plant site remedy had failed and began a state-funded RI. This RI was conducted from 2000 to 2012 and documented failure of the original remedy, identified threats to the public water system, characterized multiple NAPLs and defined the nature and extent of groundwater contamination and residential soil contamination. The FS was completed in November 2011 and a ROD was signed by the EPA in June 2012. The state of Michigan concurred with the remedy selected by the EPA.

Start Date: 03/01/2000	Primary Cost:	$9,500,000	Source: State
End Date: 06/30/2012	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The Second FYR concluded that the Plant Site, Residential Area, Groundwater OU remedy is not protective, but is expected to be protective once a new remedy is selected and implemented.

Start Date: 10/31/2001 Primary Cost: $0 Source: Federal
End Date: 09/25/2002 Secondary Cost: $0 Source:

5 Year Review The Third FYR concluded that the Plant Site, Residential Area, Groundwater OU remedy is not protective because the containment system implemented under the 1982 Consent Judgment does not meet the original design specifications, is not functioning as designed, and is not preventing the migration of contaminated groundwater and NAPL from the main plant site.

Start Date: 02/28/2007 Primary Cost: $0 Source: Federal
End Date: 09/24/2007 Secondary Cost: $0 Source:

5 Year Review The Fourth Five-Year Review confirmed the findings of the 2007 Third Five-Year Review that the remedy has failed and is not protective of human health and/or the environment.

Start Date: 03/01/2011 Primary Cost: $0 Source: Federal
End Date: 09/21/2012 Secondary Cost: $0 Source:

5 Year Review This FYR concluded that the remedy is protective of human health and the environment.

Start Date: 02/08/2012 Primary Cost: $0 Source:
End Date: 09/21/2012 Secondary Cost: $0 Source:

5 Year Review The Fifth FYR recommendations: OU1 - Continue to complete the RD and RA for all the remedy components. OU2 - Develop and implement a long-term monitoring plan for DDT levels in fish tissue and sediment. OU1 and OU2 - Develop and submit an institutional contral plan which describes the plan for ensuring that all required institutional controls (IC) at the site are implemented, and for ensuring that all ICs, once implemented, are monitored and maintained.

Start Date: 02/16/2017 Primary Cost: $0 Source:
End Date: 09/19/2017 Secondary Cost: $0 Source:

OPERABLE UNIT 01: Plant, residential area, groundwater, till

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 06/10/2012**

Remedy consists of soil excavation and off-site disposal, upgrades to the existing cap, vertical barrier, perimeter drain system, NAPL collection, in-situ soil treatment, in-situ groundwater treatment, municipal water supply replacement, and long-term monitoring.

OPERABLE UNIT 01: Plant, residential area, groundwater, till

Response Accomplishments: Completed

Remedial Design The Velsicol Chemical Corporation designed the containment system while negotiating the Consent Judgment.

Start Date: 01/01/1981	Primary Cost:	$0	Source: Private
End Date: 01/01/1982	Secondary Cost:	$0	Source:

Remedial Action The Velsicol Chemical Corporation constructed a containment system on the plant site that encapsulated the plant and the contamination at the plant site in 1983. Off-site contaminated soils from the golf course disposal area (former burn pit) were also encapsulated at the plant site. This remedy has failed and the PRPs have gone bankrupt.

Start Date: 01/01/1982	Primary Cost:	$0	Source: Private
End Date: 10/01/1984	Secondary Cost:	$0	Source:

Response Accomplishments: In Progress

Remedial Design Costs shown here are for the engineering services associated with the design of each component of the remedy.

Start Date: 07/01/2012	Primary Cost:	$6,000,000	Source: Federal
End Date: 07/02/2029	Secondary Cost:	$0	Source:

Remedial Action The remedy for the Plant Site OU is comprised of multiple individual actions, each with its own separate design and implementation schedule. On October 21, 2013, the EPA and the state signed an SSC in the amount of $4,111,111 for the remediation of the Adjacent and Nearby Properties. This SSC was amended April 14, 2015, for a revised total of $8,311,111. These are primarily residential properties near the plant site. The SSC provides for a 90 percent federal cost-share and a 10 percent state cost-share.

Start Date: 10/21/2013	Primary Cost:	$7,480,000	Source: Federal
End Date: 12/31/2018	Secondary Cost:	$831,111	Source: State

Remedial Action The remedy for the Plant Site OU is comprised of multiple individual actions, each with its own separate design and implementation schedule. In this action, the city of St. Louis drinking water supply is being replaced. The replacement is being funded from multiple sources, for a total cost of $38,576,600. The EPA and state share is $30,111,111. The EPA and the state entered into an SSC documenting the state involvement and cost-share. The EPA has a Cooperative Agreement with the city to reimburse the city for agreed upon costs. Then the state reimburses the EPA for ten percent of those costs through the SSC.

Start Date: 04/29/2014	Primary Cost:	$27,100,000	Source: Federal
End Date: 12/31/2017	Secondary Cost:	$3,011,111	Source: State

OPERABLE UNIT 01: Plant, residential area, groundwater, till

Response Accomplishments: In Progress

Remedial Action On August 4, 2016, the EPA and the state amended the adjacent and nearby properties SSC to include a new action, the in-situ thermal treatment of Area 1 of the plant site.

Start Date: 08/04/2016	Primary Cost:	$14,806,800	Source: Federal
End Date: 12/31/2018	Secondary Cost:	$1,645,200	Source: State

Response Accomplishments: Future Need

Remedial Action The remedy for the Plant Site OU is comprised of multiple individual actions, each with its own separate design and implementation schedule. In aggregate, costs are expected to reach $145 million. As such, and also due to anticipated annual funding limitations, it is expected that the period of RA will last as long as 20 years. The EPA will construct the final plant site remedy. This reflects the remaining actions, after the Adjacent and Nearby Properties, the in-situ thermal treatment, and the Drinking Water Supply Replacement portions of the remedy.

Start Date: 01/01/2019	Primary Cost:	$81,113,200	Source: Federal
End Date: 09/30/2032	Secondary Cost:	$9,012,578	Source: State

Long Term Remedial Action Total annual O & M costs are estimated to be $4.6 million per year. The first ten years of a fund-financed groundwater remedy O & M is called a Long-Term Remedial Action (LTRA) and is cost shared with the state in a 90/10 ratio, federal to state.

Start Date: 06/30/2022	Primary Cost:	$41,400,000	Source: Federal
End Date: 06/30/2032	Secondary Cost:	$4,600,000	Source: State

Operation and Maintenance Total O & M costs for the site are estimated to be $4.6 million annually and last a minimum of 40 years after the end of the LTRA.

Start Date: 07/01/2032	Primary Cost:	$4,600,000	Source: State
End Date: 08/01/2072	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: Pine R. from 46/St.Louis contamination

Response Accomplishments: Completed

Interim Response The EPA Removal Program conducted an excavation and disposal of 80 percent of the DDT mass in the St. Louis impoundment by removing over 22,500 cubic yards of the most highly contaminated soils. The state provided a ten percent match as documented in the SSC effective October 12, 1998, Amendment #1 effective February 7, 2000, and the Reconciliation and Termination Agreement effective June 21, 2004.

Start Date: 10/12/1998	Primary Cost:	$6,746,070	Source: Federal
End Date: 10/15/1999	Secondary Cost:	$749,563	Source: State

OPERABLE UNIT 02: Pine R. from 46/St.Louis contamination

Response Accomplishments: In Progress

Remedial Action The EPA conducted an RA to remove all contaminated sediments from the St. Louis Impoundment which contain more than 5 ppm total DDT, per the ROD signed February 12, 1999. The state provided ten percent match as documented in the SSC effective April 20, 1999, Amendment #1 effective March 29, 2002, and Amendment #2 effective September 14, 2004. During the sediment removal, a large quantity of DNAPL containing 28 percent DDT was discovered to be migrating from the plant site. To prevent recontamination of the sediments, the EPA constructed an interim collection system to contain the DNAPL until the permanent plant remedy can address the problem. The sediment removal was completed in 2009; however, the SSC is being kept active to fund the DNAPL collection and disposal until the permanent corrective action is in place.

Start Date: 04/20/1999 Primary Cost: $87,570,000 Source: Federal

End Date: 09/30/2020 Secondary Cost: $9,730,000 Source: State

OPERABLE UNIT 03: Pine River downstream St. Louis dam

Response Accomplishments: In Progress

Remedial Investigation These costs are associated with conducting a federally-funded ecological investigation on the portion of the Pine River, downstream of the St. Louis Dam.

Start Date: 01/01/2003 Primary Cost: $1,000,000 Source: Federal

End Date: 12/01/2021 Secondary Cost: $0 Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$103	$0	$103	$103	$103

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$20,232	$0	$0	$20,232	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$21,087	$0	$0	$21,087	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$49,201	$0	$0	$48,915	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$14,798	$0	$0	$14,797	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$463	$0	$0	$463	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$1,460	$0	$0	$1,460	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$31,737	$0	$0	$28,539	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$80,000	$0	$0	$76,226	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995261-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$128,333	$12,833	$0	$126,989	$0

Cooperative Agreement Number V995261-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$100,000	$10,000	$0	$99,920	$0
Totals:	$447,414	$22,833	$103	$438,733	$103

STATE SUPERFUND CONTRACTS

For Operable Unit 01 : Plant, residential area, groundwater, till : Open

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Alternate Water	$30,111,111	$3,011,111	$1,733,578	$0
Remedial Action	$24,763,111	$2,476,311	$1,170,078	$0

For Operable Unit 02 : Pine R. from 46/St.Louis contamination : Closed

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Interim Response	$7,495,633	$749,563	$749,563	$0
Remedial Action	$97,300,000	$9,730,000	$8,168,101	$0
Totals:	$159,669,855	$15,966,985	$11,821,320	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Torch Lake
Ste Rte 26 N Of Quincy Mills
Hubbell , MI

County: Houghton
MDEQ District Location: Upper Peninsula
Managed By: RRD-Superfund

Federal Site Code: S8
State Site ID#: 31000003
State Site Score: 32

LOCATION
The Torch Lake Superfund site is located in Houghton County in Michigan's Upper Peninsula. The Superfund site includes not only Torch Lake, but other waterbodies, and adjacent manmade lands into these waterbodies to which stampsands, tailings, and slags were deposited in the vicinity of former copper smelters, stamp mills, leach plants, reclamation plants, and power plants. It is important to understand that the Superfund site does not include the production facility areas (such as the smelters, stamp mills, and power plants, etc.) or the mining areas themselves. The Superfund site is limited to the stampsand disposal areas, groundwater under the stampsands, surface waters adjacent to the stampsands and lake sediments. The one exception is that at the Quincy Smelter site the production facility area was also included in the Superfund site through a Record of Decision (ROD) amendment. One recent clarification is that for Operable Units (OUs) 1 and 3 which are defined below, the Superfund site only consists of the top six inches of stampsands. Other materials such as slags, landfills, stampsands deeper than six inches, sludge, drums, etc., are not part of the Superfund site even though they are covered by the Superfund covers.

SITE HISTORY
The site was first identified from contamination impacting Torch Lake. Later several other areas were included in what is now known as the Torch Lake Superfund site. Copper mining activities in the area from the 1890s until 1969 produced mill tailings that were deposited in Torch Lake, along the shoreline. About 200 million tons of copper mill tailings were dumped into the lake. The contaminated sediments in Torch Lake are believed to be 70 feet thick in some areas, and surficial sediments contain up to 2,000 parts per million of copper. In some areas, copper and arsenic concentrations exceed Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), direct contact cleanup criteria. The lake has also received mine pumpage, leaching chemicals, explosive residues and by-products, municipal and industrial trash, and sanitary wastes. In 1972, an estimated 27,000 gallons of cupric ammonium carbonate were released into Torch Lake from storage vats. Barrels were also found at several places along the shoreline of Torch Lake.

The Torch Lake Superfund site includes the stampsands, tailings, and slag disposal areas at Lake Linden, Point Mills, Boston Pond, Mason Sands, Tamarack City, Calumet Lake, the North Entry, Michigan Smelter, Isle Royale mine, Scales Creek, Quincy Smelter, Dollar Bay and the Lake Superior shoreline south of the North Entry. The Torch Lake Superfund site also consists of the groundwater below these sites and the surface water adjacent to these sites. The water bodies impacted include Torch Lake, the north half of Portage Lake, Portage Canal, Boston Pond and Calumet Lake. "Stampsands" will be used throughout this report to represent both "stampsands and tailings." Slags will be referred to as "slags."

Most of the exposed stampsands were unable to support vegetation except at Calumet Lake and Mason Sands, where municipal sewage sludge had been applied, and parts of Isle Royale, where topsoil had been added. The areas designated above as the Superfund site

have been remediated with a soil cover and vegetative cap by the EPA.

The initial findings that prompted significant concern at Torch Lake were tumors that were found on the sauger fish population. The MDEQ funded a study to evaluate the incidence and cause of tumors in sauger fish. The study found no direct cause-effect relationship between the fish tumors and past human activities. The affected fish population has since disappeared due to unknown causes.

In spite of the fact that the sauger fish tumors could not be linked to site contamination, there were enough other significant resource impairments and potential human health risks that the site was listed on the National Priorities List (NPL) on June 10, 1986.

The Torch Lake Superfund site has been broken down into three OUs. OU 1, Stampsands, Torch Lake, consists of the stampsands in the Torch Lake area. OU 2 consists of the surface water, sediments and groundwater within the stampsands, at Torch Lake, Calumet Lake, Boston Pond, northern half of Portage Lake and Portage Canal (Keweenaw Waterways). OU 3, Stampsands Along Outlying Shorelines (Point Mills, Boston Pond, Mason Sands, Calumet Lake, the North Entry, Michigan Smelter, Isle Royale, Scales Creek, Quincy Smelter, and Dollar Bay), consists of the stampsands at these outlying areas.

A Remedial Investigation/Feasibility Study (RI/FS) for the Stampsands, Torch Lake OU was initiated to determine the extent and nature of the contamination and to evaluate cleanup alternatives. The EPA and the MDEQ completed fieldwork on the Torch Lake shoreline area during the summer of 1989. The RI report for this area was issued in November 1990 and the risk assessment was issued in July 1991. Additional fieldwork (test pits), conducted in the summer of 1991, discovered buried scrap metal, but removal activities were not necessary.

The RI fieldwork for the Keweenaw Waterways OU was conducted during the summer of 1990. These investigations centered on the surface waters, sediments, drums, and some limited biological assessments. Additional field investigations were conducted during the summer of 1991 to further characterize drum disposal areas. The RI report for the waterways was issued in January 1992 and the risk assessment was issued in March 1992.

The fieldwork for the Stampsands Along Outlying Shorelines OU was conducted during the fall of 1990 and focused on stampsands and slag piles in areas other than the immediate vicinity of Torch Lake. The RI report for these stampsands was issued in January 1992 and the risk assessment was issued in February 1992. An RI addendum was issued in March 1992. A drum removal was conducted at Torch Lake during the summer of 1991. Drums were taken from several shore and lake locations between Lake Linden and Mason Sands. Disposal was completed by a group of potentially responsible parties (PRPs) in 1992.

An ecological assessment for the Stampsands Along Outlying Shorelines OU was issued in April 1992. An FS and proposed plan were issued in May 1992. A ROD was signed in September 1992 for the stampsand deposits, which called for soil cover and revegetation of exposed stampsands and slags along with other use restrictions. A position paper (in lieu of an FS) and the proposed plan for the water bodies were issued in February 1994. A "No Action" Record of Decision (ROD), was signed in March 1994 for the Keweenaw Waterways OU including Torch, Calumet, and Portage Lakes.

A baseline lake study was initiated in 1999 for Torch Lake and was completed in 2000. It included water and sediment sampling, with analysis for metals, base-neutral compounds, grain size analysis, and benthic characterization. The study was intended to provide a baseline for comparison to future data in an attempt to show lake recovery over time once

the vegetative cover had reduced the erosion of stampsands into the lake. An additional ecological study, to assess and rate repopulation of the terrestrial portions of the site, was conducted by the EPA in the fall of 2002.

Remedial action (RA) designs were approved and RA funding was obtained in September 1998. The EPA entered into a Superfund State Contract authorizing the RA in September 1998.

Construction of the cover over the stampsands began in June 1999 (the Stampsands, Torch Lake OU and the Stampsands Along Outlying Shorelines OU). The Lake Linden stampsands were covered with six inches of sandy loam soil, fertilizer, and vegetative cover in 1999. The grading and covering of the Hubbell and Tamarack areas was completed in 2000. Most of the Mason Sands area was covered in 2001, with the remainder covered in early 2002. The Point Mills and Dollar Bay parcels were covered in the 2002 construction season, with the exception of one property with deed restriction/access problems that was completed in 2003 and the active traction material lot at the Houghton County Road Commission Property, which was partially covered by the EPA and the MDEQ during area remediation efforts. The Michigan Smelter, Calumet Lake, and Boston Pond areas were covered and vegetated in 2003. The Isle Royale Wastewater Treatment Plant property was graded in 2003 and vegetated in 2004. The last two parcels (North Entry and Scales Creek) were covered in 2005. The EPA declared that the construction for the entire site was completed in 2005. The MDEQ is now responsible for cover monitoring and operation and maintenance (O & M).

The Lake Linden parcel and the Keweenaw Waterways OU were deleted from the NPL in 2002. The Hubbell and Tamarack parcels were deleted from the NPL in 2004.

The EPA conducted the First Five-Year Review (FYR) in 2003, and concluded that the remedy would be protective of human health and the environment once all of the remedy had been completed in accordance with the two RODs and four memoranda to the site file. Recommendations included the following: ensure deed restrictions are in place, conduct periodic review of groundwater uses at the site and the effectiveness of the county well permitting process, repair cover and shoreline protection, as needed, investigate potential surface tailings at Lake Linden, complete restoration of Mason borrow source soils, complete evaluation of North Entry and Scales Creek, access to Point Mills, evaluate Houghton County Road Commission's road traction tailing excavation practices at Point Mills, and deed restrictions to prevent the development of residences in the slag area of Quincy Smelter.

At the Quincy Smelter, to minimize the migration of mining wastes into the water, the EPA Emergency Removal Branch performed regrading activities and constructed a drainage way with a culvert on the property and placed riprap along the potential erosional shoreline area of the site in 2005. The EPA Emergency Removal Branch removed asbestos from portions of the site and constructed a fence around some historical buildings that contained asbestos in 2003 and 2004. The EPA Emergency Removal Branch staff demolished the hazardous smokestack and performed the limited stabilization efforts necessary to allow for removal of the remainder of the bulk asbestos from the Quincy Smelter parcel of the site in 2008.

The EPA conducted a 2007 Emergency Removal of soils at the Lake Linden beach area to address the elevated concentration of contaminants which included arsenic, Polychlorinated biphenyl, and heavy metals. In 2008, MDEQ staff utilized state funding to perform limited pore water sampling to screen the Lake Linden shore as a preliminary follow-up measure for the emergency removal. This study confirmed that the groundwater is contaminated in this area.

The MDEQ performed the sampling for the first of the long-term monitoring studies in the summer of 2004. Some additional data was collected in 2005. A comprehensive report, as well as, the long-term monitoring report was finalized in March 2009. The MDEQ study conducted in 2004 clearly indicates that Torch Lake is not recovering. According to the available data, the top inch of sediments contains higher levels of contamination than the sediments from the years when the mining operations were discharging mining waste into Torch Lake. The current estimate is that recovery will take 850 years by natural attenuation, but this estimate does not reflect the current data on sediment contamination.

The ROD for the stampsands, anticipated that the Quincy Smelter property would be developed as a National Historic Park. However, since this has not taken place, a ROD Amendment was prepared and an RA was completed in September 2011 at the Quincy Smelter property. The property was turned over to the National Park Service in 2013 after the successful implementation of the Superfund RA.

The MDEQ and the EPA worked cooperatively on the Second FYR in 2008. The RAs implemented on the stampsands are protective in the short term; however, not in the long term. To be protective in the long term, a review of institutional controls (ICs) must be performed and modified, as appropriate. The review stated that a protectiveness determination for Torch Lake could not be made at this time.

Individual O & M plans were drafted by the Natural Resource Conservation Service for each stampsand parcel as they were completed using a draft created by the EPA.

The MDEQ concurred with the NPL deletion of the Isle Royale Tailings, Michigan Smelter, and Mason Sands, in a letter dated July 25, 2012. The deletion was effective December 24, 2012.

The Michigan Department of Community Health (MDCH) released Public Health Assessments on the drinking water hazards and the physical hazards posed by the site on June 1, 2012. The MDCH also issued public health risk assessments on risks posed by inhalation and direct contact with stampsands and on consumption of fish from Torch Lake. The MDCH could not determine if there was a health risk from dusts created by use of stampsands as road traction. The MDCH concluded that the stampsands at the Mason Sands Superfund site would not harm human health. They could not make a determination for other sites and beaches at the other Superfund sites due to a lack of data. The MDCH also concluded that eating fish from Torch Lake was harmful to human health.

The Third FYR was finalized on March 27, 2013.

The Quincy Smelter and Calumet Lake portions of the Superfund site were deleted from the NPL by the EPA on November 7, 2013.

The MDEQ Upper Peninsula District Office performed initial site characterization work in the industrial areas of Torch Lake during the summer and fall of 2014. The final report on the abandoned mining wastes project for Calumet, Hubbell and Tamarack City was issued in 2016.

MDEQ staff performed a Second site inspection of the caps in the summer of 2014. They were able to obtain access to sites they could not inspect in 2013.

Cap restoration work was conducted on the Point Mills portion of Torch lake Maintenance project in the summer of 2015. Several cubic yards of top soil was hauled and spread/tilled followed by seeding and mulching at the Point Mills cottages as part of the dust suppression effort at the site.

AECOM and MDEQ represetatives conducted soil cover inspections from July 12, 2016, through July 14, 2016, at 13 areas within the Site. The primary focus of the 2016 site inspections was the physical condition of soil cover, vegetation, and erosion protection systems that could indicate a reduction of remedy effectiveness. Several areas of needed cap repairs were identified during the inspection.

SITE STATUS

Twelve separate Superfund Areas (Sites) were covered with engineered covers. Deed restrictions were required for each covered parcel. Adequate deed restrictions are still not in place on all the covered stampsand parcels. The MDEQ is working with stakeholders and the EPA to place adequate deed restrictions on all remaining properties that were remediated by the EPA soil cover, however, a question of legal ownership of the properties arose.

The Point Mills, Boston Pond, North Entry, and Scales Creek areas are the only sites that still have not been deleted. The EPA and MDEQ are working to obtain acceptable deed restrictions on the covered portions of these sites. MDEQ staff prepared the Draft Deed Restrictions for these areas in 2017 and submitted to EPA for approval. Currently EPA is reviewing the Draft Deed Restrictions while at the same time the EPA is considering using a simpler and shorter version of the deed restriction form that has been used in previous years. The shorter form suggested by EPA lacks language that allows access to the areas by the Agencies. This work is in progress.

No additional work has been done to investigate the cause of benthos degradation in Torch Lake, which is one of the beneficial use impairments being evaluated under the Area of Concern program. As soon as the Upper Peninsula District Office staff completes their investigations of the industrial areas, the MDEQ will determine the next course of action to address the benthos problem.

AECOM and MDEQ representatives conducted soil cover inspections from September 11, 2017 through September 14, 2017, at 13 areas within the Site. The primary focus of the 2017 site inspections was the physical condition of soil cover, vegetation, and erosion protection systems that could indicate a reduction of remedy effectiveness. Several areas of needed cap repairs were identified during the inspection. There is a plan to perform limited cap repairs and conduct another round of soil cover inspection in the summer of 2018.

Just recently, the MDEQ, Water Resources Division posted a notice to their internet home page announcing that Mr. Tom Logue, a resident of the State of Illinois, has applied for a permit proposing to mechanically and/or hydraulically dredge an estimated 33,528,422 cubic yards of stampsands extending along the Lake Superior shoreline from the village of Freda to North Portage Entry. MDEQ Superfund staff has requested that if a permit were to be issued, a dredging buffer distance be maintianed between the landward side of the dredging and the lakeward edge of the cap. We have indicated that the integrity of the cap must not be compromised as a result of this operation.

On August 21, 2017, the MDEQ received a notification from EPA announcing the start of the Torch Lake Five-Year Review.

On October 24, 2017, the MDEQ sent a Five-Year issues letter to the EPA. The letter identified issues that need to be included in the upcoming FYR Report for the Site.

ENFORCEMENT STATUS

The EPA entered into a consent decree with the Copper Range Company in 1997 that

required Copper Range to pay $325,000 to the EPA. The EPA did not pursue the other identified PRPs. The EPA entered into an Administrative Order by Consent with numerous landowners in 1994, which required that all respondents place a restrictive covenant on their property within six months. The restrictions require the landowner to properly recover and revegetate any areas of the cap that they may disturb or otherwise cause to become uncovered.

Numerous PRPs could be liable under Part 201 of the NREPA.

SPECIAL CONSIDERATIONS

Public reaction is mixed concerning the stampsands. Many do not believe there is any risk associated with the stampsands, while others are very concerned about the potential hazards associated with the area. There has been a great deal of confusion caused by a failure to create an accurate site conceptual model. Impacted "soil" includes contaminated industrial soils (where tailings and stampsands are mixed with industrial wastes), contaminated sediments, tailings, stampsands, industrial sludges and slags. Each material represents different risks to the public health and the environment. The Superfund site only consists of the top six inches of stampsands and tailings (stampsands); and only in the areas covered. Other materials are not addressed by the Superfund remedies even if they have been covered. The EPA covers may cover other materials such as slags, industrial sludges, landfills, drums, etc., but these are not considered part of the Superfund site and it is left to the state of Michigan to address any risks associated with such wastes. Even the tailings and stampsands under the covers are not considered part of the Superfund site if they are deeper than six inches below the cover. Thus, if they are creating groundwater problems, the Superfund remedy does not address them.

This has caused the public a great deal of confusion because they believed that the EPA (and by association, the MDEQ) was addressing all the risks from the Torch Lake Mining District. This is not the case.

Deed restrictions for some of the properties are still needed; however, the deed restrictions that are in place are inadequate as they lack provision of access to the MDEQ for on-going O & M responsibilities and they do not prevent direct contact with contamination that may be incorporated into the stampsands.

Some landowners have shared discontent over the condition of the cover material. In several areas, the vegetation is not well established in part due to poor soil quality. This pertains to part of Point Mills in particular.

OPERABLE UNITS

00	Entire Site
1	Stampsands, Torch Lake
2	Keweenaw Waterways incl. Torch, Calumet, and Portage Lakes
3	Stampsands Along Outlying Shoreline

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Cancelled

Operation and Maintenance

The MDEQ drafted an outline of a Baseline Environmental Assessment and description of due care needs for the historical copper mining stampsands in the Keweenaw Peninsula. The MDEQ has suspended its efforts until a decision is made on the ownership of bottom lands of the state and lands created by tailings

Start Date: 01/01/2009	Primary Cost:	$100,000	Source: State
End Date:	Secondary Cost:	$0	Source:

Response Accomplishments: Completed

5 Year Review

The EPA conducted the First Five-Year Review in 2003 and concluded that the remedy would be protective of human health and the environment once all the remedy had been completed in accordance with the two RODs and four memoranda to the site file.

Start Date: 10/09/2002	Primary Cost:	$0	Source: Federal
End Date: 03/04/2003	Secondary Cost:	$0	Source:

5 Year Review

The MDEQ and the EPA worked cooperatively on the Second FYR in 2008. The RAs implemented at the Stampsands, Torch Lake OU and the Stampsands Along Outlying Shorelines OU are protective in the short term. To be protective in the long term, a review of ICs must be performed and modified as appropriate. Also, the RA at the Quincy Smelter property has not been implemented to date, because the ROD anticipated this area to be developed as a National Historic Park. The determination of protectiveness for the Keweenaw Waterways OU including Torch, Calumet, and Portage Lakes could not be made because the contaminant concentrations in the surface sediments are increasing, and exacerbating the biota impairment and habitat destruction. The associated ecological risks needed further evaluation. The 2004 monitoring data suggests that the time for recovery of area water bodies may be unacceptably long (850 years).

Start Date: 10/01/2007	Primary Cost:	$0	Source:
End Date: 03/27/2008	Secondary Cost:	$0	Source:

5 Year Review

Point Mills, Boston Pond, Mason Sands, Tamarack City, Calumet Lake, the North Entry, Michigan Smelter, Isle Royale, Scales Creek, Quincy Smelter, Lake Linden, and Dollar Bay were addressed in the FYR. The Draft was reviewed by the MDEQ, Remediation and Redevelopment Division. The EPA chose not to address the Remediation and Redevelopment Division concerns at this time. The Final Third Five-Year Review of Torch Lake Superfund Site was completed by the EPA on March 27, 2013, and the EPA did not address MDEQ concerns.

Start Date: 03/04/2012	Primary Cost:	$0	Source:
End Date: 03/27/2013	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: In Progress

5 Year Review

On August 21, 2017, the MDEQ received a notification from EPA announcing the start of the Torch Lake Five-Year Review.

On October 24, 2017, the MDEQ sent a Five-Year issues letter to the EPA. The letter identified issues that need to be included in the upcoming Five -Year Review Report for the Site.

Start Date: 08/21/2017	Primary Cost:	$0	Source:
End Date: 03/27/2018	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance

This is needed to monitor and maintain the soil and vegetative cover of the stampsands. It is based on an assumption of 20 years of O & M, starting in 2002 at a cost of $25,000 per year. However, this has been interrupted by the inability to produce a sustainable vegetative cover. The O & M was to begin after the completion of the establishment period. O & M of the vegetative cover will continue into the foreseeable future.

Start Date: 06/01/2013	Primary Cost:	$25,000	Source: State
End Date: 05/31/2033	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

Operation and Maintenance

Upon completion of the investigations into how to produce a sustainable vegetative cover on the stampsands, a complete investigation into the causes of the failure of the Torch Lake remedy, and an investigation into the degradation of benthos in the Torch Lake Superfund Site, the five-year lake assessment monitoring program will be developed and implemented. The cost of lake bottoms recovery monitoring will be approximately $150,000 per year in O & M for the state for twelve events (projected total cost of $1.8M).

Start Date: 01/01/2015	Primary Cost:	$150,000	Source: State
End Date: 12/31/2070	Secondary Cost:	$0	Source:

OPERABLE UNIT 1 : Stampsands, Torch Lake

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/1992**

The remedy calls for six inches of sandy loam soil and vegetative cover to minimize wind erosion and direct contact hazards. Also, riprap is being utilized for shoreline protection. The biggest concern is impact to aquatic organisms due to elevated metals and shifting windblown sands.

OPERABLE UNIT 1 : Stampsands, Torch Lake

Response Accomplishments: Completed

Remedial Investigation

Start Date: 01/01/1988	Primary Cost:	$1,229,000	Source: Federal
End Date: 09/30/1992	Secondary Cost:	$0	Source:

Remedial Design

Start Date: 09/01/1994	Primary Cost:	$476,000	Source: Federal
End Date: 09/29/1998	Secondary Cost:	$0	Source:

Operation and Maintenance Monitoring and maintaining the soil and vegetative cover of the stampsands.

Start Date: 04/08/2002	Primary Cost:	$35,000	Source: State
End Date: 09/30/2009	Secondary Cost:	$0	Source:

Emergency The EPA performed an emergency removal near the Lake Linden beach, and adjacent to the Lake Linden campground beach, after lowered lake levels exposed a contaminated area in a former backwater portion of the lake.

Start Date: 07/26/2007	Primary Cost:	$0	Source:
End Date: 10/03/2007	Secondary Cost:	$0	Source:

Response Accomplishments: Construction Complete

Remedial Action The RA consists of a six inch, sandy, loam cover and vegetation over the 10 following parcels according to the following schedule. This work is being conducted by the EPA with the state providing a 10 percent cost share through a Superfund State Contract.
Lake Linden - 1999
Tamarack City/Hubbell - 2000
Mason Sands - 2001
Dollar Bay and Point Mills - 2002
Boston Pond, Calumet Lake, Michigan Smelter - 2003
Scales Creek, North Entry - 2005
Quincy Smelter - 2011

Note that these costs are estimates from the September 1998 Superfund State Contract. They do not necessarily represent the actual expenditure amount.

Start Date: 09/29/1998	Primary Cost:	$13,680,000	Source: Federal
End Date: 09/29/2005	Secondary Cost:	$1,520,000	Source: State

OPERABLE UNIT 1 : Stampsands, Torch Lake

Response Accomplishments: Ongoing

Operation and Maintenance

The soil covers on the stampsands are in need of help to produce a sustainable vegetative cover on them. There is no current threat of a dust storm, but if the current vegetation does not become thicker and sustainable, erosion could reduce the quality of the cover over time and cause portions of the covers to fail.

Start Date: 03/01/2013	Primary Cost:	$100,000	Source: State
End Date: 04/01/2053	Secondary Cost:	$0	Source:

OPERABLE UNIT 2 : Keweenaw Waterways incl. Torch, Calumet, and Portage

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 03/31/1994**

This ROD selected "no action" as the remedy for the surface water, sediment, and groundwater. The basis for this decision was the expectation that natural processes will lend to natural recovery.

Response Accomplishments: Completed

Remedial Investigation

Start Date: 01/01/1988	Primary Cost:	$0	Source: Federal
End Date: 01/01/1992	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance

The ROD called for monitoring to be sure that the lake bottom was recovering and the wastes left in place were stabilized as predicted.

Start Date: 01/01/1999	Primary Cost:	$400,000	Source: State
End Date: 12/30/2020	Secondary Cost:	$0	Source:

Operation and Maintenance

Funding is utilized to periodically assess the recovery of the lake and includes activities such as sediment analysis, groundwater monitoring, ecological assessments, sedimentation studies, and benthos population studies.

Start Date: 03/01/2013	Primary Cost:	$2,500,000	Source: State
End Date: 04/01/2043	Secondary Cost:	$0	Source:

OPERABLE UNIT 3 : Stampsands Along Outlying Shoreline

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 01 *ESD:* 0 **Effective 07/31/2009**

Amendment to the Stampsands Along Outlying Shorelines Operable Unit ROD to allow the remediation of the Quincy Smelter, associated stampsands, and slag.

Response Accomplishments: Completed

Emergency An EPA Emergency Removal Branch effort took place in 2004/2005 to remove drums, boxes, and friable asbestos from the warehouse and other buildings, as well as, numerous chemicals from the chemical assay building. The EPA Emergency Removal Branch also performed waterway routing and shoreline erosion control at the request of the EPA Remedial Superfund Branch.

Start Date: 10/17/2004 Primary Cost: $0 Source:
End Date: 05/17/2005 Secondary Cost: $0 Source:

Emergency The EPA Emergency Removal Branch came back to the Quincy Smelter parcel and demolished the hazardous smokestack and stabilized the buildings enough to remove the bulk asbestos from them.

Start Date: 04/08/2008 Primary Cost: $0 Source:
End Date: 04/10/2008 Secondary Cost: $0 Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$15,571	$0	$15,571	$15,571	$15,571

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$55,841	$0	$0	$55,841	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$75,365	$0	$0	$75,365	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$129,995	$0	$0	$128,510	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$9,330	$0	$0	$9,330	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$12,184	$0	$0	$12,184	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$3,595	$0	$0	$3,595	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$37	$0	$0	$37	$0

Cooperative Agreement Number V995261-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$106,136	$10,613	$0	$104,960	$0

Cooperative Agreement Number V995261-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$227,519	$22,752	$0	$227,487	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995259-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Design	$50,000	$0	$0	$49,833	$0

Cooperative Agreement Number V995339-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$14,478	$0	$0	$14,478	$0
Totals:	$700,051	$33,365	$15,571	$697,190	$15,571

STATE SUPERFUND CONTRACTS

For Operable Unit 1 : Stampsands, Torch Lake : Open

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Action	$12,920,289	$1,292,029	$1,252,121	$0
Totals:	$12,920,289	$1,292,029	$1,252,121	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Adams Plating
521 N. Rosemary
Lansing , MI

County: Ingham
MDEQ District Location: Lansing
Managed By: RRD-Superfund

Federal Site Code: DJ
State Site ID#: 33000001
State Site Score: 37

LOCATION
The now-vacant property is a one-acre facility located in Lansing Township, Ingham County. It is located in a mixed commercial/industrial and residential area.

SITE HISTORY
The Adams Plating facility was used for electroplating operations from 1964 through 2010. Prior to 1964, the site was used by a dry cleaning company. From approximately 1964 to 1971, wastewater generated from the plating process was discharged directly to a (clay tile) drain, which is believed to have led to a storm sewer. The drain was damaged in the summer of 1980 during a construction project near the Adams Plating Building. As a result, chromium wastewater was released into the ground and seeped into two residential basements. The residents subsequently brought the release to the attention of the Ingham County Health Department.

The Remedial Investigation/Feasibility Study (RI/FS) was completed in 1993. Based on total estimated exposures and current toxicity information, contamination in soil posed an unacceptable risk.

According to the risk assessment, there was not an unacceptable direct contact risk associated with the contaminated groundwater. Residents in the vicinity of the site are connected to a public water supply; therefore, it is unlikely that groundwater would be utilized as a drinking water source.

The Record of Decision (ROD) for this site was signed by the EPA on September 29, 1993. The site remedy consisted of excavation of contaminated soils, which exceeded background concentrations of chromium and arsenic, with off-site disposal; collection and treatment of water encountered during excavation/dewatering activities; replacement of the excavated soil with clean fill and installation of vertical barriers to reduce the potential for recontamination of clean fill; land-use restrictions; and groundwater monitoring.

The original Remedial Design (RD) was streamlined and was completed in 1994. The MDEQ entered into a State Superfund Contract with the EPA in the amount of $150,000 for the required state ten percent match of the Remedial Action (RA) costs. Total RA costs were estimated at $1,500,000. MacKenzie Environmental Services, Inc., was retained by the EPA to complete the RA activities. The RA started in August 1994 with completion of the excavation and backfilling by September 1994. A one-year remedy shakedown period ended in September 1995. Long-term groundwater monitoring began in October 1995.

The project moved to the Operation and Maintenance (O & M) phase in October 1995. The O & M consisted of groundwater monitoring for a period of up to 30 years. In April 1997, the MDEQ successfully negotiated an agreement which transferred the O & M responsibilities to Adams Plating. State oversight costs were paid by Adams Plating pursuant to this agreement. The MDEQ sent a letter to the owner of the adjacent warehouse on October 29, 1998, explaining their obligations to notify future prospective purchasers under Part 201,

Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 201), with regard to the contamination likely to exist under the building.

On October 7, 1999, a Five-Year Review (FYR) document was signed by the EPA. According to the FYR, the remedy selected in the ROD was implemented and remained functional, operational, and effective. The majority of the contaminated soil/source area had been removed from the Adams Plating site and a deed restriction was placed on the soils of that property to ensure the protection of human health. The deed restrictions and/or other institutional controls called for in the ROD, that were meant to prevent exposure to contaminated soil beneath the warehouse (adjacent to the Adams Plating site), were not implemented; and the future protectiveness of the remedy was questionable.

The MDEQ recommended the following:
(1) Adams Plating should continue to monitor the groundwater to evaluate the effectiveness of the completed remedy.
(2) Semi-annual evaluations should be completed to ensure that the Adams Plating building and the warehouse south of Adams Plating are maintained and not demolished due to the likelihood that contaminated soil remains in these two areas.

On March 12, 2004, Adams Plating submitted a Notice of Migration of Contamination regarding the groundwater contamination to the MDEQ pursuant to R 299.5522 and R 299.51017(1) of Part 201.

The EPA completed a Second FYR of the remedy on June 27, 2005. The FYR concluded that the remedy at the Adams Plating site currently protects human health and the environment because the groundwater monitoring program and the continued maintenance of the warehouse and the Adams Plating building protect human health and the environment in the short term. It went on to state, however, in order for the remedy to be protective in the long term, it may be necessary to have additional institutional controls (ICs) put in place to prevent exposure to contaminated groundwater and soil areas outside of the Adams Plating property. Staff of the MDEQ alerted the EPA that additional deed restrictions were needed to address contamination under a warehouse building on property adjacent to the Adams Plating site.

The groundwater was initially monitored every two years. In 2005, the MDEQ agreed with a request from owner, Steve Adams, to reduce sampling frequency to every three years. The 2009 groundwater data and the 2010 FYR revealed continued exceedances of both the maximum contaminant levels (MCLs) and the National Secondary Drinking Water Regulation Criterion. Recent contaminant increases in some wells, were also noted in the 2010 FYR. The 2010 FYR, which was completed and signed on June 25, 2010, also noted a need to expand and update the site monitoring program. The issues in that document outlined concerns over the apparent exceedances, particularly the volatiles, and called for additional evaluation.

Adams Plating continued to operate until a massive fire on December 27, 2010, destroyed the 5,400 square foot building. The fire caused the release of hazardous materials stored and used at the site and affected the one-acre Adams Plating site as well as another acre of ground surrounding the site, including two homes and a vacant lot. Fire suppression water transported leaking chemicals and flowed over frozen ground into a street, stormwater catch basins, and neighboring yards. It also seeped into the ground and into basements of two adjacent homes.

The EPA undertook an Emergency Removal at the site from March through June 2011. A

majority of the time was spent sorting and removing fire damaged materials and chemicals from the site. The EPA performed test pits and determined that the soils beneath the building slab were saturated with contaminated liquids. Visible contamination was removed to as much as 8.5 feet below the slab. Contaminated soils were removed, as well as a 10,000 gallon storage tank, from beneath the concrete slab. The tank was severely deteriorated and spilled approximately 100 gallons of (non-water) fluid into the excavation as the backhoe pulled the tank out. Post-excavation samples showed significant concentrations of multiple contaminants remaining on-site in several locations.

The sump of the adjacent house at 517 N. Rosemary Street was found to be pumping highly contaminated groundwater to the surface. During the post-fire removal action, this sump water was collected and contained in a frac tank and transported for proper off-site disposal. The contaminant concentrations in the sump water dropped to below hazardous levels towards the end of the 12 months the EPA Emergency Response Team was involved. The sump water is now being diverted to the backyard of the home to prevent it from discharging to the storm sewer and the Grand River.

Two municipal wells are in the immediate vicinity of the Adams Plating site. They were both taken off-line for approximately six months during the emergency cleanup. The Board of Water and Light restarted the wells in June 2011. The Board of Water and Light has assured the MDEQ that the water meets all criteria at the point of effluent from the treatment facility.

EPA staff evaluated the site status and emergency removal data after the fire and determined that a focused RI was needed to evaluate future protectiveness. The EPA hired a contractor (CH2MHill) to perform a focused RI and tasked them with the responsibility of sampling all site wells for semivolatile organic compounds (SVOCs), volatile organic compounds (VOCs), and Resource Conservation and Recovery Act, 1986 PL 99-499, as amended (RCRA) metals, including mercury. The sampling plan also included soil gas sampling.

A vacant lot is located adjacent to the facility to the north at 521 N. Rosemary. The house was razed several years ago, but the basement foundation is still in place and may be acting as a source area post fire.

The basement at 531 N. Rosemary also flooded with green water during the fire. The EPA Emergency Removal staff cleaned the basement once the water receded, but residents at this house denied access for any follow-up investigation.

The warehouse at 513 N. Rosemary is periodically inspected to ensure that it remains intact to minimize infiltration and exposure to the contaminated soils beneath the slab. As of 2014, the block structure is showing signs of age and several cracks are developing; cracks are particularly evident on the north (Adams Plating side) of the building.

Steve and Cindy Adams placed limited restrictions on the facility parcels; they need updating. No restrictions have been placed on the adjacent properties.

The Board of Water and Light performs periodic water sampling of all municipal wells and returned the two nearby municipal wells to service approximately six months after the fire.

MDEQ staff sampled site monitoring wells in 2014 and installed three additional monitoring wells and sampled all of the site wells in 2015. This data will be used along with EPA's focused RI information to create an updated conceptual site model and soils transmissivity evaluation. It is anticipated that the MDEQ will continue to sample site monitoring wells annually. MDEQ staff continues to work with the EPA for site characterization and remediation efforts.

The EPA is conducting a focused RI as follow-up to the 2010 Emergency Response Actions and to re-evaluate site conditions. The contracts and work plan development began in 2011. The field work began in the fall of 2013. In May 2015, it was determined that a second mobilization and sampling effort were necessary for the RI/FS efforts. An additional groundwater sampling event took place in late 2015 with groundwater monitoring and well installation done in November and December 2015.

A new site perimeter fence was erected around the site late in 2016.

SITE STATUS

The EPA continues focused RI work at the site. Work efforts took place throughout 2017 to assist EPA in collecting the data needed for the RI. The draft RI was received November 21, 2017, and MDEQ staff are working to review the document and provide comments to the EPA.

MDEQ staff continues to encourage the EPA to obtain updated restrictive covenants along with the necessary access agreements as part of the focused RI efforts. MDEQ staff has a nearly complete draft version of a restrictive covenant for the warehouse property.

Two rounds of vapor intrusion (VI) sampling were completed in both March and July 2016 by the EPA Remedial Program. The sampling included the installation of sub-slab sampling points at one residence on Rosemary and the collection of indoor air samples at six residences adjacent to the site. Outdoor air samples were also collected upwind and downwind of those residences. The March round of sampling did not show any contaminants exceeding MDEQ action and trigger levels. In January 2017, MDEQ was made aware of letters that were sent out to residents that had samples collected from their homes, which included the results from the July sampling event. The July data indicated concentrations of benzene in two of the residences at concentrations above the MDEQ screening level of 3 µg/m3.

As a result, EPA Removal Program mobilized to the site March 7, 2017, to conduct additional sampling in order to determine if the VI pathway was complete. The sampling included groundwater, soil gas, sub slab and indoor air samples at three residences. Surface soil samples were also collected at one of the homes to address the resident's concerns regarding storm water runoff from the site on to her property. Of the three homes, there is only one with a sump pump in the basement, so a sump water sample was also collected from the sump. Results from the EPA removal sampling event did not identify exceedances of any screening levels for VI, however, Michigan Department of Health and Human Services (MDHHS) and MDEQ requested additional rounds of sampling be completed to ensure no unecessary exposures are taking place. EPA conducted an additional round of sampling in May 2017 which did not identify concentrations of benzene above screening levels.

MDEQ and MDHHS decided an additional round of indoor air sampling should be conducted in July 2017 in an attempt to mimic the sampling events in 2016, where the highest concentrations were found in July. MDEQ followed up with a state funded round in July 2017. Concentrations of benzene were slightly above in one home in July 2017. MDHHS prepared a document that indicates the reasons why benzene inside the home is not a result of activities that took place on the Adams Plating site as well as why they do not believe it to be a health concern.

A resident contacted the MDEQ in 2017 with concerns about his yard potentially being impacted during the 2010 fire via a storm sewer manhole in his backyard. MDEQ staff

followed up on this concern and conducted two rounds of soil sampling on the property. Analytical results from this sampling event have been provided to the resident and found concentrations of various metals, including Chromium, above background concentrations both on the residential property and on the Adams Plating site. MDEQ sent soil samples to a lab to distinguish between Chromium III and Chromium VI. The results indicated that the Chromium detected in the yard is not Chromium VI. Concentrations of Chromium III that were detected do not exceed action levels. MDHHS is preparing a letter to send to the resident.

ENFORCEMENT STATUS

In April 1997, an Agreement for Groundwater Monitoring and O & M was signed by the MDEQ and Adams Plating. In November 1998, a neighboring business was notified of its due care responsibilities.

The Adams Plating site has deed restrictions in place only for the Adams property, and those are limited to pre-fire conditions with a standing building and an operating facility. MDEQ staff has been in contact with the current owner of the adjacent warehouse and continues to discuss with the EPA the need for additional evaluation and implementation of deed restrictions on this property to ensure any remaining contamination under this building does not pose a threat to human health in the future. The absentee owner/landlord and the bankruptcy of the business make communications difficult. MDEQ staff has discussed the situation with the EPA Remedial Project Manager and has suggested that restrictions can best be obtained in association with the access agreements for the focused RI. No other enforcement action is anticipated.

Due to the emergency removal costs in addition to the total destruction of the building and business, the EPA determined that the potentially responsible party (PRP) was unable to pay any future costs. The EPA utilized cost recovery funds for removal expenses.

SPECIAL CONSIDERATIONS

At the close of the Emergency Removal Action, a badly corroded and nearly empty 10,000 gallon underground storage tank was discovered and removed from the site. A significant quantity of what is thought to be Stoddard solvent was released from the tank as it was removed from the hole. A single sample was collected from the saturated soil beneath the tank area.

The post excavation confirmation sampling (after the Emergency Removal Crew completed their excavation work) still showed significant criteria exceedances for soils in most locations around the excavation.

The house at 517 N. Rosemary Street is a rental with a high residential turnover rate, making it difficult for MDEQ staff to ensure the residents' awareness of the contamination. This, in combination with the recent history of the high contamination and proven exposure conduit, remains a concern for MDEQ staff and makes protectiveness questionable.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 09/29/1993**

Excavation with off-site disposal of soils. Backfill with clean soil. A vertical barrier was installed around the building foundations that protects the clean backfill from contamination present under existing buildings. There was no unacceptable risk associated with the groundwater, since it is not used as a drinking water source, and no other risks were determined. Groundwater monitoring is ongoing to monitor any migration of contamination from the site in the direction of the public water supply.

Response Accomplishments: Completed

Remedial Investigation

The RI was conducted in two phases. Phase I of the RI was conducted in August and September 1989. Phase II fieldwork was conducted between March 1992 and July 1992. The final RI Report is dated March 29, 1993, and the Final FS is dated July 30, 1993.

Start Date:	*10/03/1988*	Primary Cost:	$1,857,000	Source: Federal
End Date:	*09/29/1993*	Secondary Cost:	$0	Source:

Remedial Design

On September 29, 1993, the EPA notified Adams Plating that the EPA would do the RD. On September 30, 1993, the EPA issued the work assignment for the RD.

Cost information from the EPA.
May 1994 - completion of RD documents.

Start Date:	*09/30/1993*	Primary Cost:	$395,000	Source: Federal
End Date:	*05/25/1994*	Secondary Cost:	$0	Source:

Remedial Action

The completed RA consisted of source removal (soil excavation), underground waste tank removal, and groundwater monitoring to evaluate the effectiveness of the completed RA. Construction was completed and demobilization occurred on October 28, 1994. The final RA inspection was on September 14, 1995, at the end of the first year of monitoring.

Start Date:	*08/01/1994*	Primary Cost:	$1,202,000	Source: Federal
End Date:	*09/14/1995*	Secondary Cost:	$0	Source:

Operation and Maintenance

A state agreement with Adams Plating to conduct the O & M and reimburse the state for oversight costs was signed in 1997. Adams Plating started conducting the O & M voluntarily and continued from 1995 through 2010.

Start Date:	*10/01/1995*	Primary Cost:	$0	Source: <None>
End Date:	*12/27/2010*	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The 1999 FYR was completed by the state. The EPA prepared an addendum to the FYR, which was signed by the EPA on September 28, 2001.

Start Date: 06/01/1999	Primary Cost:	$0	Source:
End Date: 10/07/1999	Secondary Cost:	$0	Source:

5 Year Review The EPA completed the Second FYR on June 27, 2005, and concluded that the remedy remains protective in the short term, although it may be necessary to implement additional ICs for the remedy to be protective in the long term.

Start Date: 06/15/2004	Primary Cost:	$20,000	Source: Federal
End Date: 06/27/2005	Secondary Cost:	$0	Source:

5 Year Review MDEQ staff completed the third FYR on June 25, 2010. It was concluded that the remedy remains protective in the short term, but implementation of additional ICs is necessary for the remedy to remain protective in the long term.

Start Date: 04/29/2010	Primary Cost:	$0	Source: Federal
End Date: 06/25/2010	Secondary Cost:	$0	Source:

Emergency On December 27, 2010, a fire destroyed the facility. Large quantities of fire suppression water were used and flooded area yards and streets. Additionally, two adjacent homes had green and yellow contaminated water infiltrate their basements. The EPA conducted an emergency removal action at the site from March to June 2011. Actions included the removal of drums stored on-site, chemical vats, the building structure and slab, and large amounts of contaminated soil from the yard and the adjacent properties. Contaminated soils were removed from under the slab to depths of as much as 8.5 feet below grade. In addition to green stained soils, other contaminants were removed as well as a 10,000 gallon underground tank.

Start Date: 12/27/2010	Primary Cost:	$0	Source:
End Date: 06/29/2011	Secondary Cost:	$0	Source:

5 Year Review MDEQ staff completed the fourth FYR on June 24, 2015. A protectiveness determination cannot be made until further information is obtained with the EPA RI/FS in progress.

Start Date: 05/28/2014	Primary Cost:	$0	Source:
End Date: 06/24/2015	Secondary Cost:	$0	Source:

Monitoring Sitewide MDEQ groundwater monitoring event completed in October 2014 (previously funded).

Start Date: 10/07/2014	Primary Cost:	$0	Source:
End Date: 10/09/2014	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Monitoring State funds were utilized to contract with Weston to install four borings and three monitoring wells in November 2015. MDEQ staff hand-developed the wells, then sampled them in December 2015.

Start Date: 11/17/2015 Primary Cost: $30,000 Source: State

End Date: 12/09/2015 Secondary Cost: $0 Source:

Response Accomplishments: In Progress

Remedial Investigation The EPA is currently conducting a focused RI as follow-up to the 2010 Emergency Response Actions.

Start Date: 09/01/2013 Primary Cost: $20,000 Source:

End Date: 09/30/2018 Secondary Cost: $0 Source:

Response Accomplishments: Ongoing

Monitoring Groundwater monitoring for eight years (years three through ten) at $30,000/year.

Start Date: 09/18/2013 Primary Cost: $240,000 Source:

End Date: 09/29/2023 Secondary Cost: $0 Source:

Response Accomplishments: Future Need

Remedial Action Although the need for RA has not been determined at this time, the need for 10 percent state match of a Federal/State funded remedy is noted for potential future RA costs. A Draft RI was submitted in late 2017.

Start Date: 10/01/2019 Primary Cost: $100,000 Source:

End Date: 09/30/2020 Secondary Cost: $0 Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$23,546	$0	$23,546	$23,546	$23,546

Cooperative Agreement Number V00E192-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$20,000	$0	$0	$19,976	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$12,897	$0	$0	$12,897	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$4,708	$0	$0	$4,708	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$25,650	$0	$0	$25,650	$2,896

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$50,000	$0	$0	$50,000	$0

Cooperative Agreement Number V995261-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$14,445	$1,445	$0	$13,941	$0

Cooperative Agreement Number V995259-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Design	$11,058	$0	$0	$11,058	$0

Cooperative Agreement Number V995339-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$6,302	$0	$0	$6,302	$0
Totals:	$168,605	$1,445	$23,546	$168,078	$26,442

STATE SUPERFUND CONTRACTS

For Operable Unit 00 : Entire Site **: Closed**

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Action	$758,600	$75,860	$75,860	$0
Totals:	$758,600	$75,860	$75,860	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Motor Wheel, Inc.
2401 N. High Street
Lansing , MI

County: Ingham
MDEQ District Location: Lansing
Managed By: RRD-Superfund

Federal Site Code: S5
State Site ID#: 33000033
State Site Score: 33

LOCATION
The Motor Wheel, Inc. site is located at 2401 N. High Street in Lansing, Ingham County. The site is located in an area of residential, industrial, and commercial development. Part of the site has been excavated below the water table, creating a large pond on-site. Several municipal drinking water production wells are located nearby.

SITE HISTORY
This 22-acre site was used from approximately 1938 to 1979 by Motor Wheel, Inc., as a disposal site for paints, solvents, and other wastes generated in the manufacture of wheels for the automotive industry. Wastes were placed directly on the ground, disposed of in containers, and buried. W. R. Grace and Co. contributed waste to the site from their fertilizer and pesticide reformulation plant adjacent to the Motor Wheel, Inc. property.

In 1970, at the MDEQ's direction, Motor Wheel, Inc. removed some oils floating on ponds and containerized some waste materials and soils. A clay cap was also placed over a portion of the site during this timeframe. The property was sold to MSV Associates in 1978 for the purpose of mining sand and gravel. During mining activities, the clay cap was broken at least one time, exposing buried tanks and drums. Some of the exposed material was analyzed and sent to a local licensed landfill.

Motor Wheel, Inc. initiated hydrogeologic investigations of the site in 1982 and 1984. Results of these investigations showed groundwater in a shallow glacial drift aquifer to be contaminated with volatile organic compounds. These investigations also indicated contaminated groundwater migrating on-site from other sources, as well as migrating off-site

The site was placed on the National Priorities List on June 10, 1986. An Administrative Order by Consent (Order) went into effect on October 7, 1987, wherein Motor Wheel, Inc., Goodyear, and W. R. Grace and Co. agreed to conduct a remedial investigation/feasibility study (RI/FS) to determine the extent and nature of the contamination and to evaluate cleanup alternatives. The MDEQ was a party to the Order and has been reimbursed for previous response costs of $7,160. The RI report and the Baseline Risk Assessment were issued on May 15, 1990, and February 28, 1991, respectively. An FS for the waste source and shallow groundwater was issued in August 1991.

The RI found groundwater contaminated with concentrations of hazardous substances including vinyl chloride (VC), fluoride, ammonia, and others, which may cause health problems to area residents if they were to drink the water over a lifetime. In addition, wastes remaining on the property act as a continuing source of groundwater contamination.

A Record of Decision (ROD) outlining the chosen remedy was signed on September 30, 1991. The selected remedy included a hazardous waste cap over the waste disposal area, a slurry wall, and extraction and treatment of groundwater in the glacial and perched aquifers.

A group of potentially responsible parties (PRPs) agreed to conduct the remedial design (RD) for the waste source and shallow groundwater in 1992. As part of the pre-design investigation, the PRP consultants defined the extent of the groundwater contaminant plume in the glacial aquifer. During this investigation, it was discovered that there are areas where the contaminated glacial aquifer is connected with the deeper bedrock aquifer. Because of this, the PRP consultants installed a series of wells into the bedrock. Analytical results of samples collected from the bedrock wells indicate low-level contamination has occurred. Also, during this phase it was decided to eliminate the slurry wall as a component of the remedy.

In spring 1997, the design was finalized and remedial action (RA) construction began. RA construction was completed in late fall 1997. The RA was conducted by the PRPs pursuant to a Consent Decree (Decree) entered with the EPA in 1994. During the RA, the PRPs constructed a hazardous waste cap over the disposal area, installed one extraction well in the perched aquifer, installed six extraction wells in the glacial aquifer, laid all of the necessary piping, and constructed the treatment plant. Even though the PRPs had no enforceable agreement for cleanup of the Saginaw Aquifer, the PRPs installed two extraction wells in the Saginaw plume and tied them into the treatment system. The treatment system has been operational since November 1997.

In February 1999, the EPA Water Division issued an Administrative Order to the W. R. Grace and Co. to clean up the Saginaw Aquifer to background concentrations for ammonia.

After the 1999 Administrative Order was issued, a meeting was held with W. R. Grace and Co. at which time they expressed interest in working with the regulatory Agencies in developing a strategy that would be acceptable to all parties. Shortly afterward, the EPA withdrew the 1999 Order with the understanding that discussions would take place, the outcome of which would form the basis for issuance of a new Administrative Order. Although the W. R. Grace and Co. expressed a willingness to cooperate with the Agencies, they also filed a request for judicial review of the Order with the Third United States Circuit Court of Appeals in Philadelphia.

W. R. Grace and Co., their environmental consultant, the EPA Superfund Division, the EPA Water Division, the MDEQ, the Lansing Board of Water and Light, and the Lansing Board of Water and Light's environmental consultant formed the Saginaw Aquifer Technical Evaluation Team. The goal of the team was to: 1) make a final recommendation for the approach to dealing with ammonia in the Saginaw Aquifer, and 2) to get a commitment from W. R. Grace and Co. that they would implement the Saginaw Aquifer Technical Evaluation Team's recommendations. The Saginaw Aquifer Technical Evaluation Team's recommendations included a long-range goal of aquifer remediation and a short-term goal of managing the Board of Water and Light pumping to ensure that ammonia influent concentrations at the Board of Water and Light water conditioning plant remain below levels that might harm the plant. For various reasons, W. R. Grace and Co. refused to commit to the cleanup voluntarily.

A decision was reached to issue a new Order under Section 1431 by the EPA Water Division. The new Section 1431 Administrative Order was issued by the EPA on July 29, 1999, and required W. R. Grace and Co. to prevent ammonia from reaching the capture zone of the Board of Water and Light wells in concentrations equal to or exceeding 1.2 milligrams per liter.

Following release of the July 29, 1999, Section 1431 Administrative Order, the EPA and the MDEQ continued settlement discussions with W. R. Grace and Co. These discussions centered around the development of an acceptable Statement of Work for implementation of

a new Order. As these discussions were progressing, W. R. Grace and Co. continued with litigation with Goodyear, in an attempt to get Goodyear to contribute financially to the response to the July 29, 1999, Section 1431 Order. The litigation between W. R. Grace and Co. and Goodyear resulted in an out-of-court settlement whereby Goodyear assumed complete responsibility for responding to the July 29, 1999 Section 1431 Administrative Order.

By the end of 2000, discussions between the EPA, the MDEQ, and Goodyear resulted in a preliminary agreement on a Statement of Work for response to the July 29, 1999, Order. The first step in implementing the response activity was an installation of a series of monitoring wells. This work began in December 2000 and was completed in the spring of 2001.

While field work progressed, the Agencies and Goodyear continued to work toward formalizing the legal framework for implementing the Section 1431 Administrative Order as well as the remaining Superfund response actions. By the middle of the summer 2001, agreements for an amended Decree and Statement of Work had been preliminarily approved and were awaiting signature when the Third United States Circuit Court released its decision on the W. R. Grace and Co. appeal of the Section 1431 Order. The opinion of the court was to vacate the Section 1431 Order. This decision greatly complicated the negotiation process with Goodyear.

In July 2001, the EPA Superfund Division released an Explanation of Significant Difference (ESD). The ESD changed the original ROD in two ways. First, it added the Saginaw Aquifer cleanup as a component of the overall site remedy. Second, it re-evaluated and changed some of the cleanup standards. The issue of cleanup standards became an item of contention between the EPA and the MDEQ. The MDEQ sought to have the ammonia standard changed to be consistent with the concentration set by the EPA drinking water program as protective of the Lansing Board of Water and Light operations, 1.2 milligrams per liter. The EPA chose instead to leave the standard at 34 milligrams per liter. The MDEQ did not agree, nor concur with the ESD.

After the ESD was released, the EPA and the PRP group then began to negotiate an amendment to the existing 1994 Decree, along with a Statement of Work, for necessary response activities in the Saginaw Aquifer. The MDEQ participated in these negotiations. An Amendment to the 1994 Decree and Amended Statement of Work were finalized in mid-2002. The documents were lodged with the court in April 2003 and entered by the court in June 2003.

In late 2002, Goodyear began installation of a fourth extraction well in the Saginaw Aquifer. They also upgraded the pumps in two other Saginaw Aquifer extraction wells. The four well extraction system became operational in early 2003.

In order to improve extraction system performance in the glacial aquifer, Goodyear installed new, higher capacity pumps in the Zone 1 and Zone 2 extraction wells in early 2003.

In 2005, it became evident that the Saginaw Aquifer ammonia plume was continuing to expand to the north, west, and south, despite the increased pumping started in 2003. To address this issue, Goodyear overhauled extraction well SEW-1, to increase the pumping volume from this well. Goodyear also proposed the installation of another high capacity extraction well, to be designated SEW-5. This well was installed closer to the center of the plume, thereby removing a greater mass of contaminants, while also increasing the capture zone of the combined Saginaw Aquifer extraction system. Extraction well SEW-5 became operational in mid-2006. Pumping of SEW-5 improved capture of the Saginaw Aquifer plumes.

A Five-Year Review (FYR) was conducted in 2007. The FYR concluded that the remedy is protective in the short term. Long-term protectiveness is dependent upon the continued effectiveness of the groundwater extraction and treatment systems maintaining capture of the plumes.

In 2010 and 2011, Goodyear conducted studies that determined the extent of downgradient vinyl chloride and aquifer characteristics. Studies have included a seismic study, a boring and sampling program, a monitoring well installation program and groundwater modeling. These data were used in the engineering design of the extraction wells and to determine optimum placement of the extraction wells in the aquifer.

A FYR was conducted in 2012. The FYR concluded that the remedy is protective in the short term. Long-term protectiveness is dependent upon the continued effectiveness of the groundwater extraction and treatment systems maintaining capture of the plumes.

Goodyear constructed a major expansion of the glacial aquifer groundwater pump and treat (P & T) system in 2012 to capture the chloride plume that is located downgradient from the Zone 2 extraction wells. A long-term groundwater monitoring plan was finalized in 2015.

A deed restriction on use of the landfill property owned by Goodyear was recorded at the Ingham County Register of Deeds on February 10, 2016. The Institutional Control Plan was approved by EPA in December 2016. The Fifth FYR was completed on July 14, 2017, by EPA and assistance from MDEQ staff.

SITE STATUS
The Fourth FYR was conducted and found that the remedy is protective in the short term with adherence to institutional controls (ICs). Long-term protectiveness is dependent upon the continued effectiveness of the landfill cap and groundwater extraction and treatment systems maintaining capture of the plumes.

Most activities at the site are centered around operation and maintenance (O & M) of the cap and groundwater P & T systems and evaluation of their effectiveness. Trends in VC are being assessed to determine if other sources are contributing to the groundwater plume. Goodyear is evaluating options to update the restrictive covenant on the adjacent landfill parcel with the current property owner. Goodyear will conduct a vapor intrusion study at the landfill begining in 2018.

ENFORCEMENT STATUS
Work at the site is currently being conducted pursuant to the 1994 Consent Decree with the EPA and the 2003 Amendment to Consent Decree with EPA.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/1991**

The remedy calls for a hazardous waste cap over the waste disposal area, a slurry wall around the southern and western portions of the waste disposal area, and extraction and treatment of contaminated groundwater in the perched and glacial aquifers. This ROD did not address potential contamination in the Saginaw Aquifer. The slurry wall called for in this ROD was later eliminated by the EPA as a component of the remedy.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 07/12/2001**

The ESD addresses groundwater at the site. The original ROD set cleanup standards for site contaminants at levels established under the Michigan Environmental Response Act, 1982 PA 307, as amended (Act 307). Also, the original ROD only addressed the shallow perched and glacial aquifers. The ESD added the deep Saginaw Aquifer as an extension of the site and revised the cleanup standard for VC from 1 parts per billion (ppb) to 2 ppb. The state did not agree with the ESD because the cleanup standard for ammonia is not at the level protective of Lansing Board of Water and Light operations, 1.2 milligrams per liter. There were no cost estimates included in the ESD for cleaning up the Saginaw Aquifer.

Response Accomplishments: Completed

Remedial Investigation The RI/FS was conducted by the PRPs pursuant to the 1987 Order with the EPA and the MDEQ. Costs shown are estimated.

Start Date: 01/01/1989 Primary Cost: $1,000,000 Source: Private
End Date: 08/01/1991 Secondary Cost: $0 Source:

Remedial Design The RD was conducted by the PRPs pursuant to the 1992 Order with the EPA. The design consisted of the engineering specifications for a landfill cap over the waste mass and a groundwater extraction and treatment system for the shallow perched and glacial aquifers. Also included was an extensive pre-design investigation. Costs shown are estimated.

Start Date: 05/01/1992 Primary Cost: $2,000,000 Source: Private
End Date: 05/01/1997 Secondary Cost: $0 Source:

Remedial Action This activity includes construction of the landfill cap over the waste mass area and construction of the groundwater extraction and treatment system by the PRPs pursuant to the 1994 Decree with the EPA. Costs shown are estimates derived from the 1991 ROD.

Start Date: 05/01/1997 Primary Cost: $10,000,000 Source: Private
End Date: 10/31/1997 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Design Investigate extent of contamination in the Saginaw Aquifer and design an expansion to the existing groundwater P & T system to incorporate cleanup of the Saginaw Aquifer. Costs shown are estimated.

Start Date:	*10/01/2000*	Primary Cost:	$500,000	Source:	Private
End Date:	*10/01/2001*	Secondary Cost:	$0	Source:	

Remedial Action Construct expansion of the existing groundwater P & T system in the Saginaw Aquifer. This action focused on an area of contamination in the northwest portion of the site and included the installation of two new high-capacity extraction wells. Costs shown are estimated.

Start Date:	*10/01/2001*	Primary Cost:	$500,000	Source:	Private
End Date:	*03/01/2003*	Secondary Cost:	$0	Source:	

5 Year Review The First FYR found that immediate threats associated with the site had been effectively dealt with, but long-term threats remained. Of primary concern was the lack of capture of the groundwater contaminant plumes.

Start Date:	*05/14/2002*	Primary Cost:	$5,000	Source:	Federal
End Date:	*07/22/2002*	Secondary Cost:	$0	Source:	Federal

Remedial Design Design an expansion to the existing groundwater P & T system to further enhance the capture zone in the Saginaw Aquifer, with the goal of complete capture of the ammonia. This expansion consisted of the design of one additional extraction well, SEW-5.

Start Date:	*10/01/2005*	Primary Cost:	$25,000	Source:	Private
End Date:	*12/01/2005*	Secondary Cost:	$0	Source:	

Remedial Action Installation of extraction well (SEW-5) near the center of the deep aquifer plume. The cost shown for this work is an estimate.

Start Date:	*01/01/2006*	Primary Cost:	$250,000	Source:	Private
End Date:	*05/31/2006*	Secondary Cost:	$0	Source:	

5 Year Review The Second FYR concluded that the remedy is protective in the short-term. Long-term protectiveness is dependent upon the continued effectiveness of the groundwater extraction and treatment systems maintaining capture of the plumes.

Start Date:	*09/01/2006*	Primary Cost:	$0	Source:	Federal
End Date:	*07/20/2007*	Secondary Cost:	$0	Source:	Federal

Remedial Design Conduct pre-design and design activities for implementation of a cleanup of the VC plume, south of the glacial aquifer Zone 2 extraction wells for the shallow aquifer.

Start Date:	*03/01/2008*	Primary Cost:	$500,000	Source:	
End Date:	*03/31/2012*	Secondary Cost:	$0	Source:	

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The Third FYR concluded that the remedy is protective in the short-term. Long-term protectiveness is dependent upon the continued effectiveness of the groundwater extraction and treatment systems maintaining capture of the plumes.

Start Date: 10/01/2011 Primary Cost: $0 Source: Federal
End Date: 07/20/2012 Secondary Cost: $0 Source: Federal

Remedial Action Implementation of expanded P & T system for the VC plume, south of the glacial aquifer Zone 2 extraction wells.

Start Date: 04/04/2012 Primary Cost: $2,000,000 Source: Private
End Date: 07/25/2012 Secondary Cost: $0 Source:

5 Year Review The Fourth FYR was conducted and found that the remedy is protective in the short term with adherence to ICs. Long-term protectiveness is dependent upon the continued effectiveness of the landfill cap and groundwater extraction and treatment systems maintaining capture of the plumes.

Start Date: 01/02/2017 Primary Cost: $0 Source: Federal
End Date: 07/14/2017 Secondary Cost: $0 Source: Federal

Response Accomplishments: Ongoing

Operation and Maintenance O & M activities for the groundwater extraction and treatment systems will be conducted until cleanup standards are met. With a projected 30-year timeframe to reach cleanup standards, O & M will likely be conducted until 2033. It is estimated that O & M costs are approximately $250,000 per year.

Start Date: 04/09/1998 Primary Cost: $9,250,000 Source: Private
End Date: 10/01/2033 Secondary Cost: $0 Source:

Response Accomplishments: Future Need

5 Year Review The Fifth FYR will be needed in 2022.

Start Date: 09/30/2021 Primary Cost: $0 Source: Federal
End Date: 06/01/2022 Secondary Cost: $0 Source: Federal

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$11,272	$0	$11,272	$11,271	$11,271

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$95,000	$0	$0	$48,288	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$24,204	$0	$0	$24,204	$0

Cooperative Agreement Number V995259-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$30,933	$0	$0	$30,933	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$43,435	$0	$0	$43,435	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$12,191	$0	$0	$12,191	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$129,276	$0	$0	$129,276	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$28,693	$0	$0	$28,693	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$18,091	$0	$0	$18,091	$569

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$40,000	$0	$0	$36,011	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$360,000	$0	$0	$359,968	$0
Totals:	$793,094	$0	$11,272	$742,360	$11,840

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: American Anodco, Inc.
28 North Beardsley Road
Ionia , MI

County: Ionia
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: 2N
State Site ID#: 34000001
State Site Score: 36

LOCATION
This site is located at the eastern edge of the city of Ionia, at 28 North Beardsley Road, between Main Street and M-21. The site is bordered to the north and east by Prairie Creek and adjacent wetlands. Prairie Creek enters the Grand River approximately 1/2 mile downstream from the site.

SITE HISTORY
American Anodco, Inc., was an anodizing facility which brightened, cleaned, and sealed aluminum parts from 1962 to 1987. Sludges were discharged from acid and quench oil tanks into unlined seepage lagoons. A hydrogeologic study performed in 1985 indicated elevated phosphate levels in monitoring wells. In 1987, American Anodco, Inc., removed the lagoon sludge, disposed of it in an off-site landfill, capped the lagoon, and began discharging its process water to the Ionia treatment works. Also in 1987, American Anodco, Inc., was connected to the municipal water supply for its drinking water, and merged with and renamed American Bumper and Manufacturing Company. American Bumper and Manufacturing Company then began to manufacture bumpers at the facility. In 1999, the company changed its name to Meridian Automotive Systems.

A remedial investigation/feasibility study (RI/FS) was conducted by American Bumper and Manufacturing Company from 1988 through 1993. Groundwater samples were obtained from newly installed and existing monitoring wells. Soil borings were obtained from the former on-site lagoon area.

RI groundwater monitoring found low, residual concentrations of metals in the aquifer between the plant and Prairie Creek. Analyses indicated elevated manganese and boron concentrations on the plant property, which exceeded residential drinking water criteria by two to five times. Manganese exceeded the industrial criterion by a factor of two. Because manganese also exceeded its draft groundwater/surface water interface (GSI) criteria near Prairie Creek, the state requested that a mixing zone determination be completed for the wetlands and Prairie Creek. Phosphorus concentrations at GSI and upgradient wells near the former lagoons continued to show exceedances of surface water quality criteria. No mixing is allowed for phosphorus since it has an additive effect on algal blooms in the Great Lakes and connecting waterways. The Record of Decision (ROD) was signed in September 1993. The ROD called for no-action with continued groundwater monitoring. The state supported the main concept in the ROD of not pumping and treating the groundwater, but the state did not concur with the remedy because the remedy was not implemented in a way to meet all applicable state requirements.

Meridian Automotive Systems expanded the facility building so it now completely covers the lagoons source area. Further groundwater investigation was conducted in 2001. The monitoring report was completed in May 2002 and identified a few potential exceedances of GSI mixing zone based criteria. These findings also showed a continuous release of phosphorus, but just one hotspot of manganese in the floodplain. The state wrote the potentially responsible party (PRP) regarding the few remaining obstacles to deleting the

site.

In 2003, the MDEQ requested additional investigation of manganese and phosphorus at the GSI. The company performed this investigation in February 2004 with a report in March 2004. The MDEQ told the company that based on the results of their 2004 report they would need to remove some phosphorus from the groundwater, and determine whether the high concentrations of manganese on the Girl Scout Association property to the southeast were attributable to Meridian Automotive. The MDEQ wrote Meridian again about these issues in February and November 2008.

In 2009, Meridian Automotive was purchased by Ventra, which continues to operate the facility to the present time.

Ventra conducted the final groundwater sampling event in 2011 and 2012. Manganese, arsenic, boron and phosphorous were not detected above either residential drinking water or GSI criteria on the property or in Prairie Creek.

In 2016, both the EPA and MDEQ reviewed the site file and accumulated groundwater data through to 2012 and determined that site contamination was present at minor concentrations below the residential drinking water and GSI criteria. The agencies determined the site is a candiate for deletion from the National Priorities List (NPL) and has begun discussions with Ventra to begin and complete the deletion process. As part of the deletion process, Ventra filed a restrictive covenant on the property on August 22, 2016, that the agencies agree meets the requirements for restricting the use of site groundwater for drinking water.

SITE STATUS
Throughout 2017 Ventra worked on development of the Draft Final Closeout Report. As part of the Draft Final Closeout Report development, Ventra hired a consultant to work on pulling and properly plugging all of the site monitoring wells in the monitoring network. This work began in late 2017 and will be completed in 2018. Completion of the Site Deletion process is expected in 2018.

ENFORCEMENT STATUS
The previous owner of the site, American Bumper Company, fulfilled all the requirements of their March 1994 Administrative Order of Consent (Order) with the EPA written for implementation of the ROD. Meridian Automotive Systems owned the property from 1997 through 2009. The current owner of the site is Ventra Ionia Main LLC (2009 to present). Ventra Ionia Main LLC is liable under the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, as amended. They may also be liable under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 09/27/1993**

The ROD called for no-action with continued groundwater monitoring. The state tentatively concurred with the ROD with the contingencies that the draft Part 201 regulations be adopted, which they were, and the company would establish groundwater use restrictions for its property to prevent use of groundwater for drinking water. The company offered to establish groundwater use restrictions in October 2007. The MDEQ wrote Meridian in February 2008 detailing how to apply groundwater use restrictions, and requesting a remedial plan for the phosphorus plume.

Response Accomplishments: Completed

Interim Response Remediation of on-site lagoon in 1987, including dewatering, and sludge removal and disposal in an off-site landfill.

Start Date: 05/01/1987	Primary Cost:	$0	Source: Private
End Date: 09/01/1987	Secondary Cost:	$0	Source:

Negotiations RI/FS negotiations.

Start Date: 06/22/1987	Primary Cost:	$0	Source:
End Date: 10/23/1987	Secondary Cost:	$0	Source:

Remedial Investigation PRP conducted RI/FS.

Start Date: 10/23/1987	Primary Cost:	$0	Source: Private
End Date: 09/27/1993	Secondary Cost:	$49,000	Source: Federal

Negotiations Remedial Design/Remedial Action negotiations.

Start Date: 01/03/1994	Primary Cost:	$0	Source:
End Date: 04/13/1994	Secondary Cost:	$0	Source:

Operation and Maintenance Groundwater and surface water monitoring continued after the signing of the Order for ROD implementation, April 13, 1994, until the last monitoring report September 18, 1998. Subsequent sampling has been conducted by the PRP pursuant to an MDEQ request to monitor the exceedances of phosphorus, boron, arsenic, and manganese that continue in groundwater. The final grounwarer sampling event was conducted in 2011 and 2012. Review of the data indicated that phosphorus, boron, arsenic and manganese detected at minor concentrations were present on site and in Prarie Creek below the residential drinking water and GSI criteria. Both agencies agreed that the site was a candidate for deletion from the NPL.

Start Date: 04/13/1994	Primary Cost:	$0	Source: Private
End Date: 12/01/2012	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: In Progress

Project Closeout As part of the deletion process, Ventra has hired a contractor to conduct the pulling, plugging and abandonment of the site monitoring wells in the monitoring well network. This task is expected tp be completed in early 2018.

Start Date: 11/01/2017	Primary Cost:	$25,000	Source:	Private
End Date: 06/01/2018	Secondary Cost:	$0	Source:	

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$2,925	$0	$0	$2,923	$0

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$20,000	$0	$0	$16,708	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$8,927	$0	$0	$8,927	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$2,136	$0	$0	$2,136	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$40,000	$0	$0	$39,944	$0
Totals:	$73,988	$0	$0	$70,638	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Ionia City Landfill
Cleveland Street/West Main
Ionia , MI

County: Ionia
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: D7
State Site ID#: 34000004
State Site Score: 32

LOCATION
The Ionia City Landfill Superfund site is located southeast of the city, on Cleveland Street, in Ionia, Michigan. This 20-acre site is bounded on the south by the Grand River. Land use surrounding the site ranges from agricultural to the west, recreational to the north/northwest, light commercial/residential to the north, and undeveloped toward the northeast and east. The eastern boundary of the landfill is defined by Kanouse Drain. The Grand River is located about 1,700 feet in the direction of groundwater flow (south to southwest) from the source of contamination. A city of Ionia paved recreation trail crosses the site from east to west between the hazardous waste and solid waste disposal areas.

SITE HISTORY
The site is owned by the city of Ionia. The landfill was classified as an open dump in 1966 by the Michigan Department of Natural Resources (MDNR) and operated from the mid-1930s until it closed in 1969. The site was never licensed as a sanitary landfill under the Garbage and Refuse Disposal Act, 1965 PA 87, as amended. The city applied to the MDNR for an operating license in August 1967, but the license was not issued. After the site closed, uncontrolled dumping continued into the 1970s. The Ionia City Landfill accepted municipal and industrial waste, including 55-gallon drums of hazardous waste. The site posed an acute public health or environmental problem as a result of the potential for direct contact exposure and discharge of bioaccumulative compounds to surface water.

In 1981, the MDNR discovered exposed drums at the northern region of the fill area. About 100 drums containing liquid and solid waste were subsequently excavated. Monitoring wells were placed around the site and monitoring identified inorganic and organic chemical contamination. In 1982, the EPA collected sediment and surface water samples from Kanouse Drain. Traces of volatile organic compounds (VOCs), pesticides, and metals were detected in those samples. In September 1983, the site was placed on the National Priorities List. In 1984, the EPA directed the city of Ionia to remove the remaining drums from the former drum removal area. A fence was placed around the area where buried drums were suspected.

A 1989 remedial investigation/feasibility study (RI/FS) confirmed that the shallow aquifer was impacted by organic and inorganic contaminants. Fieldwork also confirmed the presence of a drum burial area containing an estimated 2,000 drums. About 4,900 cubic yards of drummed materials and associated soils were found to contain paint residues, resins, and solvents. In September 1989, the Record of Decision (ROD) was signed to address the source area. In-situ vitrification of buried drums and contaminated soils was selected in the ROD.

In November 1992, intact drums were either removed or crushed as part of an EPA removal action. Drum liquids were analyzed, removed, treated, or disposed of at an off-site facility, but significant amounts of liquids were released into the landfill. A geomembrane and topsoil were placed over the removal area and seeded to prevent infiltration of rainwater. In December 1992, groundwater monitoring results indicated that a new plume appeared to be

migrating toward the Grand River and into and beyond Kanouse Drain to the east as a result of contamination released during drum removal actions.

In April 1994, the EPA issued a letter to the liable parties based on an evaluation of groundwater sampling data. The EPA required a proposal to address shallow groundwater contamination under a removal action. In November 1994, a work plan was completed for final excavation of approximately 6,000 cubic yards of contaminated soil and drum fragments from the point source area instead of in-situ vitrification. A clay cap with topsoil and grass cover was placed over the excavation area. Additional wells were installed and soil borings collected to evaluate the extent of groundwater contamination and an air sparge/soil vapor extraction pilot test was completed. In addition, a Technical Memorandum and Aquifer Pump Test Report was submitted to the EPA and the MDEQ. The report proposed a pump and treat removal action downgradient from the source area to capture and prevent the new plume from impacting surface water bodies.

In November 1996, the EPA officially approved a groundwater pump and treat (P & T) system to contain the new plume as part of the removal action. Approval to discharge treated effluent into the city of Ionia wastewater treatment plant was also granted. The three recovery/extraction wells and associated monitoring wells were installed in February 1997. The groundwater treatment system became operational in September 1999; however, problems with extraction well groundwater capture occurred due to iron fouling. To address this problem, extraction well RW3 was plugged and abandoned, and a new extraction well, RW3R, was installed in March 2000. Since RW3R was also affected by iron fouling, the groundwater extraction system never operated continuously at full pump capacity.

The liable parties requested a mixing zone determination from the MDEQ, Surface Water Quality Division, for a legal discharge into the Grand River and the Kanouse Drain. The limits for groundwater discharge of contaminants (VOCs and heavy metals) established in the mixing zone criteria have been incorporated into the ROD for the groundwater plume issued in September 2000.

The long-term remedial action (LTRA) work plan was reviewed by the EPA and the MDEQ at the end of 2001 and finaled in February 2002. The initial phase of the LTRA was to conduct vertical aquifer sampling via the installation of temporary wells in Area A (north of the paved recreational trail) of the site. This was done in June 2002. The second phase of the LTRA was to conduct vertical aquifer sampling, again using temporary wells, in Area B (south of the paved recreational trail) of the site, which was completed in December 2002. In early 2003, the analytical results of the vertical aquifer sampling from Area A were compiled in the report entitled, Vertical Aquifer Sampling Report for Evaluating Capture of the Groundwater Pumping System-Phase II. The analytical results of the vertical aquifer sampling from Area B were submitted for review in June 2003. As part of the LTRA, four additional permanent monitoring wells were installed at the site in early 2003 and incorporated into the existing site monitoring well network. Quarterly groundwater sampling and reports, following the procedures outlined in the LTRA, began in the second quarter of 2003.

Groundwater sampling from all the site monitoring wells was conducted in April 2001. The sample analytical data was incorporated into a Draft Plume Status Report, a requirement established in the 2000 ROD. The data, however, indicated the current extraction well purge system was not successful in capturing the groundwater contaminant plume. This issue and the expansion of the monitoring well network were addressed in the remedial design and remedial actions for the site, which became the LTRA plan. All parties agreed in mid-2004 to delay the finaling of the Plume Capture Report for several years. Since the sampling plan in the LTRA was active, a decision on whether or not capture had been accomplished would be determined upon review of a larger data set.

In late 2003, the potentially responsible parties' (PRP) consultant requested permission to discontinue sending the treated effluent through the filter system and discharge the waste water directly to the wastewater treatment plant. This would hopefully increase the pump rate capacity of the treatment system. After discussions with the EPA, the MDEQ, and the city, all agreed to the request. The change was implemented in late 2003. Based upon information collected since 2004, bypassing the filter system improved the pump rate capacity.

The initial stages of the LTRA plan were implemented in 2002 and were projected to continue through 2005, when the First Five-Year Review (FYR) report was written. The First Five-Year Review, written by the EPA, was completed in 2005. Based upon the information gathered, the EPA determined the protectiveness statement would be deferred to a later date until the following two issues of concern were addressed: lack of groundwater plume capture and full delineation of the groundwater plume.

In late 2005, ten additional monitoring wells were installed to fill gaps in both the monitoring well and the Groundwater/Surface Water Interface (GSI) sentinel well network to further delineate the groundwater plume and to monitor two isolated spots in Area B of the site where elevated detections of VOCs were found.

During 2007, the EPA, the MDEQ, and the city of Ionia held monthly conference calls to discuss the site remedy. During those discussions, it was agreed to reduce the heavy metals monitoring for the Kanouse Drain mixing zone determination to manganese and chromium only. It was also determined that cleanup criteria for Area B should meet the mixing zone determination criteria for the Grand River rather than the criteria included in the ROD. This would address the two hot spot areas of elevated VOC contamination found in Area B. An additional investigation east of Kanouse Drain to establish the eastern boundary of the groundwater plume was completed in late 2007. Two additional monitoring wells were installed for this purpose. All of these remedy modifications were attached to the ROD in a Memorandum to the ROD-Other Remedy Changes document. Finally, a proposal was developed to expand the current site boundary to the west to address the expanding plume migrating toward the Grand River.

Evaluation of the P & T remedy and collection of data to determine if plume capture had been attained continued through 2008 under the LTRA. Review of the 2008 data indicated plume capture had not been attained but that the plume boundary had been documented. The expansion of the site boundary underwent further discussion and review by the EPA and MDEQ in 2008. It was determined however, not to expand the site boundary into adjoining properties but rather to rely upon the established monitoring well network to determine when plume capture was achieved.

Throughout 2008, the EPA, the MDEQ, and the city of Ionia continued to hold monthly conference calls to discuss the site remedy. Based upon the review of the groundwater data and the 2007 Memorandum to the ROD-Other Remedy Changes document, it was decided that an Explanation of Significant Differences (ESD) was needed to document the changes to the current ROD remedy. The ESD was developed and approved by both the EPA and the MDEQ. The ESD contained the following remedy modifications: established that the Kanouse Drain was not a receptor to the site's groundwater contamination and eliminated the need to compare the groundwater data to the Kanouse Drain Mixing Zone criteria; initiation of a two-year Pilot Test Shutdown of the P & T System to monitor for any noticeable changes to the groundwater contamination plume concentrations; comparison of the groundwater data to the Grand River Mixing Zone criteria; and elimination of collecting groundwater samples for heavy metals analysis.

The two-year Pilot Test Shutdown of the P & T System began in June 2008 and was completed in June 2010. Quarterly groundwater sampling data was evaluated and confirmed Monitored Natural Attenuation (MNA) was remediating the groundwater contamination plume while the treatment system was shut down. Development of a MNA Report began in late 2009 and was completed in mid-2010. The report confirmed MNA was actively remediating the groundwater contamination plume and that the treatment system could be shut down permanently.

The EPA completed the Second FYR Report in June 2010. The Second FYR protectiveness statement determined that the remedy is protective of human health and the environment in the short term and is expected to be protective in the long term because the source area has been removed and the current monitoring network shows that the remaining contaminant plume is stable and there are no downgradient receptors that could be affected by the plume. The only area that is showing a high level of total VOCs is at Point Source Monitoring Well PMW-1; however, this location appears stabilized and monitored to ensure the hot spot was not moving downgradient. A deed restriction prohibited the construction or use of drinking water wells and residential uses at the site.

In 2011, the EPA, with input from the MDEQ, developed a ROD Amendment to change the site remedy from the Pump and Treat System to MNA. The ROD Amendment was approved and signed in September 2011. The ROD Amendment included the following: expanded the site boundary to include the west flowing groundwater plume from Area B and the smaller east flowing groundwater plume from Area A; coverage of the area within the new site boundary with deed restrictions as well as the city of Ionia prohibition of installing water wells for drinking water usage; development of a Groundwater Waiver for the Groundwater Plume Expansion West of the original site boundary; development of a Site-Wide Contingency Plan; development of a Long-Term Monitoring Plan (LTMP); development of a new Mixing Zone Determination for the Grand River; expansion of source control options for PMW-1 in Area A; and, installation of a Permanent Marker.

In 2012, the city of Ionia opted to develop several site-specific Restrictive Covenants (RCs) and a groundwater ordinance for the landfill property and initiated the annual groundwater sampling under the LTRA. Development of the site-specific RCs and the groundwater ordinance continued through 2013. The groundwater ordinance was approved and enacted by the Ionia City Council on July 2, 2014. Both of the RCs were finaled and filed on September 3, 2014. Installation of the Permanent Marker was completed in early 2015.

The Third FYR was completed by the EPA on July 7, 2015. The Third FYR Report determined the soil remedy was protective of long term human health and the environment as the cap over the contaminated area on the site prevents exposure to site contaminants. Implementation of the ICs (i.e. the groundwater ordinance and the two RCs) will ensure long-term protectiveness of human health and the environment for the groundwater remedy.

SITE STATUS
In a letter dated September 4, 2015, both the EPA and MDEQ agreed to reduce annual groundwater sampling to every five years. Therefore, the next groundwater sampling event will be conducted in 2020 to coincide with the 2020 Five-Year review.

ENFORCEMENT STATUS
None.

SPECIAL CONSIDERATIONS
From 2000 to 2002, the MDEQ awarded the city of Ionia three Municipal Landfill Cost-Share

Grant (Grant) awards totaling $244,568 to reimburse them for up to 50 percent of their costs. Since the Grant program has been discontinued, no additional Grants have been awarded since 2002.

OPERABLE UNITS

00	Entire Site
01	Waste
02	Groundwater Plume

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/29/1989**

Proposed remedy was in-situ vitrification. However, the implementation of the remedy was unsuccessful. Excavation and removal of the source area was initiated instead.

Response Accomplishments: Completed

5 Year Review The First FYR was written by the EPA in 2005. The review determined that the protectivness statement will be deferred to a later time when the plume capture can be proven and full delination of the groundwater plume has been established.

Start Date: 02/01/2005 Primary Cost: $0 Source: Federal
End Date: 09/30/2005 Secondary Cost: $0 Source:

5 Year Review The EPA completed the Second FYR report in June 2010. The FYR protectiveness statement determined that the remedy is protective of human health and the environment in the short term and is expected to be protective in the long term because the source area has been removed and the current monitoring network shows that the remaining contaminant plume is stable and there are no downgradient receptors that could be affected by the plume.

Start Date: 06/01/2009 Primary Cost: $0 Source: Federal
End Date: 07/16/2010 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

The Third FYR was completed by the EPA on July 7, 2015. The FYR Report determined the soil remedy was protective of the long term human health and the environment as the cap over the contaminated area on the site prevents exposure to the site contaminants. The implementation of the ICs (i.e. the groundwater ordinance and the two RCs) will ensure the long-term protectiveness of human health and the environment for the groundwater remedy.

Start Date: 01/01/2015	Primary Cost:	$0	Source: Federal
End Date: 07/07/2015	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance

The EPA developed a ROD Amendment to change the site remedy from Pump and Treat to MNA. The ROD Amendment, via the LTMP, reduced the groundwater sampling from quarterly to annually. After completion of the Third FYR report in July 2015, both the EPA and MDEQ agreed to reduce the groundwater sampling from annually to every five years. Therefore, the next groundwater sampling event will be in 2020.

Start Date: 01/01/2011	Primary Cost:	$0	Source: Private
End Date: 01/01/2021	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

5 Year Review

The Fourth FYR, to be developed by the EPA, will be due by January 1, 2021.

Start Date: 01/01/2020	Primary Cost:	$0	Source: Federal
End Date: 01/01/2021	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Waste

Response Accomplishments: Completed

Interim Response

Drum removal and fencing.

Start Date: 04/01/1981	Primary Cost:	$0	Source: Private
End Date: 12/31/1981	Secondary Cost:	$0	Source:

Remedial Investigation

Start Date: 09/29/1984	Primary Cost:	$171,000	Source: Federal
End Date: 01/29/1986	Secondary Cost:	$0	Source:

Remedial Investigation

Start Date: 01/29/1986	Primary Cost:	$0	Source: Private
End Date: 09/29/1989	Secondary Cost:	$101,000	Source: Federal

OPERABLE UNIT 01: Waste

Response Accomplishments: Completed

Interim Response Drum removal.

Start Date: *11/01/1992* Primary Cost: $0 Source: Federal

End Date: *12/31/1992* Secondary Cost: $0 Source:

Remedial Action Excavation of contaminated soils; construction of clay cap with topsoil and grass cover.

Start Date: *04/01/1994* Primary Cost: $0 Source: Private

End Date: *04/01/1999* Secondary Cost: $0 Source:

OPERABLE UNIT 02: Groundwater Plume

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/2000**

Groundwater P & T remedy and MNA were selected for remediation of the groundwater plume. The contaminant concentration must meet mixing zone determination and GSI criteria for Kanouse Drain and MNA for the plume migrating off-site to the southwest. Long-term operation and maintenance, funded by the PRP will also be used.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 09/29/2008**

Based on the remedy changes included in the 2007 Memorandum to the ROD-Other Remedy Changes document, an ESD was developed and approved by both the EPA and the MDEQ. The ESD contained the following remedy modifications: established that the Kanouse Drain was not a receptor to the site's groundwater contamination and eliminated the need to compare the groundwater data to the Kanouse Drain Mixing Zone criteria; initiation of a two-year Pilot Test Shutdown of the P & T System to monitor if any noticeable changes to the groundwater contamination plume concentrations; comparison of the groundwater data to the Grand River Mixing Zone criteria; and elimination of collecting groundwater samples for heavy metals analysis.

OPERABLE UNIT 02: Groundwater Plume

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 09/22/2011**

The ROD Amendment developed by the EPA, with input from the MDEQ, alters the 2000 ROD remedy from P & T to MNA for the entire site. The Amendment also expands the site boundary to include the west flowing groundwater plume from Area B and the smaller east flowing groundwater plume from Area A. The area within the new site boundary is covered by deed restrictions as well as the city of Ionia prohibition of installing water wells for drinking water usage. The ROD Amendment also includes the following: development of a Groundwater Waiver for the Groundwater Plume Expansion West of the original site boundary; development of a Site-Wide Contingency Plan; Development of a LTMP; development of a new Mixing Zone Determination for the Grand River; expansion of source control options for Point Source Monitoring Well 1 in Area A; and installation of a Permanent Marker.

Response Accomplishments: Completed

Remedial Investigation

Start Date: 01/29/1986	Primary Cost:	$0	Source: Private
End Date: 09/28/2000	Secondary Cost:	$21,000	Source: Federal

Interim Response Construction of groundwater P & T System. Installation of monitoring wells.

Start Date: 04/01/1995	Primary Cost:	$0	Source: Private
End Date: 12/30/2002	Secondary Cost:	$0	Source:

Remedial Design

Start Date: 10/01/2001	Primary Cost:	$0	Source: Private
End Date: 12/30/2002	Secondary Cost:	$0	Source:

Long Term Remedial Action Operate P & T System. Quarterly groundwater monitoring until plume capture has been documented. The LTRA began in 2003. In 2008, the EPA, the MDEQ, and the city of Ionia agreed to conduct a two-year Pilot Test Shutdown of the P & T System. The pilot test began in June 2008 and ended in June 2010. Based on the 2010 MNA report, which confirmed MNA was actively remediating the groundwater plume, the treatment system could be shut down permanently. The LTRA was ended in December 2010.

Start Date: 01/01/2003	Primary Cost:	$0	Source: Private
End Date: 12/01/2010	Secondary Cost:	$0	Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$71	$0	$71	$71	$71

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$49,640	$0	$0	$49,640	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$11,865	$0	$0	$11,865	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$19,127	$0	$0	$19,127	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$36,277	$0	$0	$36,277	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$20,561	$0	$0	$20,561	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$92,292	$0	$0	$92,197	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$1,397	$0	$0	$1,397	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$5,000	$0	$0	$4,835	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$150,000	$0	$0	$144,576	$0
Totals:	$386,231	$0	$71	$380,547	$71

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Hedblum
1000 AuSable Road
Oscoda , MI

County: Iosco
MDEQ District Location: Saginaw Bay
Managed By: RRD-Superfund

Federal Site Code: E9
State Site ID#: 35000002
State Site Score: 39

LOCATION
The Hedblum Industries site is located about one mile southwest of the city of Oscoda. The site consists of the old Hedblum Industries plant, which was occupied by the Aircraft Tool Supply Company, followed by the Amtel Company. Contaminated groundwater flows underneath a portion of the AuSable Heights subdivision to the east of the site before reaching a swampy area, which flows into the AuSable River. The AuSable River is approximately 0.8 miles to the east and flows into Lake Huron about 1.2 miles east of the site.

SITE HISTORY
In 2004, the Amtel Company was purchased by SPX Corporation, which is the current owner. SPX Corporation is continuing with the operation of the groundwater pump and treat system. Hedblum Industries was a manufacturing plant which produced stamped metal parts for the automobile industry. In conducting production operations, trichloroethylene (TCE) was used as a degreasing solvent. From at least 1968 to 1972, Hedblum Industries discharged over 4,000 gallons of TCE directly onto the ground. Spray tank rinse water and cooling water from a jacket around the degreaser tank were also discharged to the ground surface.

A residential well was found to be contaminated with TCE in 1973. In 1978, after other residential wells were also found to be contaminated, the city of Oscoda's municipal water supply was extended to the affected area. Of the approximately 90 residential wells in the area, all but 23 were hooked up to the municipal system.

The Michigan Department of Natural Resources (MDNR) performed a limited hydrogeological study of the site in December 1982. This study concluded that TCE was present at the site and that further studies were needed. The site was placed on the National Priorities List on September 8, 1983. In 1986, the EPA initiated a remedial investigation/feasibility study (RI/FS) to determine the nature and extent of contamination and to evaluate cleanup alternatives. The RI/FS was completed in August 1989. This investigation found TCE in the groundwater at concentrations up to 4,800 micrograms per liter (µg/l) which exceeded the residential drinking water standard of 5 µg/l. The EPA published a proposed plan in July 1989, which described a remedy that consisted of purging and treating the groundwater, as well as some additional soil investigation. A Record of Decision (ROD) outlining the selected remedy was signed on September 29, 1989. The selected remedy for the site was to pump the contaminated water from the ground, treat it using a carbon adsorption system, and discharge the water to nearby surface water.

The EPA issued a Unilateral Administrative Order (Order) on September 29, 1989, to five companies, directing them to design and construct the groundwater pump and treat system. One of these companies began work on the design in 1990. As part of the design, additional monitoring wells were installed and additional analysis was performed on the contaminated soils. It was determined that no soil remedy was needed. The design of the groundwater pump and treat system was completed in September 1992. Construction of the groundwater

treatment system began in December 1992 and was completed in July 1993. The treatment system was inspected and tested and began operating in August 1993. The MDNR provided technical review of all design documents as well as assistance in oversight of on-site activities, including sampling and construction.

The First Five-Year Review (FYR) was completed in September 1999. It was estimated the system would have to operate for another five to ten years to achieve the cleanup standards (drinking water standards) throughout the aquifer. A Second FYR, written by the EPA, was completed in 2004. Based upon the information gathered, the EPA determined the protectiveness statement would be deferred to a later date until the following issues of concern identified by the EPA were addressed: the existing monitoring network was not adequate to monitor and capture the plume; groundwater extraction rates of the treatment wells were not consistent; the Substantive Requirements Document (SRD) objectives were not being met; the potential need for additional investigation to determine if a second source was contributing to the elevated concentrations of contaminants in the plume; and, finally, the discovery of TCE at 670 µg/l in one private residential well located within the groundwater plume.

In 2005, with the EPA's approval, the MDEQ conducted an RI of the groundwater plume. Results of the investigation proved that the current treatment system was not adequately capturing the groundwater plume. TCE was detected in two locations in concentrations ranging from 110 µg/l to 3,400 µg/l and tetrachloroethylene from 14 µg/l to 100 µg/l. At the end of 2005, the MDEQ provided the investigation findings to the EPA. The EPA used this information to convince SPX Corporation to undertake enhancement of the treatment system to obtain plume capture.

Based upon the results of the MDEQ 2005 RI, SPX Corporation conducted an additional RI in 2006. This second investigation was conducted in three sampling events in January, June, and August 2006. Results of this RI confirmed the findings of the MDEQ 2005 investigation. SPX Corporation proposed to implement an air sparge type of remediation to address the groundwater contamination, both on-site and off-site, to expedite the cleanup of the site. In 2007, both agencies and SPX Corporation initiated discussions on how to proceed with the new remedy if it was decided to be a viable option to run concurrently with the already existing pump and treat remedy.

Throughout 2008, SPX Corporation worked with the EPA and MDEQ to modify and develop an acceptable work plan to implement the accelerated remediation technologies pilot study. The EPA developed a new draft Statement of Work and Explanation of Significant Differences (ESD) to modify the ROD to include the accelerated remediation technologies remedy. All of these documents (the work plan, the ESD, and the Statement of Work) were finalized in June 2009.

The Third FYR was completed in August 2009. The FYR determined that the current pump and treat groundwater remedy was considered protective of human health and the environment in the short term. Long-term protectiveness will be achieved when the groundwater contamination plume has been remediated. Institutional Controls (ICs) were implemented to prevent the use of the groundwater and soils.

The construction of the remedy developed by accelerated remediation technologies was completed in November 2012 and remains operational. A local ordinance was passed restricting groundwater use within the affected area of the plume. It required the abandonment of existing wells within the affected area. The affected area is serviced by municipal water and serves as a source of potable water to homes.

The Fourth FYR was completed by the EPA in August 2014. The review determined that the remedy is protective in the short term; risks from soil vapor need to be assessed; and the monitoring network for the groundwater remedy needs to be expanded.

The pump and treat system remedy that was installed in 2012 is still performing as designed. The enhanced remediation technology is removing contaminants from the groundwater and is intercepting and removing soil vapor contaminants. MDEQ has been working with the MDEQ Water Resources Division on discharge questions that have been identified in the site status. SPX 's consultant has also been made aware of these questions and any issue should be resolved by spring of 2016.

The MDEQ Water Resources Division along with SPX 's consultant have resolved questions regarding site groundwater discharge from the pump and treat (P & T) system and are moving forward to finalize a new sampling plan. EPA along with its consultant and MDEQ are in discussion on the approach that will be taken for the evaluation of the vapor intrusion (VI) pathway on the site.

SITE STATUS
EPA and MDEQ discussed the evaluation of the VI pathway in mid 2017 and is awaiting responses from the PRP as to when the evaluation will begin. SPX is sampling site groundwater discharge from the pump and treat system in accordance to the newly approved sampling plan.

ENFORCEMENT STATUS
The EPA issued an Order on January 4, 1990, directing the Amtel Company to perform the Remedial Design (RD) and Remedial Actions (RA). The Amtel Company designed, constructed, and operated the pump and treat system. On July 13, 1998, the EPA issued a letter to the Amtel Company informing them that the treatment system was out of compliance with the Order and state SRD. The EPA assured the MDEQ the matter would be referred to the United States Department of Justice for resolution in 2002. Neither the EPA nor the United States Department of Justice pursued the matter in 2002. In June 2003, the EPA drafted a notice letter to the Amtel Company again addressing their failure to comply with the SRD. The MDEQ reviewed this draft letter and provided comments to the EPA. However, this letter was never sent.

With the purchase of the Amtel Company by SPX and the proposed change to implement the remedy developed by Accelerated Remediation Technologies at the site, the EPA amended the original 1990 Order in 2009. The new Order was completed and signed on June 30, 2009. The new Order gave approval to implement the Accelerated Remediation Technologies remedy while continuing to operate the pump and treat system. The new Order contained a Statement of Work, for both the RD and the RA, as well as the ICs.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site
01	Groundwater Plume

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Investigation SPX Corporation conducted a three-phased RI at the site during 2006.

Start Date: 01/01/2006 Primary Cost: $0 Source: Private
End Date: 10/01/2006 Secondary Cost: $0 Source:

5 Year Review The Third FYR determined that the current P & T groundwater remedy was considered protective of human health and the environment in the short term. Long-term protectiveness will be achieved when the groundwater contamination plume has been remediated. ICs were implemented to prevent the use of the groundwater and soils.

Start Date: 09/10/2008 Primary Cost: $0 Source: Federal
End Date: 08/01/2009 Secondary Cost: $0 Source:

Remedial Design The EPA and the MDEQ have accepted the proposed remedy change. A work plan and design document have been developed. SPX Corporation must first conduct a pilot study before the design is considered complete.

Start Date: 03/01/2009 Primary Cost: $0 Source: Private
End Date: 04/11/2011 Secondary Cost: $0 Source:

5 Year Review The Fourth FYR determined that the remedy is protective of human health and the environment in the short term because the enhanced remediation system is removing contaminants from the groundwater and is intercepting and removing soil vapor contaminants. Effective ICs have been implemented and are being monitored to prevent contact with contaminated groundwater. Soil gas monitoring needs to be conducted in order to assess the potential risks from soil VI. In addition, the groundwater monitoring network should be expanded in order to confirm that cleanup goals have been met along the southern margin of the plume for long-term protectiveness to be achieved.

Start Date: 10/01/2013 Primary Cost: $0 Source: Federal
End Date: 08/08/2014 Secondary Cost: $0 Source:

Response Accomplishments: In Progress

Remedial Action SPX Corporation is implementing the remedy developed by Accelerated Remediation Technologies.

Start Date: 11/01/2012 Primary Cost: $0 Source: Private
End Date: 05/17/2018 Secondary Cost: $0 Source:

Response Accomplishments: Future Need

5 Year Review The Fifth FYR is due in 2019.

Start Date: 08/01/2018 Primary Cost: $0 Source:
End Date: 08/01/2019 Secondary Cost: $0 Source:

OPERABLE UNIT 01: Groundwater Plume

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/29/1989**

The ROD remedy selected was P & T of groundwater estimated until 2010 to achieve cleanup standards with long-term operation and maintenance (O & M) funded by the Potentially Responsible Parties (PRPs).

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 04/08/2009**

The EPA developed an ESD to modify the original ROD P & T remedy to include and implement the remedy developed by Accelerated Remediation Technologies, which will run concurrently with the P & T system.

Response Accomplishments: Completed

Interim Response

The Oscoda Township Municipal Supply System was extended to those residences with private wells affected by the groundwater plume. The extension was paid for by the municipality.

Start Date: 01/01/1977	Primary Cost:	$0	Source: Private
End Date: 12/30/1977	Secondary Cost:	$0	Source:

Remedial Investigation

The EPA initiated an RI/FS to determine the nature and extent of contamination and to evaluate cleanup alternatives. This investigation found TCE in the groundwater at concentrations up to 4,800 ug/l.

Start Date: 02/15/1986	Primary Cost:	$543,000	Source: Federal
End Date: 05/21/1986	Secondary Cost:	$0	Source:

Remedial Design

The PRPs conducted the RD. As part of the design, additional monitoring wells were installed as well as additional analysis on the contaminated soils. It was determined that no soil remedy was needed.

Start Date: 08/13/1992	Primary Cost:	$0	Source: Private
End Date: 09/01/1992	Secondary Cost:	$165,000	Source: Federal

Remedial Action

Start Date: 12/01/1992	Primary Cost:	$0	Source: Private
End Date: 08/01/1993	Secondary Cost:	$168,000	Source: Federal

5 Year Review

The EPA developed the First FYR which was reviewed by the MDEQ. The FYR estimated that the P & T system would have to operate for at least five to ten years to achieve the cleanup standards included in the ROD.

Start Date: 04/01/1997	Primary Cost:	$40,000	Source: Federal
End Date: 09/30/1999	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Groundwater Plume

Response Accomplishments: Completed

5 Year Review

Based upon the information gathered, the EPA determined the protectiveness statement would be deferred to a later date until the following issues of concern identified by the EPA were addressed: the existing monitoring network was not adequate to monitor and capture the plume; groundwater extraction rates of the treatment wells were not consistent; the SRD requirements were not being met; the potential need for additional investigation to determine if a second source was contributing to the elevated concentrations of contaminants in the plume; and finally the discovery of TCE at 670 µg/l in one private residential well located within the groundwater plume.

Start Date: 01/01/2004	Primary Cost:	$6,000	Source: Federal
End Date: 09/30/2004	Secondary Cost:	$0	Source:

Remedial Investigation

With the EPA's approval, the MDEQ undertook an RI which proved the current treatment system was not capturing the groundwater plume. Contaminant concentrations were detected at elevated levels above current criteria.

Start Date: 02/01/2005	Primary Cost:	$30,000	Source: State
End Date: 12/31/2005	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance

O & M consists of monthly sampling of the influent/effluent from the purge wells and the discharge point into a creek that flows into the AuSable River, and quarterly groundwater sampling of the existing monitoring wells. The O & M activities are funded by SPX Corporation, now the current owner. It is estimated that O & M will be needed through 2018 to achieve cleanup standards in the aquifer, including meeting the criteria established in the SRD. O & M will continue until the cleanup criteria of both the ROD and SRD have been achieved.

Start Date: 09/01/1993	Primary Cost:	$0	Source: Private
End Date: 10/30/2018	Secondary Cost:	$0	Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$330	$0	$330	$330	$330

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V985560-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$6,487	$0	$0	$6,487	$0

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$20,000	$0	$0	$20,000	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$5,952	$0	$0	$5,952	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$6,286	$0	$0	$6,286	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$14,959	$0	$0	$14,959	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$5,447	$0	$0	$5,447	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$11,003	$0	$0	$11,003	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$40,028	$0	$0	$39,835	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$52,500	$0	$0	$46,355	$0
Totals:	$162,992	$0	$330	$156,655	$330

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Allied Paper/Portage Crk/Kalam
Morrow Dam to Lake Michigan
Kalamazoo , MI

County: Kalamazoo
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: 9B
State Site ID#: 39000051
State Site Score: 46

LOCATION
The site is located in southwest Michigan and includes approximately 80 miles of the Kalamazoo River from Morrow Lake Dam (upstream of the city of Kalamazoo) to the river's mouth at Lake Michigan. It also includes the lower three miles of Portage Creek, from Cork Street downstream to the confluence with the Kalamazoo River, as well as all properties presently or previously owned or operated by the Potentially Responsible Parties (PRPs).

SITE HISTORY
Carbonless copy paper manufactured between 1957 and 1971 contained polychlorinated biphenyls (PCBs) as an ink carrier. Such paper was recycled by paper mills on the Kalamazoo River and Portage Creek, resulting in discharge of PCBs. Although PCB use in the manufacture of carbonless copy paper was discontinued in 1971, the waste streams of the Kalamazoo area paper mills most likely contained PCBs for several years after 1971. The PCB-contaminated wastes from these paper mills were discharged directly to the Kalamazoo River and Portage Creek. In later years, waste effluents were sent to clarifiers prior to being discharged to the river and creek. The bottom sludge from these clarifiers was placed in at least five disposal areas along the river and creek. The clarifiers were ineffective for stopping the discharge of PCBs bceause the PCBs were associated with the suspended fine grained clay particles that did not settle during clarification. The soils, sediments, water column, groundwater, and biota in and adjacent to an 80-mile stretch of the Kalamazoo River and a 3-mile stretch of Portage Creek are contaminated with PCBs.

The MDEQ has estimated that this area contains over 350,000 pounds of PCBs and millions of cubic yards of PCB-contaminated waste in the river, floodplain, and four disposal areas situated on the river banks. The PCBs continue to migrate into the environment from various pathways. This migration of PCBs is substantially contributing to the ongoing contamination of the water column, sediments, soils, groundwater, and biota, both in and adjacent to the Kalamazoo River, Portage Creek, and ultimately Lake Michigan. Public health advisories have been issued against eating fish caught in the Kalamazoo River.

On August 30, 1990, the Allied Paper/Portage Creek/Kalamazoo River Superfund site was officially included on the National Priorities List pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, as amended (CERCLA). The PRPs for the site have included Lyondell Basell whose bankruptcy was resolved by Settlement Agreement on March 30, 2010 (formerly Millennium Holdings, LLC, formerly HM Holdings, Inc.,/Allied Paper), Georgia-Pacific, LLC (now owned by Koch Chemical), Plainwell Paper, Inc. (formerly Simpson Plainwell Paper Company) whose bankruptcy was approved by the U.S. District Court in Delaware in May 2005, the Fort James Corporation (formerly James River Corporation) was added as a PRP through a merger with Georgia-Pacific, and Weyerhaeuser Company, who was noticed as a PRP by the EPA in October 2002. In 2010, the EPA sent General Notice Letters to Consumers Energy Co., International Paper Co., MeadWestvaco Corp., and the National Cash Register Co., asserting their status as PRPs under CERCLA. In September 2013, the U.S. District Court issued a ruling that found National Cash Register Co. liable under CERCLA as an

arranger and International Paper Co. liable as an owner. Allocation apportionment regarding this liability remains unresolved.

Initially, the MDEQ was the lead agency for this Superfund site and had divided it up into numerous smaller operable units (OUs). The EPA has retained the names of OUs 1 through 4 (1: Allied Paper, Inc., 2: Willow Boulevard/A-Site, 3: King Highway Landfill, 4: 12th Street Landfill). The 80 miles of the Kalamazoo River, from the City of Kalamazoo to Lake Michigan, including a 3-mile stretch of Portage Creek were defined as OU5 (Portage Creek and Kalamazoo River sediments). OU5 was subdivided into seven segments (Areas) for cleanup. The EPA also designated the Former Plainwell Paper Mill Property as OU7. There is no OU6 at this time. Cleanup activities identified later in this report as "Operable Unit 00-Entire Site" are associated with OU5.

An ecological risk assessment for the river was completed by the MDEQ in June 1999, and a human-health risk assessment in August 2000. Both risk assessments were slightly revised in 2003 to address new EPA guidance and obtain formal EPA approval in August 2003. Both document unacceptable risk to human health and the environment. The ecological risk assessment has undergone an expert Peer Panel Review and the EPA approved a work plan in June 2010 to evaluate floodplain cleanup criteria utilizing site-specific data previously collected by Michigan State University while under contract to the PRPs. Final cleanup criteria were developed as a result of this work and will be incorporated into the completion of the various Remedial Investigation (RI) and Feasibility Study (FS) documents.

The EPA hosted a series discussions with the various responsible parties (Kalamazoo River Study Group) in an effort to negotiate voluntarily investigation and remedial actions. This EPA effort began in 2004, concluded in February 2007, and resulted in the signing of two Administrative Orders by Consent (AOC) with the Kalamazoo River Study Group. Under the first AOC, to which the MDEQ was a signatory, the PRPs conducted a Time Critical Removal Action (TCRA) at the Plainwell Impoundment. Under the second AOC with the EPA, the PRPs were required to conduct Supplemental RI/FS activities which will be followed by the preparation of Proposed Plans, and Records of Decision (ROD) relative to the various river Areas.

The TCRA for the Plainwell Impoundment was initiated in the spring of 2007. The majority of activities related to the excavation of contaminated soil and sediment were completed by the end of the 2008 construction season, which included the removal of the former powerhouse section of the Plainwell Dam. The removal action resulted in the excavation of approximately 130,000 cubic yards of contaminated material from the system with subsequent disposal at licensed landfills. The PRPs submitted a Construction Completion Report for the removal action in late 2009 which was approved by the agencies in early 2010.

After reviewing the results of sampling and investigation work in the Plainwell No. 2 Dam Area, the EPA determined that a second TCRA in Area 1 was necessary to address a subset of the contaminated bank material (approximately 12,000 cubic yards) that are acting as a source of PCBs to the river. This removal action was initiated in the summer of 2009 and was largely completed by the end of the 2010 construction season with monitoring of work elements continuing through 2013.

The EPA initiated a third Time Critical Removal Action in Area 1 to address portions of Portage Creek based on the results of recent sampling efforts in the fall of 2011. The work, conducted by the EPA, was completed in the fall of 2013.

In 2016, the EPA issued a Unilateral Administrative Order to several of the site PRPs to

conduct a TCRA in Area 3. This work is being conducted in conjunction with the removal of the dam by Michigan Department of Natural Resources (MDNR). Work was initiated in 2016 and is expected to be completed by 2018.

Non-time critical work followed the Supplemenal RI/FS process under the second AOC. A ROD was issued in the fall of 2015 for Area 1 (Morrow Dam to the Plainwell Dam). A Final Supplemental RI report was approved in 2015, and a revised Feasibility Study was submitted in the fall of 2016 for Area 2 (Otsego City Impoundment). A Supplemental RI report was approved in 2016 for Area 3 (Otsego Township Impoundment). Supplemental RI activities were initiated in 2014, completed in the fall of 2015, and a draft Supplemental RI report was submitted in 2016 for Area 4 (Trowbridge Impoundment). A preliminary field reconnaissance (Recon I) investigation and limited geophysical survey was completed in the summer of 2016 and field sampling was completed in the fall of 2016 in Area 5 (Allegan City). A carp tagging and tracking pilot study was initiated in 2016 to evaluate the potential for fish tracking and carp removal in an effort to expedite natural recovery in Area 6 (Lake Allegan).

Beginning in 1999, the MDEQ implemented a Long-Term Monitoring Program (LTMP) for OU5. This program included the collection of surface water samples, resident fish, and caged catfish. The objectives of the program were to develop baseline data for PCBs within specific reaches of the river, and to evaluate the effectiveness of remedial removal actions. The MDEQ published a series of reports that document the findings of the Long-Term Monitoring activities. In early 2016, the MDEQ passed the responsibility for the LTMP over to the Responsible Party and published its final report. The PRPs submitted a draft LTMP in the fall of 2016 and MDEQ, EPA and the PRPs are now working to coordinate a jointly developed monitoring program consistent with previous efforts.

Allied Paper/Portage Creek - OU1: In May 1999, the EPA completed an emergency removal at the Allied Paper, Inc. site. This action removed 150,000 cubic yards of PCB-contaminated waste from the Bryant Mill Pond portion of Portage Creek to control an upstream, ongoing PCB source at the site. A draft RI Report for Allied Paper/Portage Creek was submitted by the PRP in November 2000, but it did not adequately address all the risks. In 2003, an extensive monitoring well network was installed for the purpose of completing the RI Report and the PRP continued an interim action by constructing a landfill cap and upgrading a groundwater extraction system, which continues to operate. Also in 2003, an additional 1,000 cubic yards of contaminated material were removed from the Portage Creek floodplain. In a letter dated October 25, 2006, the MDEQ exercised its right under the Order to take over responsibility for authoring the final RI Report. In March 2008, the final version of the RI was submitted by the MDEQ to the EPA. After the EPA's review and comment, the EPA became the lead for the site. The EPA and its contractor developed a risk evaluation document that will be used to document the various criteria that need to be considered during FS development. On March 30, 2010, the Settlement Agreement for the Lyondell bankruptcy was executed. As such, a PRP for the Allied Paper OU no longer exists. The field work for the supplemental groundwater investigation at the site, that was initiated due to concerns raised by the city with regard to protection of the city of Kalamazoo’s wellhead, has been completed. The EPA has also completed evaluating the data and prepared a report summarizing the findings of the investigation. A final version of the EPA-authored FS was completed in January 2014, and was modified in 2015 to incorporate another redevelopment-based cleanup option following extensive discussions with the city. In the fall of 2016, the EPA issued the ROD for the site calling for consolidation and capping of the site with active stewardship by the City of Kalamazoo.

Willow Boulevard/A-Site - OU2: An interim action to remove 7,000 cubic yards of PCB-contaminated waste from the river at the Willow Boulevard/A-Site was conducted in 1999. Sheet pile was installed to protect against erosion. The MDEQ released the final

RI/FS report in November 2004, thereby resolving the PRP's dispute regarding the application of cleanup criteria, after which the lead for Willow Boulevard/A-Site was transferred from the MDEQ to the EPA. In July 2005, the EPA issued a Proposed Plan, and a ROD was finalized in September 2006. Waste generated during the TCRA performed at the former Georgia-Pacific Corporation and Hawthorne Paper Mills was consolidated at the A-Site Landfill in 2007. In May 2009, the EPA and Georgia-Pacific entered into a Consent Decree (Decree) for Remedial Design/Remedial Action (RD/RA) requiring Georgia-Pacific to perform cleanup. For the Willow Boulevard/A-Site OU, the EPA negotiated a Decree with the PRPs that included consideration of Natural Resource Damage claims. The RD was finalized in May 2011 and RA construction began following the completion of the RD. Construction of the remedy, including residuals consolidation and landfill cap construction, was completed during the 2011 and 2012 construction seasons. Monitoring well installation was completed in 2013. RA completion and construction completion certification was achieved in September 2014. Operation, maintenance, and monitoring has begun and is ongoing.

King Highway Landfill - OU3: A ROD for the King Highway Landfill was signed February 10, 1998. The ROD was implemented by Georgia Pacific under an Order with the MDEQ. The remedy included excavation of PCB-contaminated waste from several areas with placement in the landfill. Areas that were excavated include the King Street Storm Sewer (5,000 tons), five former lagoons (38,000 tons), and a small portion of the Kalamazoo River along the edge of the King Highway Landfill (1,000 tons). After this waste was consolidated, a cap and containment system was constructed. A vegetative cover was established on the landfill cap and a long-term groundwater monitoring network, landfill gas monitoring network, and gas venting system have been installed. Based on results from the sampling event in November 2003, a gas collection trench was installed on the western side of the property to help mitigate high concentrations of methane. A sedimentation basin (a stormwater control feature) was also cleaned out. A final inspection was conducted in the fall of 2003 and a draft final report on completion of construction was generated. Routine monitoring of landfill gas indicated that methane was migrating off-site to the south and west directions. In the fall of 2008, landfill gas cutoff trenches were installed to mitigate migrating methane. During trench installation, PCB-containing residual material was encountered. During the spring of 2009, additional excavation of the residual material was conducted along the southern portion of the OU. A Construction Completion Report and a Final Operation and Maintenance (O & M) Plan was approved June 26, 2013, and routine O & M is being conducted. In 2014, additional landfill gas cutoff trenching was installed along a portion of the west side in an effort to mitigate methane migration in that direction. Monitoring is being conducted to evaluate the effectiveness of that and to determine if further action is warranted.

12th Street Landfill - OU4: The ROD for the 12th Street Landfill was signed in September 2001, after which the lead was transferred from the MDEQ to the EPA. In 2003, the EPA and MDEQ conducted additional sampling in the former powerhouse discharge channel, adjacent wetlands, and wooded area around the landfill. In 2005, the EPA and Weyerhaeuser Company entered into a Decree for RD/RA requiring Weyerhaeuser to perform cleanup of the 12th Street Landfill. In fall 2007, Weyerhaeuser implemented an emergency removal action along the eastern edge of the landfill in anticipation of the removal of the Plainwell Dam and the resultant redirection of river flow adjacent to the 12th Street Landfill OU. The work was intended to be consistent with the final remedy required in the ROD. In early 2008, the emergency action was completed at the landfill and flow has since been reintroduced into the former powerhouse channel. The PRPs developed an RD work plan for the site which is dated April 2008. The RD report for the 12th Street Landfill OU was approved in early 2010. Remedial activities were initiated in the spring of 2010 and were completed in June 2011. The Final Construction Completion/Remedial Action Completion Report was

approved in September 2012. Operation, maintenance, and monitoring of the remedy is ongoing.

Plainwell Mill - OU7: Emergency work at the Plainwell Mill, consisting of partial removal of PCB-contaminated bank sediments, was completed in 2008. Since that time, the EPA and the MDEQ have worked with the city of Plainwell in redevelopment efforts and with the PRPs in completion of RI/FS activities at the Plainwell Mill. In the summer of 2015, the EPA authored a proposed plan for the site and finalized the ROD in the fall of 2015. The Pre-Final Remedial Design Report was submitted in fall 2017.

Mill Properties: The MDEQ has provided support to the EPA and local units of government as it relates to work conducted at the various former paper mill properties located along the Superfund site. Specifically, in 2007, the PRPs completed the EPA-ordered TCRA for the former Georgia-Pacific Corporation and Hawthorne Paper Mills located in Kalamazoo, and the MDEQ has reviewed documents prepared by the PRPs. The MDEQ has also worked with the city of Kalamazoo on redevelopment efforts at various sites including the former Performance Paper Mill. The EPA and MDEQ have also been involved in recent redevelopment activities at the former King Mill Lagoons, where contaminated paper waste remains unaddressed.

Natural Resource Damage Assessment: The state and federally authorized trustee agencies initiated a natural resource damage assessment in 2000 which is continuing in conjunction with the Superfund removal and response process. After settlement of the Lyondell bankruptcy proceedings for OU 1 natural resource damage liability, Stratus Consulting, Inc. prepared a restoration plan for OU 1 in 2013 utilizing state funding. After public notice of the OU 1 restoration plan, the natural resource damage trustees began implementation of projects funded through the Lyondell settlement funds. The natural resource damage trustees prepared a riverwide restoration plan and environmental impact analysis plan which can be used for future restoration actions. The Restoration Plan/Environmental Impact Statement was prepared by Stratus Consulting, Inc. with the state funding allocated for natural resource damage for the Kalamazoo River. The plan was public noticed in 2015 and the trustee agencies finalized the plan in 2016. The trustees are also determining restoration projects that could address injuries to natural resources in Area 1 of the river. The remaining NRDA funding will be used to update injury assessments in Area 1, 2 and 3 for future settlement purposes.

SITE STATUS

Substantial portions of this Superfund site remain unaddressed and PCBs in the river continue to pose risks to human health and the environment. TCRAs were conducted in recent years and are further detailed in the history section. Activities at the site are currently following the schedule set forth in the 2007 Administrative Order between the EPA and Georgia-Pacific.

The PRPs are conducting Supplemental RI/FS investigation activities on several areas of the river and EPA is beginning to complete RODs for upstream areas. The Pre-Design Investigation work plan was submitted in August 2017 and field activities associated with the work plan began in the fall of 2017 and are anticipated to be completed in 2018 for Area 1 (Morrow Dam to the Plainwell Dam). A revised FS was conditionally approved in April 2017, a draft Proposed Plan was issued by EPA in June 2017, and a ROD was signed in the fall of 2017 for Area 2 (Otsego City). The Feasibility Study is due in January of 2018 for Area 3 (Otsego Township). Additionally, a TCRA was initiated in Area 3 (Otsego Township) in 2016 and is expected to be completed in the fall of 2018. The draft Supplemental RI was disapproved by EPA in July 2017 and a revised Supplemental RI report was received in November 2017 and is currently under review for Area 4 (Trowbridge Impoundment). A follow-up field reconnaissance (Recon II) investigation and additional field sampling was

completed in the fall of 2017 and Supplemental RI/FS sampling and field activities are scheduled for 2018 in Area 5 (Allegan City). The PRPs continued the carp tagging and tracking study and performed a bathymetric survey in the winter of 2017 in Area 6 (Lake Allegan).

For the other OUs at the site, the Pre-Investigation Design and the 95% Remedial Design reports were received and approved in 2017 and the Final (100%) Remedial Design report is anticipated to be received in 2018 for OU7 - Plainwell Mill. A ROD for OU1 - Allied Landfill, was issued in the fall of 2016 with RD activities expected in 2017. A Fiver Year Review was completed for those portions of the Site that have a remedy in-place (OU-2, OU-3, and OU-4) in the fall of 2017.

ENFORCEMENT STATUS

In addition to being a Superfund site, the Kalamazoo River and Portage Creek have been designated a site of environmental contamination under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The Kalamazoo River and Portage Creek have also been identified as an Area of Concern by the International Joint Commission on the Great Lakes. The four PRPs signed an AOC with the MDEQ to fund and conduct the RI and FS on the River. A separate Order was signed for RA activities at the King Highway Landfill. In June 2001, the MDEQ asked the EPA to redesignate portions of the greater Kalamazoo River Superfund site as a federal enforcement lead. Portions of the State's Order were terminated in 2007 when the EPA signed a replacement AOC with the Responsible Parties as the lead agency. Transition of the lead is now complete on the river and is also complete at the remaining landfill OUs as investigation milestones were reached. The King Highway Landfill remains the sole OU with the MDEQ as the lead agency.

The Georgia-Pacific Corporation incurred stipulated penalties for not meeting the Financial Assurance Mechanism requirements specified by the Order for the King Highway Landfill. On October 21, 2001, Georgia-Pacific Corporation agreed to pay $42,000 to settle the non-compliance issue. The MDEQ has been recovering costs for work conducted at the King Highway Landfill under a separate AOC. The MDEQ has billed the PRPs over $795,000 since August 2001, successfully recovering the full amount. Cost recovery will continue indefinitely under the King Highway Landfill AOC.

The MDEQ has completed negotiations with the Kalamazoo River Study Group for payment of past costs as specified in the state's AOC for the Kalamazoo River RI/FS. Between 1991 and 2006, the MDEQ billed the Kalamazoo River Study Group over $12,037,000 for costs related to the site. As of June 2007, the MDEQ had received over $10,325,000 in payments for RI/FS related activities. The balance of the unpaid charges were moved to a cost package which includes expenses incurred by the state for activities on the river not related to the AOC, but still necessary under Part 201. A cost demand package for the lawful expenses incurred by the MDEQ was sent to the Kalamazoo River Study Group and the Weyerhaeuser Company in a letter dated November 22, 2006, seeking $8.3 million. In June 2008, the Kalamazoo River Study Group paid $4.1 million in order to resolve the state's past response costs with Georgia-Pacific LLC and Millennium Holdings (now Lyondell Basell, but originally a successor to Allied Paper). The Weyerhaeuser Company has yet to resolve these costs. The MDEQ is also looking to negotiate for recovery of future costs related to activities on the river.

In December 2008, the MDEQ prepared a cost demand package for expenses incurred by the MDEQ related to oversight of the Plainwell TCRA. The package combined expenses incurred in 2007 ($161,962.39) and 2008 ($175,000.00) for a total request of $336,962.39.

The Kalamazoo River Study Group incurred stipulated penalties for not meeting the Financial Assurance Mechanism required by the state's AOC for the Kalamazoo River RI/FS. On January 11, 2002, Georgia-Pacific Corporation paid $17,000 in stipulated penalties, the amount requested by the MDEQ for non-compliance.

The EPA and the Weyerhaeuser Company entered into a Consent Decree in 2005 for RD/RA requiring the Weyerhaeuser Company to perform cleanup of the Plainwell Mill and 12th Street Landfill, pay the EPA's past and future response costs, and withdraw objections to the Plainwell Settlement and issues on appeal. All rights with respect to natural resource damages at the Mill and 12th Street Landfill are reserved.

Plainwell Paper, Inc. went bankrupt in 2005. Plainwell Paper, Inc., the state of Michigan, and the United States filed a settlement agreement to the Bankruptcy Court and resolved claims for response costs and natural resource damages.

Lyondell Chemical Company/Millennium Holdings LLC, one of the two remaining PRPs for the Superfund site, filed for bankruptcy in January 2009 along with 90 of its affiliates and subsidiaries. Millennium Holdings LLC acquired Allied Paper, Inc., a chief contributor of PCBs into the Kalamazoo River system and floodplains. Various government parties filed claims for over $2 billion in the bankruptcy, but the Debtors' January 2010 amended filing indicated that the financial status of the Debtors left only $250 million available to address all of the sites of contamination associated with Lyondell/Millennium. On April 23, 2010, the United States Bankruptcy Court for the Southern District of New York confirmed the Debtors' reorganization plan and settlement with the United States, MDEQ, and several other state agencies, addressing 23 sites of contamination. The reorganization plan creates a custodial trust that will take ownership of some of the contaminated properties, including the Allied Paper Mill in Kalamazoo, Michigan. Under the reorganization plan and settlement, the EPA received about $103 million total for cleanup of the Allied Paper/Portage Creek/Kalamazoo River site, with about $50 million of that amount dedicated to cleanup of the Allied Paper Mill, and the remainder allocated to resolving environmental liabilities at the Kalamazoo River site as a whole. The MDEQ received $1,671,850 which was deposited in the Custodial Trust MDEQ Cost Account for the Allied Paper Mill. In addition, the federal and state agencies designated as Natural Resource Trustees for the Kalamazoo River received $2,000,000 for restoration work on the river. In 2012, the MDEQ received a single payment of approximately $201,000 related to the unsecured bankruptcy claim. The reorganization plan liquidates all Lyondell entities connected to the Allied Paper/Kalamazoo River Superfund site, leaving Georgia-Pacific LLC as the major PRP. Georgia-Pacific recenlty brought a contribution action against International Paper, Weyerhaeuser, and NCR. Weyerhaeuser admitted liability while reserving the right to contest divisibility of harm and allocation of damages. After taking evidence and testimony, the U.S. District Court for the Eastern District of Wisconsin also found International Paper liable as an “owner” or “operator” under CERCLA, and found NCR liable as an arranger under CERCLA. The Court is currently weighing the proper division of responsibility and possible allocation of harm among all 4 parties. Even after this decision is rendered, all of these findings (including liability) are subject to appeal. Weyerhaeuser Corporation continues to conduct response activities at the 12th Street Landfill (OU4) and the Former Plainwell Mill (OU7).

SPECIAL CONSIDERATIONS

The Plainwell Dam was successfully removed in 2008. The MDEQ and the Michigan Department of Natural Resources (MDNR) believe the three remaining state-owned dams (Otsego City, Otsego Township, and Trowbridge) need to be removed to achieve state resource and environmental protection goals. For the Otsego City Dam, the EPA Preferred Alternative selected in the Draft Proposed Plan includes removal of the dam as part of the remedy and therefore costs associated with dam removal will fall on the PRPs. FS and

Engineer Designs have been completed for the removal of the Otsego City Dams. For the Otsego Township Dam, EPA issued a Unilateral Administrative Order to have certain PRPs at the site conduct a TCRA within the Otsego Township Impoundment. The TCRA was initiated in 2016 and is expected to be completed by 2018. In coordination with the ongoing TCRA, MDNR successfully removed the Otsego Township Dam in late 2015/early 2016 and a temporary Water Control Structure was installed at the dam site and is being utilized during Cleanup Activities. O & M responsibilities for the WCS were transferred from DNR to the PRPs and their contractors in 2016 and the WCS is slated to be removed before March 2018. For the Trownbridge Dam, DNR encumbered AECOM in Spring 2017 to engineer removal of the Trowbridge Dam. Engineering Design is expected to be completed during FY18 and removal activities are anticipated to begin FY19.

OPERABLE UNITS

00	Entire Site
01	Allied Paper, Inc.
02	Willow Boulevard/A-Site
03	King Highway Landfill
04	12th Street Landfill
05	Kalamazoo River and Portage Creek
07	Plainwell Mill

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/28/2015**

A ROD for Area 1 (Morrow Dam to Plainwell Dam, including Portage Creek) of OU5 was issued by EPA. It includes Sediment Remedy S-3A (removal of hots spot areas and Crown Vantage Side Channel, Monitored Natrual Recovery (MNR), Institutional Controls (ICs), with additional sampling of the remedial reach) and Floodplain Soil Remedy FPS-4A (removal of floodplain soil in Plainwell with a remedial action limit of 20 mg/kg PCBs, ICs, engineering controls, and additional floodplain sampling)

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 09/28/2017**

Area 2 ROD of OU5

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Interim Response

A total of 11,314 cubic yards of material were excavated from the former King Mill Lagoons and transported to Cell 4 at King Highway Landfill in September and October 1999. An estimated 5,000 cubic yards of PCB-contaminated material remains. Areas beyond the lagoons also have not been adequately investigated. Mill properties are not formally considered part of the Superfund Site by the EPA, with the exception of Operable Unit 7, or Plainwell Mill.

Start Date: 09/01/1999	Primary Cost:	$100,000	Source: Private
End Date: 10/29/1999	Secondary Cost:	$0	Source:

Emergency

Emergency repairs were conducted in 2001 by the MDEQ for three MDNR-owned dams to prevent catastrophic failure. Repairs were conducted at the Plainwell Dam ($66,745), Otsego Dam ($122,540), and Trowbridge Dam ($233,500). Costs were also incurred for engineering associated with dam repair design and periodic inspection of the structures following repair (~$120,000).

Start Date: 12/07/2000	Primary Cost:	$540,000	Source: State
End Date: 03/30/2001	Secondary Cost:	$0	Source:

Emergency

In 2007, the PRPs and various state and federal agencies entered an Order to conduct a TCRA in the Former Plainwell Impoundment. This action included excavation and disposal of approximately 132,000 cubic yards of in-stream and floodplain sediment and partial removal of the Plainwell Dam owned by the MDNR. The majority of work was completed by the end of 2008 with some restoration work taking place in 2009. The PRPs will retain maintenance obligations at the impoundment for a period of three years following the completion of construction in 2010.

Start Date: 02/28/2007	Primary Cost:	$26,000,000	Source: Private
End Date: 08/27/2013	Secondary Cost:	$1,000,000	Source: Federal

5 Year Review

The protectiveness statement in the report concluded that the remedy at the King Highway Landfill OU currently protects human health and the environment in the short term, that the remedy at the 12th Street Landfill OU is not protective because the remedy has not yet been constructed and because access controls are inadequate to protect trespassers from short-term risks associated with remedy construction, and that the EPA will ensure that long-term stewardship of the 12th Street Landfill OU, as well as every other OU of the site, includes implementation and maintenance of each component of the selected remedy, including any necessary ICs.

Start Date: 05/01/2007	Primary Cost:	$0	Source:
End Date: 10/18/2007	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Emergency

After reviewing the results of sampling and investigation work in the Plainwell No. 2 Dam Area, the EPA determined that another TCRA was necessary to address a subset of the contaminated bank material (approximately 12,000 cubic yards) that are acting as one of the sources of PCBs to the river. This removal action was initiated in the summer of 2009 and was largely completed by the end of the 2010 construction season with monitoring of work elements continuing into 2014.

Start Date: 06/01/2009	Primary Cost:	$10,000,000	Source: Private
End Date: 09/09/2014	Secondary Cost:	$0	Source:

5 Year Review

The Second FYR report included a protectiveness statement for OU2, OU3, and OU4. Protectiveness determinations for OU1, OU5, and OU7 are not included because RA work has not yet started. There currently is not an OU6 for the site. The remedy at OU3 and OU4 is currently protective of human health and the environment in the short term. Long-term protectiveness requires compliance with the existing ICs for both OUs. The remedy at OU2 is expected to be protective of human health and the environment upon completion of the remedy. In the interim, exposure pathways that could result in unacceptable risks are being controlled.

Start Date: 05/01/2012	Primary Cost:	$0	Source:
End Date: 10/18/2012	Secondary Cost:	$0	Source:

Emergency

After reviewing the results of sampling and investigation work in Portage Creek, the EPA determined that a Time Critical Removal Action was necessary to address a subset of the contaminated sediments and floodplain material (approximately 14,000 cubic yards) that are acting as one of the sources of PCBs to the river. This removal action was initiated in the fall of 2012 and was completed by the end of the 2013 construction season.

Start Date: 10/01/2012	Primary Cost:	$12,000,000	Source: Federal
End Date: 11/15/2013	Secondary Cost:	$0	Source:

5 Year Review

The Third FYR report included a protectiveness statement for OU2, OU3, and OU4. Protectiveness determinations for OU1, OU5, and OU7 are not included because RA work has not yet started. There currently is not an OU6 for the site. The remedy at OU2 is expected to be protective of human health and the environment upon completion of the remedy. In the interim, exposure pathways that could result in unacceptable risks are being controlled. The remedy at OU3 and OU4 is currently protective of human health and the environment in the short-term. Long-term protectiveness requires compliance with the existing ICs for both OUs and OU3 requires additional action to address off-site migration of landfill gases.

Start Date: 10/19/2012	Primary Cost:	$0	Source:
End Date: 10/06/2017	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: In Progress

Remedial Investigation

Remedial Investigation Reports have been approved for Area 1, 2, and 3. For Area 4 (Trowbridge Impoundment), investigation activities were completed by the fall of 2015, with a Draft Supplemental RI report submitted in the summer of 2016. A draft version of the RI report for Area 5 is expected in 2019, with reports for Area 6 and Area 7 anticipated beyond 2020.

Start Date: *01/01/1993*	Primary Cost:	$45,000,000	Source: Private
End Date: *09/30/2030*	Secondary Cost:	$0	Source: Federal

Recovered/ Reimbursed

As of June 2007, the MDEQ had received over $10,325,000,000 in payments for RI/FS related activities. The balance of the unpaid charges were moved to the state's Non-Administrative Order by Consent cost package which includes expenses incurred by the state for activities on the river not related to the AOC, but still necessary under Part 201. Importantly, a cost demand package for the Non-Administrative Order by Consent costs lawfully incurred by the MDEQ outside the AOC was sent to the Kalamazoo River Study Group and the Weyerhaeuser Company in a letter dated November 22, 2006, seeking $8.3M. In June 2008, the Kalamazoo River Study Group paid $4.1 Million in order to resolve the state's past response costs with Georgia-Pacific LLC and Millennium Holdings (successor to Allied Paper) related to the non-Administrative Order by Consent activities. Reimbursed funds may include other costs recovered by the MDEQ pursuant to Part 201 (e.g., interest, fines, and penalties, etc.) and, therefore, may not reflect the actual dollars expended in the performance of response activities at the site. Settlement of past costs with Weyerhaeuser is not yet concluded.

Start Date: *01/01/1993*	Primary Cost:	$0	Source: Private
End Date: *09/28/2035*	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: In Progress

Remedial Investigation

Various RI activities have been conducted at the site to understand the nature and extent of contamination. These sampling activities have been conducted by state and federal entities and private parties. The site was redesignated as federal lead in 2001. A Draft RI/FS submitted by the PRP was rejected by the MDEQ on July 11, 2002. The EPA initiated Facilitated Discussions via a letter dated December 31, 2003. This process resulted in the EPA and the PRPs entering into an AOC, dated February 2007, to conduct Supplemental RI/FS activities on the river. In accordance with the EPA's AOC, the site was divided into Areas separated primarily by dams, with the different areas in various stages of investigation. For Area 1 (Morrow Dam to the Plainwell Dam), a ROD was issued by EPA. For Area 2 (Otsego City Impoundment), a Final Supplemental RI report was approved and a FS is expected to be approved in 2017. For Area 3 an RI report was approved and a TCRA was initiated in 2016. For Area 4, a draft RI report was submitted in the Summer of 2016. Work in development of a sampling plan for Area 5 was initiated in 2016. Over the life of the project, the MDEQ has spent approximately $13,280,000 in contractor support of remedial investigative activities on the river portion of the site (of which ~$640,000 was spent on analytical costs for independent sample analysis).

Start Date: 07/01/2000	Primary Cost:	$0	Source: <None>
End Date: 12/31/2025	Secondary Cost:	$13,280,000	Source: State

Special Programs Funding

The state and federally authorized trustee agencies initiated a natural resource damage assessment in 2000 which is continuing in conjunction with the Superfund removal and response process. The natural resource damage trustees prepared a riverwide restoration plan and environmental impact analysis plan which can be used for future restoration actions. The Restoration Plan/Environmental Impact Statement was prepared by Stratus Consulting, Inc. with state funding allocated for natural resource damage for the Kalamazoo River. The plan was public noticed in 2015 and the trustee agencies finalized the plan in 2016. The trustees are also determining restoration projects that could address injuries to natural resources in Area 1 of the river. The state has spent approximately $1,810,000 in contractor support for the natural resource damage assessment. The remaining funding will be used for assessment updates in Area 1, 2 and 3 for settlement of these liabilities.

Start Date: 09/01/2000	Primary Cost:	$0	Source:
End Date: 09/28/2035	Secondary Cost:	$1,810,000	Source: State

Emergency

Start Date: 04/06/2016	Primary Cost:	$0	Source:
End Date: 08/31/2018	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Ongoing

Monitoring

The MDEQ is conducting long-term monitoring at the site. Long-Term Monitoring Activities were initiated by the state in 1999 in order to establish baseline pre-removal conditions, and to evaluate the effectiveness of removal/remedial actions. The program includes surface water monitoring and resident fish collection, and has evaluated options for using alternatives to using live fish, to evaluate effectiveness of RA activities. In early 2016, the MDEQ passed the responsibility for the LTMP over to the Responsible Party group and published its final report. The EPA, MDEQ, and Responsible Parties are now working to coordinate a jointly developed monitoring program consistent with previous efforts. Over the life of the project, the MDEQ spent approximatley $6,080,000 in contractor support for implementation of the program (of which ~$1,875,000 was used for analysis of collected samples).

Start Date: *09/01/1999*	Primary Cost:	$0	Source:	<None>
End Date: *09/29/2034*	Secondary Cost:	$6,080,000	Source:	State

Response Accomplishments: Future Need

5 Year Review

A Five-Year Review (FYR) will be needed in fall 2022.

Start Date: *10/01/2021*	Primary Cost:	$0	Source:	
End Date: *10/07/2022*	Secondary Cost:	$0	Source:	

OPERABLE UNIT 01: Allied Paper, Inc.

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/2016**

EPA issued a ROD in the fall of 2016 that calls for consolidation and capping with Long Term O & M.

Response Accomplishments: Completed

PRP Oversight

The MDEQ and its contractor conducted oversight of PRP-related activities including review of multiple versions of the Draft RI report and oversight of groundwater sampling. In 2005, following review of a PRP's draft RI report, the MDEQ under authority of the AOC disapproved the PRP report and assumed responsibility for authoring an RI for the site with the EPA approving the final RI in May 2008.

Start Date: *01/01/1993*	Primary Cost:	$0	Source:	Private
End Date: *05/30/2008*	Secondary Cost:	$0	Source:	State

OPERABLE UNIT 01: Allied Paper, Inc.

Response Accomplishments: Completed

Remedial Investigation

The PRPs submitted the RI report for the Allied Paper OU in December 2003 and a revision of Section 4 in October 2005. The MDEQ reviewed and rejected the documents and assumed authorship of the final version. In February 2007, the MDEQ submitted a draft version of the RI to the EPA for review and submitted a State-Approved RI report to the EPA in December 2007 based on their initial comments. The MDEQ spent approximately $1,490,000 in contractor support over the life of the project in participating in RI activities and in developing a final report (of which ~$31,000 was spent on the analysis of independently collected samples). A final version of the EPA authored FS was approved in January 2014. However, following requests by the city of Kalamazoo to consider other redevelopment-based cleanup options, the EPA modified the FS, based on input from the city, and issued a ROD in 2016.

Start Date: 01/01/1993	Primary Cost:	$0	Source: Private
End Date: 05/30/2008	Secondary Cost:	$1,490,000	Source: State

Emergency

Approximately 150,000 cubic yards of sediment were excavated from Bryant Mill Pond as part of a Time Critical Removal Action in 1998-99.

Start Date: 06/15/1998	Primary Cost:	$7,500,000	Source: Private
End Date: 10/29/1999	Secondary Cost:	$1,000,000	Source: Federal

Response Accomplishments: In Progress

Interim Response

This interim response addressed Historic Residual Dewatering Lagoons/Former Residual Dewatering Lagoons capping, sheet pile installation, and groundwater recovery. Capping activities associated with the Interim Response were completed in the 2005 construction season. Groundwater collection and treatment will be ongoing pending a final remedial decision for the site.

Start Date: 02/01/2000	Primary Cost:	$3,000,000	Source: Private
End Date: 11/11/2019	Secondary Cost:	$0	Source: <None>

Remedial Design

The RD began in May 2017. The RD Work Plan has been submitted and is in review by the agencies. Design is anticipated to be completed by November 2019.

Start Date: 05/23/2017	Primary Cost:	$0	Source:
End Date: 11/11/2019	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

Remedial Action

Remedial action to implement the remedial design.

Start Date: 12/02/2019	Primary Cost:	$0	Source:
End Date: 12/31/2020	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: Willow Boulevard/A-Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/27/2006**

Consolidation and capping of PCB-contaminated material.

Response Accomplishments: Completed

Remedial Investigation Initial PRP-generated RI/Focused Feasibility Study (FFS) report was rejected by the MDEQ who assumed responsibility for authoring the document under the terms of the AOC.

Start Date: 01/01/1993 Primary Cost: $7,000,000 Source: Private
End Date: 11/01/2004 Secondary Cost: $0 Source: <None>

PRP Oversight The MDEQ and its contractor conducted oversight of PRP activities including review of draft documents and field activities including groundwater sampling. Following rejection of the final PRP-authored draft of the RI/FFS, the MDEQ completed a Final RI/FFS report in November 2004, which transferred the lead to the EPA. In all, the MDEQ has spent about ~$235,000 of state funds on contractual services to assist with review, oversight, and writing of the RI/FFS report.

Start Date: 01/01/1993 Primary Cost: $0 Source: <None>
End Date: 11/01/2004 Secondary Cost: $235,000 Source: State

Interim Response 7,000 cubic yards of contaminated sediment were excavated from the river and river banks and placed on the landfill.

Start Date: 11/01/1999 Primary Cost: $100,000 Source: Private
End Date: 01/31/2000 Secondary Cost: $0 Source:

Remedial Design The remedial design was completed to consolidate PCB containing materials into the landfill and provide a landfill cap, landfill gas venting sytem, and storm water control.

Start Date: 03/11/2010 Primary Cost: $50,000 Source: Private
End Date: 05/04/2011 Secondary Cost: $0 Source:

Remedial Action The RA began on the Willow Boulevard Landfill in March 2011 and was certified construction and RA complete in September 2014.

Start Date: 03/31/2011 Primary Cost: $0 Source: Private
End Date: 09/30/2014 Secondary Cost: $0 Source:

Response Accomplishments: Ongoing

Operation and Maintenance PRP lead O & M is ongoing. Migration of landfill gas beyond the perimeter gas collection trench is being evaluated.

Start Date: 09/30/2014 Primary Cost: $0 Source: Private
End Date: 01/26/2046 Secondary Cost: $0 Source:

OPERABLE UNIT 03: King Highway Landfill

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 02/27/1998**

Landfill capped and river edge sheet piled. Groundwater and landfill gas are being monitored.

Response Accomplishments: Completed

Remedial Investigation The RI for the King Highway Landfill Operable Unit is complete.

Start Date: 01/01/1993	Primary Cost:	$4,250,000	Source: Private
End Date: 07/31/1997	Secondary Cost:	$0	Source:

Remedial Design Engineer Design Report submitted in lieu of RD report.

Start Date: 07/31/1997	Primary Cost:	$0	Source: Private
End Date: 06/01/1999	Secondary Cost:	$0	Source:

Interim Response PCB-contaminated material was excavated from the King Street Storm Sewer, the Former Georgia-Pacific Corporation Mill Lagoons, and from areas directly adjacent to the King Highway Landfill. All material consolidated and capped as part of the King Highway RA. Blasland, Bouck & Lee Inc. prepared Removal Action Summary Reports describing these removal actions in more detail.

Start Date: 11/01/1998	Primary Cost:	$0	Source: Private
End Date: 10/31/1999	Secondary Cost:	$0	Source:

Remedial Action The King Highway Landfill RA was to eliminate or reduce the potential migration of PCBs to the Kalamazoo River or reduce the risk associated with exposure to PCB-contaminated material. This RA included excavation and on-site containment of PCB-contaminated material from the landfill berms, former Georgia-Pacific Corporation lagoons, the landfill itself, and areas adjacent to the property by controlling the current and potential future release of contaminants. A construction completion report has been completed. Additional actions to address methane migration were implemented at a later date.

Start Date: 06/01/1999	Primary Cost:	$2,000,000	Source: Private
End Date: 06/26/2013	Secondary Cost:	$0	Source: <None>

OPERABLE UNIT 03: King Highway Landfill

Response Accomplishments: Ongoing

PRP Oversight

The MDEQ and its contractor have provided oversight of PRP activities including review of documents and site sampling activities. Over the life of the project the MDEQ has spent approximately $650,000 in contractor support for oversight activities (of which approximately $12,800 has been spent on the analysis of independently collected samples). PRP oversight will continue throughout the O & M phase.

Start Date: 01/01/1993	Primary Cost:	$650,000	Source: State
End Date: 07/29/2033	Secondary Cost:	$0	Source:

Recovered/ Reimbursed

The MDEQ continues to develop cost packages and recover costs related to PRP oversight at King Highway Landfill, which total over $795,000 to date.

Start Date: 08/20/2001	Primary Cost:	$0	Source: Private
End Date: 08/20/2021	Secondary Cost:	$0	Source:

Operation and Maintenance

The landfill has been capped and a Final O & M Plan is being implemented.

Start Date: 01/01/2003	Primary Cost:	$3,750,000	Source: Private
End Date: 01/30/2033	Secondary Cost:	$0	Source: <None>

OPERABLE UNIT 04: 12th Street Landfill

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/28/2001**

The ROD called for PCB-contaminated soil, sediment, and residual material that eroded from the landfill, into areas adjacent to the landfill, to be excavated and relocated back into the landfill. The landfill was capped and appropriate erosion control measures have been implemented.

Response Accomplishments: Completed

Remedial Investigation

The RI for the 12th Street Landfill OU is complete. The EPA is currently the lead agency for this OU.

Start Date: 03/01/1993	Primary Cost:	$0	Source: Private
End Date: 07/31/1997	Secondary Cost:	$0	Source:

OPERABLE UNIT 04: 12th Street Landfill

Response Accomplishments: Completed

PRP Oversight The MDEQ and its contractor conduct oversight of PRP activities including review of documents and oversight of field activities with a limited amount of samples sent to the lab for independent analyses. Over the life of the project, the MDEQ has spent approximately $90,500 in contractor support.

Start Date: 03/01/1993	Primary Cost:	$90,500	Source: State
End Date: 09/25/2012	Secondary Cost:	$0	Source:

Remedial Design The RD was completed in March 2010 by the PRP's consultant.

Start Date: 10/01/2003	Primary Cost:	$50,000	Source: Private
End Date: 03/12/2010	Secondary Cost:	$0	Source:

Emergency In the spring of 2007, Weyerhaeuser initiated Emergency actions at the 12th Street Landfill in anticipation of changes to river flow following removal of the Plainwell Dam. Action included excavation of material from the former powerhouse channel and regrading and stabilization of the east bank. This work was completed in 2008.

Start Date: 05/08/2007	Primary Cost:	$1,000,000	Source: Private
End Date: 03/31/2008	Secondary Cost:	$0	Source:

Remedial Action The RA began in March 2010 and was completed in September 2012, including final reporting.

Start Date: 03/12/2010	Primary Cost:	$0	Source: Private
End Date: 09/25/2012	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance PRP lead O & M is ongoing with an annual estimated cost of $60,000.

Start Date: 09/25/2012	Primary Cost:	$60,000	Source: Private
End Date: 09/25/2042	Secondary Cost:	$0	Source:

OPERABLE UNIT 07: Plainwell Mill

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/23/2015**

EPA selected Alternative 3B for OU7 which includes design sampling, excavation of soil, removal of the coal tunnel, verification sampling, backfilling, restoration, monitoring, and implementation of ICs. It is expected that by addressing the soil contamination at the site, that groundwater will achieve appropriate criteria.

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995088-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$327,000	$0	$0	$324,389	$0

Cooperative Agreement Number V975860-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$561,000	$0	$0	$560,622	$0

Cooperative Agreement Number V00E00999 : Open

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$700,000	$0	$0	$501,746	$73,443
Totals:	$1,588,000	$0	$0	$1,386,757	$73,443

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$24,625	$0	$0	$24,625	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$38,901	$0	$0	$38,901	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$3,598	$0	$0	$0	$0
Totals:	$67,123	$0	$0	$63,525	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Auto Ion Chemicals, Inc.
74 Mills Street
Kalamazoo , MI

County: Kalamazoo
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: C4
State Site ID#: 39000005
State Site Score: 36

LOCATION
This 1.5-acre site is located adjacent to the Kalamazoo River in an industrial area of the city of Kalamazoo, Kalamazoo County, Michigan. A residential area is about one block away and a city park and recreation area is located just upstream and across the Kalamazoo River. There is also a Conrail yard immediately upgradient of the site and across Mills Street. No water supply wells are impacted, but two municipal water supply wells are located within two miles of the site.

SITE HISTORY
The site was used as an electrical generating station by the city of Kalamazoo from about 1914 until 1956 when Consumers Power purchased the property and closed and decommissioned the power station. Auto Ion Chemicals, Inc., (Auto Ion) began operation in 1964. Auto Ion used the facility to store and treat electroplating wastes containing heavy metals and cyanide. The facility was abandoned in 1973 when Auto Ion's license to transport, store, and treat industrial wastes was not renewed. Company records have identified approximately 60 potentially responsible parties (PRPs). Liquid waste and sludges were stored at several locations including an unlined surface lagoon on-site. In addition, the building had five process storage tanks containing waste, and liquid waste had flooded the basement. Chromium, nickel, cyanide, mercury, arsenic, lead, vinyl chloride, 1,1-dichloroethane, 1,2-dichloroethane, bromodichloromethane, dibromochloromethane, benzo(b)fluoranthene, methylene chloride, 4-methyl-2-pentanone, acetone, carbon disulfide, trichloroethene, cadmium, and seven halogenated volatile organic compounds (VOCs) were among the contaminants detected in groundwater samples taken from the site.

Actions taken to date include an immediate removal action in 1982, building demolition in September 1986, and Operable Unit (OU)1 soil remedial investigation (RI) completion in June 1989. A Record of Decision (ROD), which addressed soil contamination, was signed in September 1989. In March 1993, an Explanation of Significant Differences (ESD) established a treatability variance for excavated soils contaminated with classified F006 waste. This treatability variance established alternate treatment standards for cadmium, chromium, nickel, and lead. Other aspects of the OU soil remedy are unchanged. A soil removal action out to the fence line and down to approximately 10 feet below ground surface was completed in November 1993. A second ROD, addressing groundwater contamination, was signed in September 1994. The state did not concur with this ROD because it allows continued venting of the contaminated groundwater plume, including bioaccumulatives, to the river at concentrations exceeding criteria pursuant to Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). The ROD called for monitored natural attenuation and alternate concentration limits (ACLs).

The PRP's consultants analyzed the data and submitted an ACL proposal document in June 2000 for groundwater discharging to the river. The proposed criteria were not acceptable to staff of the MDEQ/EPA. The PRPs June 2003 document entitled Review of Monitoring Results Rounds 1-20 proposed that the sampling parameters be scaled back. The review

of this document and proposals was comprised primarily of references to the Agency comment letter responding to the Preliminary ACL document.

In the first Five-Year Review (FYR) (September 30, 2001), the EPA delayed making a determination of protectiveness because of ACL exceedances.

In October and November 2003, the MDEQ, with encouragement from the EPA, conducted two rounds of groundwater sampling under random groundwater gradient conditions to assess the impact, if any, of the groundwater reversals on concentrations of contaminants in groundwater on-site. The report for this sampling was completed in 2004 and the data did not show statistically significant trends of contaminant concentrations up or down. Staff of the MDEQ also sampled for additional parameters beyond those being sampled for in the current monitoring program. Some parameters (i.e., Boron) were detected at concentrations significantly greater than Part 201 criteria. Review of field notes also revealed potential differences in sampling protocol between the various parties performing the work.

In the Second FYR (September 22, 2006), the EPA concluded that the remedy for the Auto Ion site is protective of human health and the environment in the short term. "To ensure the remedy continues to be protective in the long term, however, enforceable use restrictions running with the land and required by the OU2 ROD must be implemented. In addition, other Institutional Controls (ICs) or use restrictions may be necessary to ensure the long-term protectiveness of the remedy." An updated restrictive covenant was registered on June 11, 2013. The EPA began evaluation and implementation of additional issues and recommendations in 2012 and 2013.

The EPA completed the Third FYR in September 2011. The state did not agree with the EPA's conclusion that the remedy was performing as designed. The concentrations of contaminants had not dropped at the rates modeled and predicted by the PRPs in support of the ACL remedy.

Due to budget issues, this site was previously targeted as a low priority site and MDEQ involvement ceased. In 2012, the EPA requested MDEQ assistance for additional site investigation efforts.

The EPA required the PRPs to perform additional field work in 2012 to better understand groundwater flow direction and mass loading to the Kalamazoo River. The new data has revealed a previously underestimated westerly component of flow. A second phase of the river sampling field work was deemed necessary and took place in October 2014.

The EPA works with the responsible parties to manage the site. The MDEQ, in a letter dated May 5, 2015, notified EPA that "...we have determined that it is unlikely that the State of Michigan would consider current groundwater monitoring well concentrations to represent an unacceptable discharge to the Kalamazoo River at this time. Although there are periodic exceedances of some parameters, including the bio-accumulative toxics arsenic and mercury, the concentrations of the eight site chemicals of concern currently monitored in the Point of Compliance wells, do not regularly exceed the estimated site-specific GSI [groundwater/surface water interface] criteria and may not constitute an exposure concern." The site-specific GSI criteria needs to be updated to accurately represent the discharge zone.

Due to budget issues, this site was again targeted as a low priority site and MDEQ involvement ceased in 2015.

SITE STATUS

n fall was contacted by the alama oo ounty and an and participated in discussions regarding the possibility of including the Auto Ion property in potential brownfield redevelopment opportunities.

ENFORCEMENT STATUS

This site is a federal-lead site with the PRPs doing the work. The PRPs have secured GHD (formerly Conestoga-Rovers & Associates, Inc.) for the groundwater monitoring.

The PRPs are liable under the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, as amended. No determination about liability under Part 201 has been made.

The PRPs worked with MDEQ enforcement staff to complete a Restrictive Covenant (RC) for the property. The final RC was placed on June 11, 2013.

OPERABLE UNITS

00	Entire Site
01	Soil
02	Groundwater

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Emergency — The EPA did an emergency removal in 1982. The EPA's costs were subsequently recovered from the PRPs.

Start Date:	*04/30/1982*	Primary Cost:	$1,500,000	Source: Private
End Date:	*07/30/1982*	Secondary Cost:	$0	Source:

Remedial Investigation — Private funding costs were secured from PRP estimates.

Start Date:	*09/08/1983*	Primary Cost:	$495,000	Source: Private
End Date:	*06/01/1989*	Secondary Cost:	$5,000	Source: Federal

5 Year Review — The 2001 FYR was completed on September 30, 2001. The EPA determined that the ACL exceedances at the time made the determination of protectiveness difficult. The protectiveness determination was delayed.

Start Date:	*09/07/2001*	Primary Cost:	$29,000	Source: Federal
End Date:	*09/30/2001*	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review MDEQ staff provided a detailed letter of issues to the EPA in preparation for the 2006 FYR. While all of the issues were discussed or at least mentioned in the document, MDEQ staff did not agree with several of the assessments made.

Start Date: 03/27/2006	Primary Cost:	$0	Source:
End Date: 09/29/2006	Secondary Cost:	$0	Source:

5 Year Review MDEQ staff did not agree with the EPA's assessment that the remedy is functioning as designed and is protective of human health and the environment.

Start Date: 10/18/2010	Primary Cost:	$0	Source:
End Date: 09/01/2011	Secondary Cost:	$0	Source:

5 Year Review The FYR OU1 Protectiveness Statement indicates the remedy is currently protective and "...in order for the remedy to be protective in the long term, EPA should complete an ESD to incorporate ICs related to soils as part of the OU1 remedy, and the PRPs should complete a LTS [long-term stewardship] Plan to define actions needed to confirm the integrity of the remedy and to ensure that ICs remain in place and continue to be effective."

The FYR OU2 Protectiveness Statement indicates the remedy is currently protective and "...in order for the remedy to be protective in the long term, the PRPs should complete a LTS Plan..., conduct further evaluation of the data collected during the surface water investigation to determine if there are potential risks to the river, and, if an unacceptable risk due to contaminants of concern in pore water is identifeid, the PRPs should review the algorithm used to evaluate ACL exceedances to determine if it needs to be revised and/or if additional action(s) need to be taken."

Start Date: 05/05/2015	Primary Cost:	$0	Source:
End Date: 08/30/2016	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

5 Year Review Estimated dates based on 8/30/2016 signature of last FYR.

Start Date: 08/01/2020	Primary Cost:	$0	Source:
End Date: 08/30/2021	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Soil

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 09/27/1989**

The ROD calls for excavation, off-site treatment via stabilization, and off-site disposal of approximately 7,200 cubic yards of contaminated soil. Soil removal down to 10 feet below ground surface and out to the site perimeter fence.

Record of Decision *Amendment:* 00 *ESD:* 1 **Effective 03/26/1993**

This ESD establishes a treatability variance for excavated soils contaminated with classified F006 waste. This treatability variance establishes alternate treatment standards for cadmium, chromium, nickel, and lead. Other aspects of the OU soil remedy are unchanged.

Response Accomplishments: Completed

Remedial Design Private cost totals were secured from PRP estimates. Remedial design (RD) estimated as 10 percent of the PRPs reported RD/remedial action (RA) costs.

Start Date: 02/01/1993	Primary Cost:	$480,000	Source: Private
End Date: 03/01/1993	Secondary Cost:	$305,000	Source: Federal

Remedial Action Private expenditures estimated by the PRPs.

Start Date: 04/01/1993	Primary Cost:	$4,000,000	Source: Private
End Date: 11/01/1993	Secondary Cost:	$154,000	Source: Federal

OPERABLE UNIT 02: Groundwater

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 09/23/1994**

The selected remedy includes the establishment of ACLs to be used as action levels for the monitoring of groundwater discharging to the Kalamazoo River. The remedy also includes groundwater monitoring, ICs, and development of a RA plan to be implemented in the event ACLs are exceeded.

Response Accomplishments: Completed

Remedial Investigation The OU for soil RI was amended to include the OU for groundwater. Federal costs are from EPA records.

Start Date: 09/08/1983	Primary Cost:	$320,000	Source: Private
End Date: 11/01/1993	Secondary Cost:	$55,000	Source: Federal

OPERABLE UNIT 02: Groundwater

Response Accomplishments: Completed

Remedial Design Groundwater monitoring system design and ACL. Private expenses are estimated based on 10 percent of the PRP reported RD/RA costs. Federal expenses as reported in the EPA information.

Start Date: 02/01/1993	Primary Cost:	$36,000	Source: Private
End Date: 11/01/1997	Secondary Cost:	$11,000	Source: Federal

Remedial Action Well installation and vertical aquifer sampling. Private costs secured from PRP estimates.

Start Date: 11/02/1997	Primary Cost:	$324,000	Source: Private
End Date: 11/02/1998	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance Includes long-term monitoring, data review, and contingency plan. The site will be closed out once the cleanup criteria have been met for a satisfactory period of time. Cost estimates are secured from ROD estimates. The operation and maintenance process is ongoing.

Start Date: 11/02/1998	Primary Cost:	$355,000	Source: Private
End Date: 11/02/2048	Secondary Cost:	$0	Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$9,044	$0	$0	$9,044	$62

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$40,000	$0	$0	$40,000	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$92,581	$0	$0	$91,997	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995260-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$4,539	$0	$0	$4,538	$0

Cooperative Agreement Number V995258-03 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$24,783	$0	$0	$24,782	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$685	$0	$0	$685	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$14,987	$0	$0	$14,987	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$9,967	$0	$0	$9,967	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$100,000	$0	$0	$99,958	$0
Totals:	$296,586	$0	$0	$295,958	$62

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: KL Avenue Landfill
8606 West K L Avenue
Kalamazoo , MI

County: Kalamazoo
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: 37
State Site ID#: 39000017
State Site Score: 34

LOCATION
The KL Avenue Landfill is a closed sanitary landfill located on 87 acres in Oshtemo Township, west of the city of Kalamazoo, in Kalamazoo County, Michigan, a light residential area. In the early 1960s, it was a garbage dump for the township but became a county sanitary landfill in 1968 that also accepted industrial waste. Three surface water bodies, Dustin Lake, Springwood Lake, and Bonnie Castle Lake are located nearby. There are many residences that have historically relied on private wells for drinking water in the vicinity of the site. Many of these wells closest to the site were abandoned as municipal water was extended to the affected areas.

SITE HISTORY
From 1968 to 1979, the site operated as a county sanitary landfill. The landfill was ordered closed by the Michigan Department of Natural Resources in May 1979, after volatile organic compound (VOC) contamination was discovered in ten domestic wells. Many residential wells were closed and 36 homes were connected to municipal water mains by Kalamazoo County. Eleven private wells were replaced with deeper wells. Beginning in 1997, municipal water was extended to residents in subdivisions to the northwest of the site after contamination was found in several domestic wells. It is suspected that this contamination is site-related.

In 1980, as part of the site closure plan, a partial bentonite clay cap was placed on the landfill to reduce soil permeability and retard contaminant migration. Gas monitoring wells, soil gas probes, and gas vents were also installed on the landfill to provide information on methane generation and to vent the facility.

The site was placed on the National Priorities List in September 1983. The EPA initiated a remedial investigation/feasibility study (RI/FS) to determine the nature and extent of contamination and to evaluate cleanup alternatives; this was completed in September 1990. On September 28, 1990, the EPA issued a Record of Decision (ROD) that describes the selected cleanup alternative for this site. This alternative requires the extraction and treatment of contaminated groundwater and a modified Resource Conservation and Recovery Act, 1976 PA 94-580, as amended (RCRA) Subtitle C cap over the landfill contents.

There is a large plume of groundwater contamination that has migrated west of the site. Levels of contamination in the groundwater exceed federal and state drinking water standards. If unabated, the contaminants may cause health problems for residents drinking the water over a lifetime.

Kalamazoo County and Oshtemo Township continue to own the site. The site remains closed and has not received any wastes since May 1979. In 2001, work on the remedial design (RD) was placed on hold pending a study, by the potentially responsible parties (PRPs) and the EPA in conjunction with the MDEQ, into the possibility of utilizing bioremediation to remedy both the contaminated groundwater and the landfill material.

Originally, the cost of the study was to be split between the EPA and the PRPs. However, due to severe budget cutbacks, the EPA was unable to fund their portion of the study. The PRP group agreed to fund the entire study. The study began in mid-1996 and was completed by the end of 1997. The results of the study indicated that some of the primary contaminants of concern in the landfill contents and leachate were indeed biodegradable, although time has shown that the rate of degradation was insufficient to prevent the expansion of the plume, and several contaminants are recalcitrant to biodegradation.

In 1998 and again in 1999, the PRPs conducted a mass water level survey of domestic wells and monitoring wells in downgradient and crossgradient locations from the landfill in order to determine how the local hydrology interacts with the regional hydraulic discharges. The results of these mass water level surveys are evaluated in light of current groundwater contamination data to determine if monitored natural attenuation (MNA) remains an appropriate remedy for the groundwater plume. The nature and extent of groundwater contamination led the EPA and the MDEQ to request that the PRPs design and implement some type of source control for the groundwater contamination emanating from the landfill. The PRPs investigated semi-passive, in-situ measures that can manage and remediate contaminated groundwater emanating from the landfill property. A remedy proposal was submitted to the EPA and the MDEQ in the form of a second focused FS in the fall of 2001 and a third focused FS was submitted in the fall of 2002.

Additional groundwater contamination was discovered during residential well monitoring in 1999 in a subdivision located approximately 1-1/2 miles northwest of the site. These residents were provided with bottled water until municipal water was provided during the fall of 1999. In addition, the PRPs conducted a groundwater investigation in this area to delineate the problem and eventually installed monitoring wells in the area; these are sampled semiannually.

In 2002, the MDEQ investigated the groundwater/surface water interface (GSI) at the two nearby lakes and has detected contamination at levels just below maximum contaminant levels (MCLs). It is likely that this contamination is associated with the landfill. In addition, in the Springwood Hills subdivision northwest of the landfill, there was a seepage area that contained contamination at concentrations exceeding the MCLs. The MDEQ completed an investigation in this area and found that the source was an area of buried and decomposing vegetation. In July 2003, the MDEQ installed a seepage collection system to collect this seepage and direct it into the ground to eliminate its surface expression. In 2002, the MDEQ performed vertical soil gas surveys near the landfill and close to nearby residences to determine if landfill gas migration was an imminent threat at the site. While the MDEQ found elevated levels of methane exist in the soil gas near the landfill, methane was not detected near any of the nearby residences.

In November 2002, the MDEQ sampled monitoring wells and performed a reconnaissance of a salvage yard downgradient of the landfill to help determine if this property is an additional source of groundwater contamination that has been detected in residential wells in a nearby subdivision. This initial phase of investigation was followed by soil and groundwater sampling at the salvage yard and other nearby properties during the 2005 field season - no sources of contamination were found. The MDEQ had identified four other potential contaminant source areas northwest of the landfill that were investigated in the spring/summer of 2008 at state expense. Results of this investigation determined that the contaminated groundwater had originated from the landfill and not the other potential sources.

The PRPs had at one time proposed the pilot testing of two innovative remedial technologies. For the groundwater contamination, a sulfate solution would be amended to

the groundwater to stimulate bacteria capable of metabolizing the VOC contamination in the leachate contaminated groundwater. The PRPs had also proposed Enhanced Landfill Gas Extraction of the landfill contents. The Enhanced Landfill Gas Extraction system would apply a vacuum to the landfill contents and remove and destroy VOCs at the source, preventing them from entering the groundwater. In February 2004, the Agencies rejected the Enhanced Landfill Gas Extraction/Sulfate addition as not equivalent to a cap for the long-term protection of the groundwater. The pilot testing of these technologies was not conducted by the PRPs.

The EPA initiated a ROD Amendment in 2002 to address the potential risk to nearby residents should the plume expand and affect additional residential wells. The EPA had established a service area within which the PRPs must supply residents with municipal water. This service area encompassed all of the groundwater contamination known at the time to be associated with the landfill and included a small buffer zone. The MDEQ concurred with this ROD Amendment which was signed by the EPA on February 27, 2003.

During the 2002 construction season Oshtemo Township (also a PRP) extended municipal water to residents both within and outside the EPA defined service area to supply municipal water to residential areas that are in areas where contamination levels are present but below MCLs. The MDEQ contributed approximately $82,000 towards this project to supply clean water to an area of groundwater contamination that has not definitely been linked to the landfill, but exists in exceedance of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), drinking water criteria.

In February 2004, Oshtemo Township requested an informal dispute resolution action by the EPA to reevaluate the EPA's decision to uphold the ROD and require an impermeable cap on the KL Avenue Landfill.

The dispute by the township was dropped, the landfill capping resumed, and was completed in October 2006. The PRPs agreed to install a portion of the Enhanced Landfill Gas Extraction system as part of the cap construction. In March 2008, the PRPs converted the existing passive gas venting system to an active gas system by installing a flare and condensate pumping system to accelerate the landfill contaminant destruction prior to its leaching to the groundwater.

In early 2004, a new contaminant (1,4 dioxane) was found in both monitoring and residential wells above drinking water criteria throughout the site. The detection of this compound at the downgradient edge of the buffer zone established by the EPA in their 2003 ROD Amendment necessitated consideration of an expanded buffer zone at its downgradient edge to include an additional 1000 feet of property.

The PRPs submitted a revised petition to substitute MNA for the ROD specified pump and treat (P & T) of the groundwater. This document was reviewed and commented to by the MDEQ. The EPA issued a ROD Amendment in 2005 to change the groundwater remedy from P & T to MNA. The MDEQ did not concur with this ROD Amendment primarily due to the uncertainties in the definition of the extent of groundwater contamination (1,4 dioxane) to the northwest, and the lack of adequate institutional controls (ICs) to limit access to contaminated groundwater.

The EPA issued the First Five-Year (FYR) Review report in May 2009. The FYR concluded the remedy was protective in the short-term but made several recommendations for additional actions needed to ensure the remedy remains protective in the long-term.

s the groundwater contamination plume continues to expand the PRPs extended municipal water to homes in the affected areas. In November 2013, municipal water hook-ups were provided to seven residences that accepted connection agreements.

In December 2013, in November 2014 and again in 2015 the PRPs met with Kalamazoo County Health Department and Van Buren/Cass District Health Department representatives to discuss recent residential monitoring results in Van Buren County and future actions that need to be taken to deal with potential plume migration to Van Buren County including groundwater use contingency measures.

In 2013, the MDEQ staff reviewed Work Plans prepared by the PRPs for additional investigative work in the plume area as well as proposal for a groundwater use restriction zone at the KL Avenue Landfill site. Approval of the most recent groundwater use restriction proposed by the PRPs that precludes the Chaddsford Way Subdivision, required issuing an Explanation of Significant Difference (ESD). The ESD was signed by the EPA on June 23, 2014.

Also on May 9, 2014, the EPA signed the Second Five-Year Review report for this site. The EPA deferred protectiveness of the current remedy until such time that the following actions are taken: source control/contingent remedies to reduce 1,4-dioxane and tetrahydrofuran concentrations in the groundwater; continue characterizing the movement and full extent of groundwater contamination northwest of the landfill; and investigate the presence of methane gas at nearby structures and, if needed take appropriate measures. It is expected that these actions will take approximately two years to complete, at which time a protectiveness determination will be made.

Public Hearing on the Groundwater Use Restricted Zone was held on June 2, 2015. Again, in 2015 the PRPs met with the Kalamazoo County Health Department and the Van Buren/Cass District Health Department officials as noted above.

Pursuant to the Kalamazoo County Sanitary Code, Kalamazoo County approved the PRP's application for a groundwater use restricted zone on December 2, 2015. This formally implements iICs in the areas where groundwater results have been reported above the Part 201 standards and a 1000 foot downgradient buffer zone.

The Kalamazoo Board of Commissioners approved the Groundwater Use Restricted Zone amendment to the Kalamazoo County Sanitary Code at its January 19, 2016 meeting.

The MDEQ and the EPA reviewed the "Second Five-Year Evaluation of Monitored Natural Attenuation" document submitted by the PRPs pursuant to the Consent Decree. Further, the Agencies received and approved the Institutional Control Implementation and Assurance Plan (ICIAP) submitted by the PRPs in May 2015.

SITE STATUS

Operation and maintenance (O & M) of the landfill cap system continues including quarterly site inspections and monitoring of the perimeter gas probes in accordance with the June 2007 Landfill Cap Operation and Maintenance Plan.

MDEQ staff reviewed the “2017 Residential Well Replacement Plan” document submitted by the PRPs and provided written comments.

On July 27, 2017, MDEQ staff reviewed the “Irrigation Well Waiver Requests” document dated May 9, 2017, prepared and submitted by the PRP Consultant on behalf of 21 owners of residential water supply and/or irrigation wells and provided recommendation to the Kalamazoo County Health and Community Services, Environmental Health Director.

of residential water supply and or irrigation wells and provided recommendation to the alama oo ounty Health and ommunity ervices nvironmental Health irector.

In May 2017, MDEQ staff reviewed “Propane Biosparge Bench Scale Field Study Work Plan” submitted by the PRP Consultant and provided written comments.

In August 2017, MDEQ staff reviewed and provided written comments on the “Work Plan-For Supplemental Hydrogeologic Investigations, West KL Avenue Landfill Site “ document prepared by Golder Associates.

In Spring/Summer 2017, remaining residents within the restriced zone were connected to municipal water.

The agencies are reviewing the addendum to the second FYR and have determined that in order for the remedy to be protective in the long term, the following actions need to be taken to ensure protectiveness: fully evaluate potential contingent remedies and emerging technologies against the nine National Contingency Plan (NCP) criteria; implement a contingent remedy to prevent further downgradient migration of the contaminant plume; continue providing municipal water connections (Kalamazoo County) and new potable wells (Van Buren County) to residents with 1,4-dioxane in their well water at or above 7.2 parts per billion (ppb); as an interim measure, continue offering bottled water to residents with concentrations in well water at or above 7.2 ppb until the home is connected to municipal water or a new potable well is installed; amend the ICIAP to include ICs for impacted homes in Van Buren County; modify the decision document to incorporate the new 1,4-dioxane drinking water criterion, ICs, and alternate water supplies for impacted Van Buren County homes; and install additional wells between Fish Hatcheries Road and wetland area to further characterize the 1,4-dioxane groundwater plume.

The PRP Group is conducting bench-scale study to enhance the microbial degradation of 1,4-dioxane through cometabolic oxidation processes utilizing specific strains of bacteria capable of aerobically degrading the chemical.

There is a proposed municipal agreement for Almena Township and other municipalities that would allow residents to connect to the existing water main along VanKal that runs from W.J Ave and M-43. This option is being made available to the residents in the area as there are two or three residential locations that have low level detection of 1,4-dioxane along VanKal.

ENFORCEMENT STATUS

The EPA and a group of PRPs successfully negotiated a Consent Decree for performance of the selected Remedial Action. The PRPs have conducted all site-related response activities since 1992. No liability determination has been conducted under Part 201.

The EPA, in consultation with the MDEQ, renegotiated the site Consent Decree and Scope of Work with the PRPs to include the extension of municipal water to residents within a buffer zone as described in the February 27, 2003, ROD Amendment. This Consent Decree underwent further revision to encompass the requirements and obligations of a MNA solution to the groundwater contamination problem as described in the 2005 ROD Amendment.

SPECIAL CONSIDERATIONS

Oshtemo Township, Kalamazoo County, and the city of Kalamazoo have received $911,428 from the state through the Municipal Landfill Cost-Share Grant Program to cover 50 percent of their 1996 through 2005 expenses.

The state previously allocated $100,000 to extend municipal water to residents surrounding the landfill. This money was not spent because the PRPs assumed the costs of extending municipal water to affected residents. The MDEQ provided funds ($82,000) to Oshtemo

Township in 2003 to extend municipal water to the residents living on north 4th Street between Almena Drive and M-43 as part of a larger Oshtemo Township project to extend municipal water to properties that have contaminated groundwater or are in the path of contaminated groundwater movement. The portion funded by the MDEQ provides municipal water to several residences whose private wells have been affected by groundwater contamination not easily associated with the landfill.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 09/28/1990**

The ROD requires installation and maintenance of a cap and a gas venting system on the landfill. It also calls for installation and operation of a groundwater extraction and treatment system using a fixed film bioreactor. The remedy also includes deed restrictions or other ICs restricting use of the shallow groundwater and prohibiting construction on the landfill cap.

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 02/27/2003**

On February 27, 2003, the EPA signed a ROD Amendment to add provisions for municipal water to be extended throughout the known area of groundwater contamination and also a buffer zone downgradient of this contamination. This component of the remedy also includes abandonment of private drinking water wells and enactment of ICs to prevent the use of the affected groundwater as a drinking water source. This amendment did not alter the components of the remedy selected in the 1990 ROD.

Record of Decision *Amendment:* 2 *ESD:* 0 **Effective 09/12/2005**

On September 12, 2005, the EPA signed a ROD Amendment that changed the groundwater remedy from P & T to MNA. The state did not concur with this change as the areal extent of the 1,4 Dioxane groundwater contamination has not been delineated and the area of proposed IC described in the Amendment did not encompass the contamination and provided no buffer zone downgradient to address uncertainties associated with the distribution of the contamination.

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 2 *ESD:* 1 **Effective 06/23/2014**

The EPA signed the ESD in June 2014 to allow potable groundwater use for existing wells within the municipal water supply zone (e.g., Chaddsford Way Subdivision), provided certain conditions are met.

Response Accomplishments: Completed

Alternate Water The county replaced 11 residential wells with deeper wells. The cost of this effort is unknown.

Start Date: 01/01/1980	Primary Cost:	$0	Source: Private
End Date: 12/31/1980	Secondary Cost:	$0	Source:

Alternate Water The county installed a new water main for 36 residences in 1980 and for several residents in distant subdivisions in 1997, 1999, 2000, 2002, 2004, and 2013. The cost of this effort is unknown.

Start Date: 01/01/1980	Primary Cost:	$0	Source: Private
End Date: 12/29/2013	Secondary Cost:	$0	Source:

Remedial Investigation

Start Date: 01/01/1985	Primary Cost:	$1,334,000	Source: Federal
End Date: 12/31/1990	Secondary Cost:	$49,540	Source: State

Remedial Design The RD was on hold while pre-design investigations were being completed by the PRPs. Design of an impermeable cap resumed in 2002 and was completed by the EPA's deadline of August 2004.

Start Date: 08/01/1992	Primary Cost:	$1,200,000	Source: Private
End Date: 08/01/2004	Secondary Cost:	$140,000	Source: Federal

Remedial Investigation Supplemental investigation of potential off-site contamination sources, GSI discharges, and methane migration. Some of the groundwater discharge has been found in Dustin Lake, but indications from upgradient wells show little potential for discharge to the lake above generic GSI criteria. The MDEQ conducted a limited soil gas survey of the nearest residents to the landfill to determine if there was an acute methane migration problem. The remainder of this investigation was conducted by the PRPs. Other potential off-site contaminant source areas on the former Minott property were investigated by the MDEQ during the summer and fall of 2005. Investigation of the remaining properties was completed in the fall of 2008 and confirmed that the source of contamination is within the confines of the landfill.

Start Date: 07/02/2001	Primary Cost:	$285,000	Source: State
End Date: 10/31/2008	Secondary Cost:	$0	Source: <None>

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Alternate Water The state started a monitoring program for residential wells surrounding the KL Landfill groundwater contamination that are threatened by groundwater contamination sources that do not seem associated with the landfill. The state financed the extension of municipal water to the homes between Almena Drive and M-43 on 4th Street at a cost of ~$82,000. Additional homes were connected to municipal water as the PRPs complied with the February 27, 2003, ROD Amendment.

Start Date: 07/08/2002	Primary Cost:	$3,000,000	Source: Private
End Date: 11/29/2003	Secondary Cost:	$82,000	Source: State

Alternate Water Municipal water extension (per 2003 ROD Amendment) to residents along 2nd Street, Almena Drive, M-43.

Start Date: 09/01/2004	Primary Cost:	$0	Source: Private
End Date: 05/01/2005	Secondary Cost:	$0	Source: Private

Remedial Action This cost reflects the PRP's estimates of a modified RCRA Type C cap, MNA, and sulfate addition to the groundwater near the landfill. The EPA wrote a ROD Amendment in 2005 to change the groundwater remedy from P & T to MNA. Preparations for capping the landfill began in the fall of 2005 with the majority of the cap construction completed during the 2006 field season.

Start Date: 10/01/2005	Primary Cost:	$25,150,985	Source: Private
End Date: 06/07/2007	Secondary Cost:	$0	Source:

5 Year Review The EPA issued the First FYR report in May 2009. The FYR concluded the remedy was protective in the short term but made several recommendations for additional actions needed to ensure the remedy remains protective in the long term. MDEQ staff sent a letter dated September 14, 2009, to the EPA expressing concerns about the omission of relevant issues and recommendations suggested by the MDEQ.

Start Date: 12/10/2008	Primary Cost:	$0	Source: Federal
End Date: 05/11/2009	Secondary Cost:	$0	Source:

5 Year Review The Second FYR for this site was completed in May 2014. The EPA deferred protectiveness of the current remedy until such time that the following actions are taken: source control/contingent remedies to reduce 1,4-dioxane and tetrahydrofuran concentrations in the groundwater; continue characterizing the movement and full extent of groundwater contamination northwest of the landfill; and investigate the presence of methane gas at nearby structures and, if needed take appropriate measures.

Start Date: 08/04/2013	Primary Cost:	$0	Source:
End Date: 05/09/2014	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: In Progress

Interim Response Residential well monitoring for homes not monitored by the PRPs is being performed for the MDEQ by the Kalamazoo County Health Department. The PRPs installed municipal water at 13 residences and abandoned 13 private residential wells on First Street in 2008. The PRPs completed (June 2010) installation of a water main loop from West Main Street to 22nd Street to J Avenue to Wickford Drive back to West Main Street. The construction took about two months to complete. More similar work is anticipated in 2017 going forward.

Start Date: 01/01/1979 Primary Cost: $50,000 Source: State
End Date: 12/28/2020 Secondary Cost: $0 Source:

Response Accomplishments: Ongoing

Operation and Maintenance Ongoing O & M of the constructed remedy. The PRPs are maintaining the landfill cap and the active gas collection system on an ongoing basis.

Start Date: 06/07/2007 Primary Cost: $0 Source: Private
End Date: 07/01/2036 Secondary Cost: $0 Source:

Response Accomplishments: Future Need

Remedial Action The PRP Group needs to implement a contingent remedy to prevent plume expansion.

Start Date: 04/23/2018 Primary Cost: $0 Source:
End Date: 04/23/2019 Secondary Cost: $0 Source:

5 Year Review The EPA will conduct the third FYR in 2019.

Start Date: 08/04/2018 Primary Cost: $0 Source:
End Date: 05/09/2019 Secondary Cost: $0 Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$24,882	$0	$24,882	$24,882	$24,882

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$117,239	$0	$0	$115,326	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$33,154	$0	$0	$33,154	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$12,498	$0	$0	$12,498	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$16,196	$0	$0	$16,196	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$37,804	$0	$0	$37,804	$0

Cooperative Agreement Number V995260-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$19,901	$0	$0	$19,901	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$42,975	$0	$0	$42,975	$4,786

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$49,540	$0	$0	$49,540	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$179,631	$0	$0	$179,512	$0
Totals:	$533,820	$0	$24,882	$531,787	$29,668

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Michigan Disposal (Cork St LF)
2800 East Cork Street
Kalamazoo , MI

County: Kalamazoo
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: Q2
State Site ID#: 39000010
State Site Score: 31

LOCATION
The landfill is located in the southeastern portion of the city of Kalamazoo. The landfill is bounded to the north by Cork Street where the entrance is located, Conrail Railway to the west, Interstate I-94 to the south, and both Davis Creek and a Grand Trunk Western Railway line to the east. The area surrounding the landfill is immediately bordered by a wetland area and a county drain. Otherwise, the landfill area is generally industrial/commercial in nature.

SITE HISTORY
The Michigan Disposal site, also known as the Cork Street Landfill, was operated as a general refuse landfill from 1925 to 1968. It was owned and operated by the city of Kalamazoo from 1961 to 1968, during which time a Wilco incinerator was operated on-site. The site was sold to the Dispos-O-Waste Company (later becoming Michigan Disposal), which operated a Type III landfill on top of the old municipal landfill until mid-1992.

Various contaminants have been found in the groundwater. Benzene, at 150 parts per billion (ppb), and lead, at 28 ppb, are above the state Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA) drinking water cleanup standards of 5 ppb and 4 ppb, respectively. There are no private wells in use near the site. It is believed that historical early operations at the site are the primary cause of the contamination.

The site was placed on the federal National Priorities List on February 21, 1990. The potentially responsible parties (PRPs) completed a remedial investigation/feasibility study (RI/FS) in 1991. These studies were conducted to determine the nature and extent of the contamination and to evaluate remedial alternatives. The EPA issued a Record of Decision (ROD) in September 1991, selecting a groundwater purge and treatment remedy and the installation of an enhanced landfill cap. Design of the landfill cap portion of the remedial action (RA) was completed in 1999. The RA construction of the landfill cap, that began in April 2000, was completed in 2002.

In lieu of implementing the ROD groundwater remedy of purging and treating groundwater prior to entering Davis Creek, the city requested a mixing zone determination from the MDEQ. After evaluation by the MDEQ Surface Water Quality Division, it was determined that a mixing zone was allowable. The mixing zone approval is contingent upon an acceptable Groundwater Monitoring Plan being put into place and continued compliance with the allowable discharge criteria. A ROD Amendment was issued September 25, 2002, with state concurrence.

The site Operation and Maintenance (O & M) Plan was approved in 2004.

A Five-Year Review (FYR) of the protectiveness of the remedy was completed in December 2004. This review stated that the remedy is considered protective in the short term because there is no evidence of a cap breach, groundwater use, or exceedance of groundwater

surface water interface (GSI) calculated mixing zone criteria and thus no current exposure. It went on to say, however, since the gas probes were not installed, there was no data to positively affirm that landfill gas was not escaping the landfill and migrating laterally. Therefore, in order for the remedy to be demonstrated to be protective and to remain protective in the long-term, the gas probes were installed in October 2005 and monitoring of landfill gas commenced. Two probes revealed elevated gas concentrations. The FYR also identified a concern with contaminated leachate potentially venting to the ground surface and also possible problems with the condition of the gas vents.

The zinc and arsenic concentrations in groundwater have been found to exceed criteria in some sampling rounds and specific wells. In October 2005, additional groundwater monitoring wells (including the replacement of galvanized wells) were installed adjacent to existing wells to better understand the elevated concentrations. Installation of required gas probes was also performed in October 2005. Data was received from the PRPs late in 2006 revealing elevated gas levels existing only at the toe of the cover and not above criteria in nearby buildings. Additional data collected in 2008 and 2009 revealed extremely high methane concentrations in probes and manholes on site.

Due to budget issues, this site has been targeted as a low priority site since the 2010 FYR. The remedy is considered to likely be protective in the short term. The 2010 FYR concluded that in order for the remedy to remain protective in the long term, implementation of the Institutional Controls (ICs) was necessary and noted that further evaluation of the elevated site methane levels and potential leachate from the site were needed. MDEQ staff is only minimally involved in this site at this time.

The EPA and the PRPs began investigations in early 2012 to determine the impact and potential migration of the methane gas from the Michigan Disposal Landfill.

In early 2014, the EPA requested MDEQ technical assistance in preparation for the 2015 FYR (third FYR). On June 30, 2014, MDEQ sent a letter to the EPA stating concerns regarding following issues; methane, GSI, Mixing Zone Determination, gas probe construction, groundwater and surface water collection procedures and the "seep area" continue to be items of concern. In addition to this letter, MDEQ staff also provided review and comments regarding the need for updated Restrictive Covenants (RCs) and provided specific revisions to the draft ICs study submitted by the PRPs in early 2015. EPA finalized the third FYR on September 29, 2015, stating following remedy performance recommendations; i) localized settlement in the cap near many of the passive gas vents areas should be corrected by filling them with top-soil, re-grading the surface to promote proper runoff and restoring the vegetation; and ii) replace or repair the inoperable turbine tops for long-term functionality to reduce landfill gas pressure and gas migration. Furthermore, EPA recommended to develop an Long-Term Stewardship Plan and complete and record environmental restrictive covenants to ensure that implemented ICs are effective and properly maintained, monitored and enforced.

In 2016-2017, the PRP group conducted quarterly landfill inspections and O & M activities, bi-annual landfill gas and groundwater monitoring events. During quarterly O & M activities, the PRP group completed maintenance in several areas to address the 2015 FYR remedy performance related concerns; this included filling various settled areas around gas vents, repair of animal burrows, gas turbine repairs, and fence repairs.

SITE STATUS

On October 4, 2013, the PRP group submitted a revised petition to EPA for the current GSI Monitoring Plan to a reduced semi-annual and annual monitoring schedule. A response to the request is still pending. However, EPA has verbally approved that the frequency of the GSI Monitoring can be reduced to semi-annually.

MDEQ staff also provided review and comments regarding the need for updated RCs and provided specific revisions to the draft ICs study submitted by the PRPs in early 2015. This document is still pending as well.

ENFORCEMENT STATUS
The city of Kalamazoo and Michigan Disposal entered into an Administrative Order by Consent (Order) with the EPA in December 1987. Kalamazoo County and Upjohn Company (now Pharmacia) are contributing parties under the Order. The Order directs that the selected ROD remedy be implemented at the landfill. The MDEQ was also involved in litigation with the PRPs regarding the licensing and proper closure of the site under Part 115, Solid Waste Management, of the NREPA. Due to the Order, the EPA is the primary enforcement authority for the site.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/1991**

The EPA ROD called for capping of the landfill and installation of a groundwater treatment system with extraction wells to capture migrating groundwater.

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 09/25/2002**

The EPA issued a ROD amendment with utilization of the state's Mixing Zone Determination. The concentrations of contaminants leaving the site are thought to be low; not high enough to justify the implementation of a pump and treat groundwater treatment system.

Response Accomplishments: Completed

Remedial Investigation The RI/FS was conducted by the city of Kalamazoo.

Start Date: 12/15/1987 Primary Cost: $500,000 Source: Private
End Date: 09/30/1991 Secondary Cost: $34,000 Source: Federal

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Design The remedial design (RD) was conducted by the city of Kalamazoo. This includes Pre-RD/GSI monitoring, which provided information to seek a Mixing Zone Determination from the state. The Mixing Zone was allowed contingent upon continued monitoring to show compliance.

Start Date: 10/01/1998	Primary Cost:	$600,000	Source: Private
End Date: 11/30/1999	Secondary Cost:	$139,000	Source: Federal

Remedial Action Note: The city of Kalamazoo has been awarded $3,210,285 in state funding under the Michigan Landfill Cost-Share Grant Program to help offset their costs for construction of the landfill cap and associated work. The city of Kalamazoo repaid $525,563 to the state in 2005 as a result of recovering some of their costs from other liable parties.

Start Date: 04/01/2000	Primary Cost:	$6,920,000	Source: Private
End Date: 09/25/2002	Secondary Cost:	$97,000	Source: Federal

5 Year Review The First FYR for the site was performed in 2004. It noted an area of potential leachate seep, potential methane gas migration concerns, and a potential zinc and ammonia problem in site groundwater.

Start Date: 10/01/2004	Primary Cost:	$0	Source:
End Date: 12/10/2004	Secondary Cost:	$0	Source:

5 Year Review The issues from the Second FYR are primarily methane concerns, unionized ammonia, and potential leachate discharge along the creek. The remedy is considered to be protective in the short term. Analytical results postively affirm escape of landfill gas at or near the property boundary. In order for the remedy to be protective in the long term the PRPs must evaluate the lateral extent of landfill gas migration to determine whether or not a more aggressive landfill gas system is needed. ICs are also necessary for long-term protectiveness.

Start Date: 05/06/2009	Primary Cost:	$0	Source:
End Date: 09/30/2010	Secondary Cost:	$0	Source:

5 Year Review The MDEQ PM prepared a FYR Issues letter in June 2014 outlining outstanding site issues and concerns. EPA finalized the FYR.

Start Date: 06/30/2014	Primary Cost:	$0	Source: Federal
End Date: 09/29/2015	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance O & M includes cap maintenance and groundwater monitoring with a contingency for additional action if GSI criteria are exceeded.

Start Date: 09/26/2002	Primary Cost:	$41,300	Source: Private
End Date: 09/27/2032	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Future Need

5 Year Review	The purpose of this FYR will be to determine whether the implemented remedy at this site is actually protective of human health and the environment.			
Start Date: 06/30/2019		Primary Cost:	$0	Source:
End Date: 09/30/2020		Secondary Cost:	$0	Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$8,000	$0	$0	$8,000	$0

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$15,000	$0	$0	$9,094	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$33,757	$0	$0	$33,662	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$2,684	$0	$0	$2,684	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$2,589	$0	$0	$2,589	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$5,308	$0	$0	$5,308	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$3,260	$0	$0	$3,260	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$30,192	$0	$0	$30,192	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$70,932	$0	$0	$70,932	$0
Totals:	$171,722	$0	$0	$165,721	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Roto-Finish Co., Inc.
3700 East Milham Road
Portage , MI

County: Kalamazoo
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: 4X
State Site ID#: 39000042
State Site Score: 24

LOCATION
Roto-Finish Co., Inc. is an inactive manufacturing facility located at 3700 East Milham Road, Portage, Michigan. The site is located approximately 0.2 miles west of Sprinkle Road and directly east of the Kalamazoo/Battle Creek International Airport. The land surrounding the site is zoned for industrial use and is used for industrial activities. Residential areas near the site include the Colonial Acres mobile home park, 0.5 miles north of the site; the Lexington Green residential development, 0.3 miles northeast of the site; and the Fairfield residential development, 1.0 mile northwest of the site, west of the airport.

SITE HISTORY
During its years of operation, Roto-Finish Co., Inc. manufactured specialized equipment to debur and polish metal castings, mechanical parts, and similar objects that required smooth finishes. Operations began in the late 1940s to early 1950s and ceased in 1988. Manufacturing wastes were disposed of in a variety of ways: a system of septic tanks, dry wells, and a tile field handled the sanitary wastes and non-processing and laboratory wastes; and three lagoons handled the process and testing wastes. In 1980, the facility was connected to the municipal sanitary sewer system. The lagoons and areas visibly stained were excavated and disposed of in the early 1980s. The site was placed on the National Priorities List in 1986, and the potentially responsible party (PRP), Illinois Tool Works, agreed in 1987 to perform a Remedial Investigation/Feasibility Study (RI/FS) to characterize the remaining environmental impacts at the site and evaluate potential cleanup alternatives. The RI revealed that, while remaining soils pose no health concerns, the groundwater beneath and hydraulically downgradient of the site was contaminated with organic compounds and inorganic chemicals.

A Record of Decision (ROD) was signed by the EPA in March 1997, selecting monitored natural attenuation as the cleanup alternative for the groundwater contamination. The estimated time to achieve Michigan drinking water criteria and federal maximum contaminant levels was identified as 15 to 60 years, depending upon the actual rate of natural attenuation. The MDEQ determined that monitored natural attenuation (MNA) was an acceptable remedial alternative for the site. However, since the EPA did not specifically stipulate which institutional controls (IC) would be imposed to assure protection of public health during the MNA process, the MDEQ was not able to concur with the ROD. The PRP, Illinois Tool Works, signed a voluntary Consent Decree (Decree) in 1998 to implement the selected remedy.

From June 1995 until July 16, 2001, the PRP operated a non time-critical removal action groundwater extraction system followed by discharge to the Kalamazoo Wastewater Treatment Plant for treatment and discharge. With EPA approval, the extraction system was deactivated to complete plume delineation and evaluate the adequacy of contaminant degradation rates for monitored natural attenuation under natural conditions. The extraction system will continue to be maintained in operational condition as the contingency in the event MNA is determined to not be the remedy for the site. Private well sampling performed in 2002 did not indicate impact from this site. However, there was the potential for future

in 2002 did not indicate impact from this site. However, there was the potential for futureimpact due to plume migration and/or identification of additional private downgradient wells.

After repeated efforts to obtain an acceptable RD Work Plan from the PRP proved unsuccessful, the EPA finalized a Pre-Design Work Plan and Field Sampling Plan for the pre-design field work at the site. These documents were forwarded to the PRP in February 2001. Later in 2001, the PRP conducted Phase I pre-design field activities including vertical aquifer sampling west of the plant property to complete characterization of the westerly component of the contaminant plume. Complete plume characterization was postponed by the PRP during the RI until the pre-design phase. Although the work plan anticipated continuing the plume delineation investigation until the extent of the contaminant plume was completely defined, the PRP demobilized in December 2001 after completing the first eight vertical aquifer sampling borings.

The Phase I Report (May 2002) indicated that the plume was much larger than the PRP had anticipated. In late sumer 2002, the PRP field work included multiple vertical aquifer sample locations and the installation of six shallow piezometers. In June 2003, the PRP submitted a MNA Assessment Report. The MDEQ's comments on this report indicated that the plume has yet to be completely delineated, additional investigations are needed to be able to demonstrate monitored natural attenuation at this site, and a comprehensive private well survey needs to be conducted to ensure protection of public health.

The 2002 Five-Year Review (FYR) concluded that it was not possible at this time to determine whether the remedy contained in the Record of Decision (ROD) was protective. Additional information was needed before this determination would be made. Some of the information lacking included full plume delineation; identification of the core(s) of the plume; installation of numerous monitoring wells within and at the edges of the plume and the collection of several rounds of biogeochemical data from them; evaluation of whether it was possible to determine a biodegradation rate for the plume; and evaluation of potential downgradient recipients. The FYR called for a milestone supplemental update report in September 2003 to incorporate all additional data collected during late 2002 and in 2003.

In the summer of 2004, the PRPs vertically sampled the aquifer in several locations on the western side of the airport runway to better understand groundwater contaminant distribution. In the fall of 2004, the PRPs installed several core monitoring wells to collect data to be used to determine degradation rates in the aquifer (Phase III).

Quarterly sampling of the plume core monitoring wells commenced in spring 2005. This sampling was conducted for at least two full years. These are the wells that supply the biogeochemical data to demonstrate whether the MNA remedy is effective or not. Additional field work was performed in the fall of 2005 (Phase IV) for plume delineation purposes with the installation of several more monitoring wells. More locations were vertically profiled and two more monitoring wells were installed in 2006 to help delineate the groundwater plume to the west (Phase V).

In 2007, the PRP replaced one of three core monitoring wells that were abandoned due to airport runway expansion. The PRP's installed several additional monitoring wells and sentinel wells. Continued effort is needed to comply with the ROD.

On May 1, 2007, the EPA issued the Second FYR for the site. The EPA determined that "all immediate threats to human health and the environment have been eliminated....Long-term protectiveness will be determined when:

* the rate of attenuation is accurately calculated
* an ade uate groundwater monitoring well networ is installed to fully bound the plume to detect any expansion and migration of the groundwater plume and to monitor for potential impact on downgradient receptors
* the long-term groundwater monitoring and monitoring well maintenance plan is implemented,
* ICs are implemented and monitored to restrict groundwater use in all areas affected by the contaminated groundwater plume until groundwater restoration cleanup standards are achieved,
* an appropriate and effective contingency remedy is proposed,
* a contingency plan is developed which identifies the triggers that will indicate when additional actions need to take place, indicate what actions will be taken, and the implementation time frame."

In September 2007, the EPA approved the Field Sampling Plan and the Performance Monitoring Plan thus signaling the end of the Remedial Design (RD) and the commencement of the Remedial Action (RA) phase. The PRP has declined to actually perform the appropriate degradation rate calculations to determine the viability of continuing with MNA as the site remedy. Subsequent to the PRP degradation rate submittal, the groundwater flow direction at the site changed, necessitating installation of new plume core monitoring wells, additional data collection, and calculation of subsequent degradation rates. In spite of repeated MDEQ requests, this work has yet to be done.

The MDEQ has also repeatedly requested that the EPA require the PRP to design and implement a program to install and monitor sentinel wells and private drinking water wells to minimize the potential for the downgradient private drinking water wells to be impacted.

In December 2011, the MDEQ provided the EPA with a letter identifying key issues that need to be addressed in the upcoming Third FYR. This letter pointed out that the key issues in the 2007 Second FYR had not been substantially addressed. The December 2011 letter also notified the EPA that the MDEQ was withdrawing from active participation in site management due to funding limitations, staffing, and a lack of site progress.

The EPA subsequently drafted the Third FYR without addressing the MDEQ's comments. The MDEQ provided substantial comments (many reiterated from the prior FYR) essentially indicating that the remedy is not functioning as intended and is not appropriate for site conditions, an appropriate contingency remedy needs to be developed and implemented, and that there are downgradient receptors that are not being protected.

Since the December 2011 notification to the EPA, the MDEQ has not participated in site management at this site.

In anticipation of the upcoming 2017 Five-Year Review, MDEQ reviewed the 2014 annual performance monitoring report and provided EPA with extensive comments. Comments included the need to implement a contingency remedy because the groundwater contaminant plume had expanded, making natural attenuation an inappropriate remedy. Many of the comments were focused on the type and quality of site data. The goal was for EPA to use these comments to have the PRPs change their approach and collect quality data by which the site could be evaluated in the 2017 FYR. MDEQ provided comments in April 2015 and resent them in September 2015. EPA responded they were conducting a technical review of MDEQ's comments. Results of their technical review have not been shared with MDEQ.

SITE STATUS

MDEQ restated numerous key issues that should be addressed in the 2017 FYR. In

ecember P submitted the draft R indicating there are no issues or recommendations. wor ed with the new P project manager to ensure the final R addressed many of s ey issues by including the following recommendations 1) continue monitoring to determine the need for enhancements to the remedy (MDEQ had stated the monitored natural attenuation remedy is not working as intended), 2) develop and implement new monitoring program (including installation of additional monitoring wells) and conduct downgradient private drinking water well inventory and sampling, 3) assess the potential for vapor intrusion pathway and conduct appropriate investigations and remedial actions as needed, 4) update existing Restrictive Covenants (MDEQ wants implementation of a Groundwater Use Restriction Zone within the county ordinance), 5) develop/implement procedures to track ICs. EPA also agreed to several additional items that need to be addressed (Other Findings) as part of the remedy.

In July 2017, as a result of state-funded sampling, a downgradient private drinking water well (located at a small business) was identified as containing contaminants also found at the Roto-Finish site. Resampling confirmed detections of one compound above drinking water standards. Fortunately, the business was only using their well water for non-potable purposes. MDEQ is working with EPA, the county health department, and the consultant for the Roto-Finish responsible party to identify additional private water wells in the area and sample them. The responsible party has agreed to reimburse the impacted business the cost of bottled drinking water for the next year (minimum).

ENFORCEMENT STATUS
Illinois Tool Works signed a voluntary Decree in 1998 agreeing to implement the remedial alternative stipulated in the ROD.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 03/30/1997**

The MDEQ determined that MNA (with a contingency plan of on-site pumping) was an appropriate remedy for the site. However, adequate ICs were not identified as required by Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended; and, for this reason, the MDEQ could not concur on the ROD.

The EPA waived Part 201 Rule R299.5705(5) (horizontal and vertical extent of hazardous substances is not to increase after the initiation of remedal activities unless a waiver has been granted) by stating that they have made a finding that the RA is protective of public health, safety, and welfare, and the environment and therefore, according to Section 324.20118(5), it is not necessary to comply with R299.5705(5).

Response Accomplishments: Completed

Interim Response Lagoon/soil removal.

Start Date: 06/15/1979 Primary Cost: $0 Source: Private
End Date: 06/15/1984 Secondary Cost: $0 Source:

Remedial Investigation PRP Lead RI/FS with an EPA oversite contractor and the MDEQ in support.

Start Date: 12/18/1987 Primary Cost: $0 Source: Private
End Date: 03/31/1997 Secondary Cost: $99,000 Source: Federal

Remedial Design The PRP completed the first phase of field work for the pre-design study in 2001. The second phase of the pre-design field work was conducted in the summer and fall of 2002. Further plume delineation work was performed and plume core monitoring wells were installed in the fall of 2004, and again in the fall of 2005. Both Agencies agreed that additional plume delineation was necessary as well as the installation of sentinel monitoring wells. After several iterations of the Field Sampling Plan and the Performance Monitoring Plan, the EPA approved these two documents on September 28, 2007.

Start Date: 06/16/1998 Primary Cost: $0 Source: Private
End Date: 09/28/2007 Secondary Cost: $94,000 Source: Federal

5 Year Review The EPA completed a FYR, and concluded that it was not possible at this time to determine whether the remedy contained in the ROD is protective.

Start Date: 06/30/2002 Primary Cost: $0 Source: Federal
End Date: 09/24/2002 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

The review indicated the remedy is protective in the short-term and "Long-term protectiveness will be determined when:
* the rate of attenuation is accurately calculated,
* an adequate groundwater monitoring well network is installed to fully bound the plume, to detect any expansion and migration of the groundwater plume, and to monitor for potential impact on downgradient receptors,
* the long-term groundwater monitoring and monitoring well maintenance plan is implemented,
* ICs are implemented and monitored to restrict groundwater use in all areas affected by the contaminated groundwater plume until groundwater restoration cleanup standards are achieved,
* an appropriate and effective contingency remedy is proposed,
* a contingency plan is developed which identifies the triggers that will indicate when additional actions need to take place, indicate what actions will be taken, and the implementation time frame."

Start Date: 09/24/2006	Primary Cost:	$0	Source: Federal
End Date: 05/01/2007	Secondary Cost:	$0	Source:

5 Year Review

The EPA incorrectly concluded that the remedy is protective and functioning as intended. The issues and recommendations from the 2007 FYR were not addressed in this Third FYR.

Start Date: 12/22/2011	Primary Cost:	$0	Source:
End Date: 05/01/2012	Secondary Cost:	$0	Source:

5 Year Review

The FYR included the following recommendations: 1) continue monitoring to determine the need for enhancements to the remedy (MDEQ had stated the monitored natural attenuation remedy is not working as intended), 2) develop and implement new monitoring program (including installation of additional monitoring wells) and conduct downgradient private drinking water well inventory and sampling, 3) assess the potential for vapor intrusion pathway and conduct appropriate investigations and remedial actions as needed, 4) update existing Restrictive Covenants (MDEQ wants implementation of a Groundwater Use Restriction Zone within the county ordinance), 5) develop/implement procedures to track ICs. EPA also agreed to several additional items that need to be addressed (Other Findings) as part of the remedy.

Start Date: 03/30/2016	Primary Cost:	$0	Source:
End Date: 04/18/2017	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Ongoing

Monitoring MNA commenced following the ROD. To date, the plume has expanded and there have been no accurate attenuation calculations made indicating the need to modify the remedy. The MNA remedy does not appear to be effective.

Start Date: 09/28/2007 Primary Cost: $0 Source:

End Date: 10/01/2048 Secondary Cost: $0 Source:

Response Accomplishments: Future Need

5 Year Review Dates estimated based on completion of prior FYR.

Start Date: 04/18/2021 Primary Cost: $0 Source:

End Date: 04/18/2022 Secondary Cost: $0 Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$601	$0	$0	$601	$0

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$30,000	$0	$0	$30,000	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$88,512	$0	$0	$88,328	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$7,668	$0	$0	$7,668	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$5,106	$0	$0	$5,106	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$4,790	$0	$0	$4,790	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$135,000	$0	$0	$118,922	$0
Totals:	$271,676	$0	$0	$255,413	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Butterworth Landfill #2
1500 Butterworth SW
Grand Rapids , MI

County: Kent
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: D6
State Site ID#: 41000008
State Site Score: 43

LOCATION
The 180-acre site is located adjacent to the west bank of the Grand River on the south side of the city of Grand Rapids and is estimated to contain about 4,825,000 cubic yards of combined residential, municipal, and industrial waste. The landfill is fenced and near industrial, residential, and recreational areas.

SITE HISTORY
The landfill was owned and operated by the city of Grand Rapids until the state of Michigan ordered it closed in 1973 for improper operations. Prior to closure, the landfill accepted industrial waste, including plating wastes, cyanide, and organic solvents. The site was added to the National Priorities List on September 8, 1983. The potentially responsible parties (PRPs), including the city of Grand Rapids, agreed to conduct a remedial investigation/feasibility study (RI/FS) that began in January 1988 and was completed in December 1989.

Monitoring wells located between the landfill and the river exhibited concentrations of chromium, iron, manganese, cadmium, and lead above federal drinking water standards. Site soils were found to contain unacceptable levels of polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons, and heavy metals. Analysis of site soils indicated that the site could pose a direct contact threat to the public. PCBs and inorganic compounds were detected at elevated levels in surface soils. No potable water supply wells are known to be impacted. The waste is partially saturated by a shallow aquifer which has been contaminated with volatile organic compounds and inorganic contaminants, including ammonia, from the waste. The contaminated groundwater from this aquifer discharges directly to the Grand River. The concentrations of ammonia have exceeded the acute and chronic groundwater/surface water interface (GSI) criteria of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 201).

The PRPs removed a hotspot of PCB-contaminated soil in May 1990 as an interim response under the EPA's removal authority. A human health assessment was completed in May 1991. In the spring of 1991, the PRPs, at the request of the MDEQ and the EPA, completed additional investigations. An ecological assessment was also prepared to evaluate the effect of the landfill on the Grand River.

On October 31, 1991, the PRPs submitted an FS that was accepted as a final product. In that document, at the EPA's request, the PRPs evaluated the appropriateness of implementing alternate concentration limits (ACLs) as cleanup criteria for the site groundwater.

On September 29, 1992, the EPA signed a Record of Decision (ROD) for the site. The remedy consisted of placement of a clay cap over the landfill; monitoring of surface water, river sediment, and biota; removal of surface drums; and establishment of ACLs for groundwater. The MDEQ did not agree with the establishment of ACLs and did not concur

with the ROD.

In January 1993, the EPA entered into an Administrative Order by Consent (Order) with six PRPs for the remedial design (RD). In June 1996, the PRP group submitted a request to the MDEQ for a preliminary mixing zone determination for the groundwater discharge to the Grand River. In November 1996, without Agency approval of their work plan, the Butterworth site group installed a GSI monitoring well network. The well network was later deemed inadequate by the EPA and the MDEQ.

In October 1998, the EPA issued an Explanation of Significant Differences (ESD) to the ROD. The document called for implementation of a GSI performance monitoring program, using individual final acute values established by the MDEQ. The comparison of groundwater contaminants to final acute values allowed the original requirement for monitoring of surface water, river sediment, and biota to be discontinued, as long as GSI criteria are met. The ESD also allowed installation of a 12-inch soil cover (instead of a clay cap) in the site's radio tower and station area, where wastes are highly weathered. The MDEQ concurred with the revised remedy required by the ESD. In December 1998, an amendment to the ESD specified new GSI criteria for 1,1-dichloroethane and chloroethane.

In May 1999, a Consent Decree for the remedial actions (RAs) was filed in federal court. The Consent Decree outlines work to be performed under the ROD and the ESD, as amended. In June 1999, the EPA and the MDEQ approved an amended RD, allowing landfill capping and installation of new GSI wells and gas probes. The final RA work plan was approved by the Agencies in August 1999.

In 1999, much of the site was re-graded and a clay cap was placed on 82 acres of the western side of the landfill. Placement of frost protection and topsoil layers was completed on 53 acres. Two rounds of groundwater sampling in the new GSI wells along the Grand River indicated that vinyl chloride, ammonia, and biological oxygen demand exceeded GSI criteria.

The EPA completed a Five-Year Review (FYR) report on September 23, 2004, and concluded that "the remedy is protective of human health and the environment". However, this report did not address ammonia venting to the Grand River at levels that exceed both the acute and chronic water quality criteria of the state of Michigan and the MDEQ did not concur with the protectiveness statement. Data collected in 2008 and 2010 confirmed that in addition to ammonia exceedances of GSI criteria that mercury, chloride, Total Suspended Solids, arsenic, barium, and manganese periodically exceed the GSI criteria.

In August 2008, the MDEQ conducted groundwater sampling to assess the adequacy of the PRPs groundwater sampling program, the PRP's analytical methods, and to collect representative groundwater samples to gain a more accurate picture of the on-going contaminant migration into the Grand River. The data indicated exceedances of the chronic and acute criteria of the State Water Quality Standards for ammonia.

In 2012, the EPA contracted with Skeo Solutions to develop a FS for solar site reuse. MDEQ staff participated in meetings to discuss the potential for site reuse in 2013. The FS for solar site reuse was finalized in November 2013. In 2015, the City of Grand Rapids competatively bid a solar reuse project entitled "The Butterworth Acres Solar Project" entailing passive solar panels placed at the Butterworth Landfill to provide electricity for the Grand Rapids Waste Water Treatement Plant directly across the Grand River from the landfill. American Capital Energy was the successful bidder and was awarded the project in December 2015. The project stalled in 2016 due to non-responsiveness from American Capital Energy.

In June 2014, the MDEQ participated in the Third FYR process. The Third FYR determined that the remedy is protective of human health and the environment in the short term. Long-term protectiveness issues included: the need to file restrictive covenants (RCs) for use restrictions on the landfill property, performance of a vapor intrusion (VI) study to determine if there are relevant methane and other contaminant vapor pathways in buildings on the landfill or at the landfill boundaries, and to continue to assess groundwater migration pathways to surface water.

In September 2014, the RCs for the landfill property were filed at the Kent County Register of Deeds office, by the PRPs.

SITE STATUS

Operation and maintenance (O & M) activities on the landfill continue to be conducted by the PRPs. Based upon the findings of the Third FYR, the MDEQ will continue to work with the EPA and the PRPs to modify the groundwater monitoring program, determine the presence of perfluorinated chemicals (PFCs), assess GSI impacts of ammonia and to evaluate the potential for methane or VI issues from the landfill in 2018.

The passive solar project is currently on hold. The City of Grand Rapids is currently evaluating options to move the project forward.

ENFORCEMENT STATUS

The RI/FS was conducted by six PRPs under the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, as amended (CERCLA) pursuant to a 1986 Consent Decree with the EPA. The RD was conducted by six CERCLA PRPs pursuant to the Order with the EPA for the remedial actions. The EPA sent general and special notice letters to approximately 100 parties who are PRPs under CERCLA. Settlement negotiations began in early 1998 and a Consent Decree for RAs was entered into federal court in May 1999. No liability determination has been conducted under Part 201.

SPECIAL CONSIDERATIONS

The state of Michigan awarded the city of Grand Rapids $3,703,203 between 1998 and 2005 under the Municipal Landfill Cost-Share Grant Program to reimburse the city for up to 50 percent of their costs. The city of Grand Rapids paid $208,733 back to the state in 2005 because of money they received from other liable parties to help pay for cleanup costs.

OPERABLE UNITS

00	Entire Site
01	Cap & Contain, ACLs for Groundwater

OPERABLE UNIT 01: Cap & Contain, ACLs for Groundwater

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/29/1992**

The ROD calls for a clay cap on the landfill, removal of surface drums, ACLs for groundwater, and monitoring of surface water, river sediment, and biota.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 10/23/1998**

The ESD changed the ROD to allow the PRPs to construct an alternative cap. Also, in December 1998, an amendment to the ESD specified new GSI criteria for 1,1-dichloroethane and chloroethane.

Response Accomplishments: Completed

Remedial Investigation

Start Date: 09/26/1984 Primary Cost: $500,000 Source: Federal
End Date: 04/22/1987 Secondary Cost: $0 Source:

Remedial Investigation

Start Date: 04/22/1987 Primary Cost: $0 Source: Private
End Date: 09/29/1992 Secondary Cost: $0 Source:

Interim Response Removal of PCB contaminated soil.

Start Date: 01/01/1989 Primary Cost: $0 Source: Private
End Date: 01/01/1990 Secondary Cost: $0 Source:

Remedial Design Design of the landfill cap.

Start Date: 02/23/1993 Primary Cost: $0 Source: Private
End Date: 02/03/1998 Secondary Cost: $200,000 Source: Federal

Remedial Action Construction of the cap has been completed.

Start Date: 02/03/1998 Primary Cost: $21,347,000 Source: Private
End Date: 10/01/2000 Secondary Cost: $24,000 Source: Federal

5 Year Review The FYR was performed by the EPA and concluded that the remedy is protective of human health and the environment. Based upon the existing data this conclusion is inaccurate and the MDEQ disagreed with the conclusions.

Start Date: 04/01/2004 Primary Cost: $0 Source: Federal
End Date: 09/30/2004 Secondary Cost: $0 Source:

OPERABLE UNIT 01: Cap & Contain, ACLs for Groundwater

Response Accomplishments: Completed

Remedial Action Conducted additional groundwater investigation to further define the source and extent of the acute and chronic ammonia GSI exceedances at the site, as well as evaluate the levels and extent of groundwater PCBs and mercury.

Start Date: 08/01/2004	Primary Cost:	$2,500,000	Source: State
End Date: 10/01/2010	Secondary Cost:	$0	Source:

5 Year Review The Second FYR was performed by the EPA and concluded that the remedy is protective of human health and the environment. Based upon the 2008 and 2010 state funded groundwater analytical data the MDEQ disputes this conclusion.

Start Date: 01/05/2009	Primary Cost:	$15,000	Source: Federal
End Date: 09/29/2009	Secondary Cost:	$0	Source:

5 Year Review The Third FYR was completed by the EPA on June 27, 2014. The MDEQ reviewed and provided comments to the EPA on June 3, 2014. The Third FYR determined that the remedy is protective of human health and the environment in the short term. Long-term protectiveness issues were the need to file RCs for use restrictions on the landfill property and to perform a VI study to determine if there are relevant methane and other contaminant vapor pathways in buildings on the landfill or at the landfill boundaries. Groundwater migration to surface water will also continue to be assessed.

Start Date: 01/10/2014	Primary Cost:	$0	Source: Federal
End Date: 06/27/2014	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance Maintenance of the cap and monitoring of groundwater are ongoing tasks. An evaluation of VI pathways was performed as part of on-going O & M activities. Evaluation of groundwater contaminants which may migrate to surface water will continue to be assessed including the presence of PFCs.

Start Date: 10/01/2000	Primary Cost:	$2,000,000	Source: Private
End Date: 10/01/2030	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

5 Year Review The Fourth FYR will be conducted in 2019.

Start Date: 06/27/2018	Primary Cost:	$0	Source: Federal
End Date: 06/27/2019	Secondary Cost:	$0	Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$1,167	$0	$1,167	$1,167	$1,167

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$89,026	$0	$0	$88,211	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$1,609	$0	$0	$1,609	$0

Cooperative Agreement Number V995260-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$28,735	$0	$0	$28,735	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$26,736	$0	$0	$26,736	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$5,491	$0	$0	$5,491	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$79,046	$0	$0	$79,028	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$9,249	$0	$0	$9,249	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$4,975	$0	$0	$4,975	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$10,000	$0	$0	$8,030	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$189,671	$0	$0	$189,671	$0
Totals:	$445,704	$0	$1,167	$442,900	$1,167

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Chem Central
2940 Stafford Avenue SW
Wyoming , MI

County: Kent
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: W5
State Site ID#: 41000011
State Site Score: 38

LOCATION
The Chem Central property is a two-acre parcel of land located in a mixed residential and commercial section of the city of Wyoming that includes small industrial facilities. The nearest residences to the facility are located approximately 500 feet west of the property boundary. There are two hotels within 800 feet of the site. Cole Drain is located about 100 feet west of the site's western boundary and enters Plaster Creek about 2,500 feet north of the site. Plaster Creek flows into the Grand River approximately 2.5 miles northwest of the site.

SITE HISTORY
The Chem Central (now Univar USA) site is an active facility that has distributed chemicals to industry since its construction in 1957. The plant site covers approximately two acres and a large area of the property has been contaminated. Chemicals entered the ground during a five-year period (between 1957 and 1962) via a construction flaw in a T-arm transfer pipe used to transfer liquid products from bulk storage tanks to small delivery trucks. The T-arm pipe was located on the west side of the building near the southwest corner. Bulk transfer operations resulted in additional losses in and around the plant facility.

Contamination was first noted in 1977 when a ditch downgradient of the property was found to be contaminated with oils, polychlorinated biphenyls, heavy metals, and other organic compounds. The MDEQ and the EPA traced contamination in the ditch back to Chem Central. Soil and groundwater are contaminated primarily with oils and volatile organic compounds, including toluene, trichloroethylene, chloroethane, and xylene. Concentrations of these contaminants in groundwater exceed the unrestricted residential cleanup levels by up to 500 times. These contaminants posed health threats to potential future users of groundwater and environmental risks to Cole Drain.

The MDEQ sued Chem Central in 1980 asking for an injunction, reimbursement of expenses, a hydrogeologic study, correction of contamination, institution of a monitoring program, civil penalties and damages, a restrictive covenant on the property, and an order to obey the law. The site was added to the National Priorities List on September 8, 1983. In 1984, the Kent County Circuit Court ordered Chem Central to define the groundwater contamination plume, design and construct a groundwater purge system and air stripping treatment system, and establish shutdown criteria for the treatment system.

Pursuant to the 1984 court order, a groundwater purge and treat system was installed. An underdrain collection system to intercept the flow of contaminated groundwater to Cole Drain was installed in 1986. The system became operational in June 1988.

The EPA and Chem Central signed an Administrative Order by Consent on June 30, 1987, wherein Chem Central agreed to conduct the remedial investigation/feasibility study (RI/FS). This additional investigative work was needed to determine the extent and nature of the contamination. The RI/FS began in August 1988. The final RI report was issued in April 1990, and the final Baseline Risk Assessment was issued in July 1990. The FS was

finalized in July 1991.

The EPA issued a Record of Decision (ROD) for the site on September 30, 1991. The ROD requires expansion and continued operation of the existing groundwater purge and treat system, installation and operation of a soil vapor extraction (SVE) system, imposition of soil and groundwater deed restrictions on contaminated property, and a groundwater monitoring system.

On April 7, 1992, the EPA issued a Unilateral Administrative Order to Chem Central to conduct the remedial design/remedial action (RD/RA) activities. Chem Central complied with this order. The RD/RA work plans were completed in June 1993. The SVE system became operational in December 1995. Multiple legal actions were taken before Chem Central actually implemented the required investigation and remediation components. The final Order was effective as of March 23, 2001. Chem Central completed all the expansions to the groundwater purge and treat system in 2004, with the exception of the extension to the north underdrain extraction system, which was determined to be unnecessary by that time.

Chem Central asked the EPA and the MDEQ to re-evaluate the need for the underdrain extension based on additional data and amendments to Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). Chem Central began additional investigation work in September 1997 to provide information to support their request. Subsequently, the Agencies reviewed the report entitled, "Report on the Review and Update of Site Hydrogeology" dated April 1998. Chem Central developed a plume dynamics report and a groundwater surface water interface monitoring program for review by both Agencies. This monitoring program was implemented for four years, from 2000 through 2004. Review of the accumulated sample data indicated that the current operating remedy system appeared to be adequately treating the groundwater plume and, therefore, extension of the underdrain was unnecessary.

The First Five-Year Review (FYR) was written and completed by the EPA in 1999. The review concluded the selected remedy, as designed, was protective of human health and the environment.

The Second FYR was written and signed by the EPA in 2004. Again the review concluded the selected remedy, as designed, was protective of human health and the environment. The EPA determined an Explanation of Significant Differences (ESD) would be written for the ROD stating that the current treatment system, as constructed, was an adequate remedy for the site and the extension of the underdrain would not be required. The MDEQ agreed with this decision. The EPA also discovered that several deed restrictions had not been registered, as required in the ROD, for affected properties located in the off-site groundwater contamination plume path.

In 2007, Univar USA purchased Chem Central and assumed the responsibility for all of the site related remediation.

The EPA provided notification to both the MDEQ and Univar USA, via a November 2008 letter, that the development of the Third FYR had been initiated. This FYR was completed on November 12, 2009. The review concluded that the current remedy was protective of human health and the environment. However, long-term protectiveness required compliance with effective Institutional Controls which need to be monitored, maintained, enforced, and updated as needed to prevent exposure to the contaminated groundwater and soils.

bioremediation remedy to address the source area contamination located under the building and the groundwater contamination plume extending to 28th Street. This bioremedy, approved by both the EPA and the MDEQ, operates concurrently with the pump and treat remedy. The initial review of the Conceptual Remediation Enhancement Plan by both the EPA and the MDEQ was completed in August 2009 and comments were provided to Univar USA. The EPA gave its conditional approval of the Aerobic Remediation Enhancement Plan 90 percent Design document in a letter dated October 29, 2010. Univar USA began the installation of the Aerobic Bioremedy in 2011 and began operations on December 15, 2011; this action was undertaken without incorporating MDEQ comments or final Agency approval.

Univar USA recently shifted operations from a rail and tank farm based chemical transport system to a truck transport system. The pump and air sparge treatment, SVE, and carbon vapor adsorption systems were shut down on August 8, 2011, to accommodate facility improvements and construction of an aerobic remediation enhancement system.

Traditional remediation systems are extremely costly and long term in nature. The potentially responsible parties (PRPs) implemented an aerobic bioremedial enhancement action and planned to utilize the data collected for design and implementation of an anaerobic remediation activity, downgradient of the initial treatment area, with the intent of cleaning up the remaining contaminants prior to off-site migration. The Agencies continue to work with the PRPs and the new consultants to evaluate the quality of existing data, gather new data, fill data gaps, and develop an updated conceptual site model. The information will be used to determine next steps for moving toward closure on site remediation efforts.

The aerobic sparge system was shut down in 2015 with MDEQ and EPA staff evaluating the completeness and compliance with remediation requirements. Only a portion of the SVE system is functioning at this time. MDEQ staff have concerns over accuracy of post shutdown data and have requested additional post-shutdown monitoring.

Pumping Well-4 and the North Underdrain system suffered repeated problems and reduced functioning in 2014 and 2015. A complete blockage of the conveyance lines back to the treatment system forced shut down of that system in July 2015. Drinking water criteria exceedances have also been documented to be migrating beyond the site property lines as well as last extraction pumps. Monitoring efforts were shifted to monitoring the GSI and north underdrain portion of the site for the past few years. MDEQ staffs determined that the ROD requirements of contaminant capture and antidegradation were not being met and raised their concerns of drinking water protection to the EPA and the PRPs in late 2015.

Univar staff attempted to find alternatives to stop the migration of contaminated groundwater exceeding drinking water standards and the associated aquifer degradation at the toe of the plume. In late 2016, new pumps, conveyance lines and electrical wiring and controls were installed at PW-1, PW-2 and PW-3. The new system is currently up and running and MDEQ, EPA and PRP are re-evaluating the ability of the system to capture the plume.

SITE STATUS

Chem Central, now Univar USA, continues to operate the groundwater purge and treat and the Air Sparge/SVE systems. The systems may have to operate for 30 years to achieve the site cleanup standards.

Agency staff has put on hold the Restrictive Covenant work in order to revisit data quality and site characterization issues.

The PRP submitted a workplan in 2017 for evaluating on and off-site vapor intrusion (VI)

risks assocaited with contamination in the groundwater as a result of activities on the site. MDEQ has been working with EPA and the PRP to develope a final work plan.

ENFORCEMENT STATUS
Chem Central is conducting the work under the April 7, 1992, Unilateral Administrative Order issued by the EPA and under the 1984 Kent County Circuit Court Order. Multiple Orders have been placed since the original 1984 Order. The Final Order was effective as of March 23, 2001, and specifically outlines future remediation requirements.

OPERABLE UNITS

00	Entire Site
01	Groundwater Plume

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Investigation RI conducted to determine the nature and extent of contamination.

Start Date: 06/01/1987 Primary Cost: $0 Source: Private
End Date: 07/01/1991 Secondary Cost: $0 Source:

5 Year Review The FYR report was written by the EPA and determined that the remedy was protective of human health and environment.

Start Date: 01/02/1999 Primary Cost: $0 Source: Federal
End Date: 11/16/1999 Secondary Cost: $0 Source:

5 Year Review The Second FYR report was written by the EPA in 2004 and determined that the remedy was protective of human health and environment.

Start Date: 01/01/2004 Primary Cost: $0 Source: Federal
End Date: 11/16/2004 Secondary Cost: $0 Source:

5 Year Review The Third FYR was completed on November 12, 2009. The review concluded that the current remedy was protective of human health and the environment. However, long-term protectiveness required compliance with effective Institutional Controls (ICs) which will need to be monitored, maintained, enforced, and updated as needed to prevent exposure to the contaminated groundwater and soils.

Start Date: 11/26/2008 Primary Cost: $0 Source: Federal
End Date: 11/12/2009 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The Fourth FYR was completed in November 2014. The document details ongoing characterization efforts and concludes that the remedy is protective in the short term but needs implementation and enforcement of updated ICs to prevent exposure to contaminated groundwater and soils.

Start Date: 11/07/2013	Primary Cost:	$0	Source:
End Date: 11/07/2014	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

5 Year Review The next FYR is due in November 2019.

Start Date: 11/07/2018	Primary Cost:	$0	Source:
End Date: 11/07/2019	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Groundwater Plume

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/1991**

The ROD requires expansion and continued operation of the groundwater purge and treat system, SVE for the contaminated soils, groundwater monitoring, and deed restrictions. In 2002, both the EPA and the MDEQ agreed the expansion of the underdrain portion of the remedy was no longer required. The EPA has yet to write the ESD to make official this change to the ROD.

Response Accomplishments: Completed

Interim Response Groundwater Purge and Treat System funded by the PRPs [private].

Start Date: 03/01/1984	Primary Cost:	$0	Source: Private
End Date: 06/01/1988	Secondary Cost:	$0	Source:

Remedial Design

Start Date: 04/01/1992	Primary Cost:	$0	Source: Private
End Date: 08/01/1994	Secondary Cost:	$125,000	Source: Federal

Remedial Action SVE system for soil treatment.

Start Date: 08/01/1994	Primary Cost:	$0	Source: Private
End Date: 09/30/2000	Secondary Cost:	$14,000	Source: Federal

OPERABLE UNIT 01: Groundwater Plume

Response Accomplishments: Completed

Remedial Design In May 2009, Univar USA proposed, in a Conceptual Remediation Enhancement Plan, a bioremediation remedy to address the source area contamination located under the building and the groundwater contamination plume extending to 28th Street. The EPA gave its conditional approval of the Aerobic Remediation Enhancement Plan 90% Design document in a letter dated October 29, 2010.

Start Date: 05/01/2009 Primary Cost: $0 Source:
End Date: 12/15/2011 Secondary Cost: $0 Source:

Remedial Action The PRP Group implemented the Aerobic Remediation Enhancement System starting on August 8, 2011, and completed on December 15, 2011.

Start Date: 08/08/2011 Primary Cost: $0 Source:
End Date: 12/15/2011 Secondary Cost: $0 Source:

Response Accomplishments: Ongoing

Operation and Maintenance The groundwater purge and treat system continues to operate. This is funded by the PRP and costs are unknown to the MDEQ.

Start Date: 12/15/2011 Primary Cost: $0 Source:
End Date: 12/15/2041 Secondary Cost: $0 Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$10,277	$0	$10,277	$10,277	$10,277

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$30,000	$0	$0	$24,952	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$18,271	$0	$0	$18,271	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995260-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$2,642	$0	$0	$2,642	$0

Cooperative Agreement Number V995258-03 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$13,090	$0	$0	$13,089	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$6,563	$0	$0	$6,563	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$53,754	$0	$0	$53,421	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$10,800	$0	$0	$10,800	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$46,784	$0	$0	$46,784	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$22,023	$0	$0	$22,023	$5,188

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$2,638	$0	$0	$2,638	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$90,000	$0	$0	$89,758	$0
Totals:	$306,843	$0	$10,277	$301,219	$15,465

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: H. Brown Co., Inc.
2200 & 2160 Turner Ave. NW
Walker , MI

County: Kent
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: 1A
State Site ID#: 41000031
State Site Score: 41

LOCATION
The site is located in an industrial area along the west side of U.S. 131 in Walker, Michigan, just north of downtown Grand Rapids. A Grand Rapids city park and the Grand River are located 1/4 mile to the east of the site.

SITE HISTORY
Before 1961, the area along the river where H. Brown Company, Inc. is now located was an uncontrolled dump. Mr. Herman Brown and his heirs owned most of the property, now called the H. Brown Company, Inc. Superfund site, from 1957 to 1998. In 1998 the site property was purchased by DBV Partners LLC.

Between 1961 and approximately 1982, H. Brown Company, Inc., reclaimed lead from wet cell batteries at the site. During that period until 1978, battery acid, believed to be contaminated with heavy metals, was reportedly poured directly on the ground prior to shredding the battery casings. The total volume of battery acid disposed of at the site has been estimated to be between 170,000 and 460,000 gallons.

Due to the battery reclamation practices at the site, lead was the primary contaminant in surface soils, subsurface soils, groundwater, surface water, and sediments. Other metals were detected but at much lower concentrations. Among organic contaminants, volatile organic compounds, semi-volatile organic compounds, and polychlorinated biphenyls were detected in surface and subsurface soils, sediments, and groundwater.

Lead concentrations in surface soil were detected at levels as high as 380,000 parts per million (ppm) and, in subsurface soils, as high as 649,000 ppm. Air at the site was contaminated by dust carrying lead and other compounds. The groundwater was contaminated with inorganic chemicals, such as antimony, lead, cadmium, and nickel; and organic contaminants, such as benzene, vinyl chloride, and polynuclear aromatic hydrocarbons (PNAs). Lead levels in the surface waters, in sediments in storm sewers in front of the site, in drainage ditches, and in wetlands east of the site were above state and federal standards and guidelines.

The site posed an acute public health risk to anyone who would come into direct contact with or ingest the soils, and to anyone who would ingest the groundwater. The site also posed an acute environmental threat to wildlife having repeated or prolonged exposure to the contaminated surface water and sediments, or direct contact with, and ingestion and inhalation of, surface soil.

After the remedial investigation was completed in September 1992, it was determined an imminent public health risk existed at the site and an emergency action was performed. The EPA fenced off the site to reduce access and initiated measures to suppress lead-contaminated dust from blowing off-site.

A Record of Decision (ROD) was signed in December 1992 which called for demolition of

the on-property buildings; consolidation of surface soils onto the property; solidification in place of contaminated surface and subsurface soils; construction of a containment wall around the solidified mass; construction of a hazardous waste landfill cap; collection, treatment, and discharge of contaminated groundwater; implementation of land and groundwater use restrictions; fencing; and installation of additional wells for a predesign study. The 1992 ROD was amended in 1995 based on the results of the predesign study that showed contaminants to be adhering to soil particles on the property and not migrating off-property in the groundwater. The ROD Amendment called for a solid waste management cap, groundwater and surface-water monitoring, consolidation of contaminated soils onto the property, fencing, land and groundwater use restrictions, monitoring for landfill gas, and cleaning of the Turner Avenue storm sewer. An Explanation of Significant Difference (ESD) was issued by the EPA in March 1999, which modified the ROD Amendment by deleting some non-site related constituents. The state concurred with the ESD. The First Five-Year Review (FYR) was completed by the EPA in May 2004 and it concluded that the remedy continues to be protective of human health and the environment.

The site is currently owned by DBV Partners L.L.C., a non-potentially responsible party, under both the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, as amended (CERCLA), and Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). DBV Partners L.L.C. entered into a prospective purchasers agreement with the EPA and the potentially responsible parties (PRPs) to redevelop the site to a limited industrial use.

A redevelopment plan in the form of a ROD Amendment was finalized in 1998 to reconsolidate contaminated soils onto the H. Brown Company, Inc. property, demolish the current building, build new warehouses, cap the site using the buildings, parking lots, and landscaping as a portion of the cover for the contamination, and provide deed restrictions and landfill gas monitoring. DBV Partners L.L.C., applied for and received state Brownfield Redevelopment grant funds to facilitate some of the redevelopment. Redevelopment is 100 percent complete.

A Restrictive Covenant (RC) was filed on the H. Brown site on September 21, 2005, placing restrictions on both the soil and the groundwater on and under the property.

The Second FYR was completed in May 2009. The assessment of this FYR determined that the remedy was constructed in accordance with the requirements of the 1992 ROD, the 1998 ROD Amendment and the 1999 ESD. The remedy components, including the excavation and removal of contaminated soils, maintenance of the cover systems, and long-term groundwater monitoring, are functioning as designed. There is no evidence of cap breach and thus no current exposure. The remedy components of the decision documents are operating as intended and are considered to be protective of human health and the environmsent in the short term. The immediate threats have been addressed and the remedy will be protective in the long term once institutional controls (ICs) are fully implemented at the site.

The Third FYR was completed in May 2014 by the EPA. The review found that the remedy was functioning as designed and is protective in the short term because no unacceptable exposures are occurring. The soil cover, building foundations, and asphalt pavement are intact and in good condition, and the fencing encircling the property limits site access. To be protective in the long term the following needs to be addressed: re-evaluate the need for a RC to be filed on the adjacent Baker Property; collect one final round of groundwater data; and continue implementing the requred Operation and Maintenance (O & M) activities and report development. MDEQ reviewed the site file and notified EPA in 2014, that an additional RC was not needed for the adjacent Baker Property.

In 2016, MDEQ petitioned the EPA to consider the H Brown site a candidate for deletion from the National Priorities List (NPL).

SITE STATUS
EPA is developing the Draft Final Construction Completion Report. The site can potentially be deleted from the NPL in 2018.

ENFORCEMENT STATUS
DBV Partners L.L.C., entered into a prospective purchasers agreement with the EPA. General Motors and several other PRPs entered into a Consent Decree with the EPA to implement the excavation and consolidation of contaminated soils, installation of a cap, and landfill gas monitoring. General Motors, et. al., are liable under the CERCLA and Part 201, Environmental Remediation, of the NREPA.

SPECIAL CONSIDERATIONS
As stated under the Site Status, DBV Partners L.L.C., bought the H. Brown Company, Inc., property for redevelopment purposes and received grant funds for Brownfield Redevelopment from the state of Michigan. Redevelopment is 100 percent complete.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/1992**

Hazardous waste landfill cap, pump and treat of contaminated groundwater, consolidation and solidification of landfill mass, installation of slurry walls, fencing, land and groundwater use restrictions, demolition of on-property buildings. Installation of additional wells for pre-design study.

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 09/29/1995**

Consolidating contaminated surface soil in the area where subsurface soil cleanup will be required. Placing a Part 115, Solid Waste Management, of the NREPA, multi-layer cap over soils exceeding 500 ppm of lead. Long-term monitoring of the shallow and intermediate aquifers to monitor effectiveness of the remedy. Restricting the use of the land and the groundwater. Maintaining a fence around the site to prevent access.

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 2 *ESD:* 0 **Effective 02/25/1998**

The remedy was amended to facilitate redevelopment of the property by building warehouses on the property. The revised remedy includes: installation of a landfill cap consisting of 2 feet of clean fill material with a top layer of either concrete or asphalt and a 3-foot cap thickness in vegetated areas, landfill gas monitoring, groundwater and surface water monitoring, land and groundwater use restrictions, cleaning of the Turner Avenue storm sewer, and a contingency for implementation of ROD Amendment #1 if redevelopment design fails for some reason.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 03/30/1999**

Modification of the ROD Amendment's cleanup constituents to delete the non-site related contaminants.

Response Accomplishments: Completed

Remedial Investigation

Start Date: 09/12/1988	Primary Cost:	$815,000	Source: Federal
End Date: 09/30/1992	Secondary Cost:	$0	Source:

Interim Response Site fencing to reduce access and initiated measures to suppress lead contaminated dust from blowing off-site. Amount expended is unknown at this time as well as the actual months of start and end dates. The file states a start in 1991 and completion in 1992.

Start Date: 01/30/1991	Primary Cost:	$0	Source: Federal
End Date: 01/30/1992	Secondary Cost:	$0	Source:

Remedial Design Hazardous waste landfill cap, pump and treat of contaminated groundwater, consolidation and solidification of landfill mass, installation of slurry walls and fencing.

Start Date: 03/30/1993	Primary Cost:	$1,062,000	Source: Federal
End Date: 07/01/1996	Secondary Cost:	$0	Source:

Remedial Design Remedial design of ROD Amendment #2.

Start Date: 08/19/1996	Primary Cost:	$0	Source: Private
End Date: 07/12/1998	Secondary Cost:	$49,000	Source: Federal

Remedial Action Remedial action of ROD Amendment #2.

Start Date: 01/30/1999	Primary Cost:	$5,200,000	Source: Private
End Date: 01/30/2001	Secondary Cost:	$289,300	Source: State

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

The First FYR was completed by the EPA in May 2004 and it concluded that the remedy continues to be protective of human health and the environment.

Start Date: 01/30/2004	Primary Cost:	$25,000	Source: Federal
End Date: 05/28/2004	Secondary Cost:	$0	Source:

5 Year Review

The Second FYR was completed in May 2009. The assessment of this FYR determined that the remedy was constructed in accordance with the requirments of the 1992 ROD, the 1998 ROD Amendment and the 1999 ESD. The remedy components, including the excavation and removal of contaminated soils, maintenance of the cover systems, and long-term groundwater monitoring, are functioning as designed. There is no evidence of cap breach and thus no current exposure. The remedy components of the decision documents are operating as intended and are considered to be protective of human health and the environment in the short term. The immediate threats have been addressed and the remedy will be protective in the long term once ICs are fully implemented at the site.

Start Date: 10/30/2008	Primary Cost:	$25,000	Source: Federal
End Date: 05/20/2009	Secondary Cost:	$0	Source:

5 Year Review

The Third FYR was completed in May 2014 by the EPA. The review found that the remedy was functioning as designed and is protective in the short term because no unacceptable exposures are occurring. The soil cover, building foundations, and asphalt pavement are intact and in good condition, and the fencing encircling the property limits site access.

To be protective in the long term the following needs to be addressed: re-evaluate the need for a RC to be filed on the adjacent Baker Property; collect one final round of groundwater data; and continue implementing the requred O & M activities and report development.

Start Date: 05/01/2013	Primary Cost:	$25,000	Source: Federal
End Date: 05/20/2014	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance

Ongoing maintenance of the site capping, which includes warehouses with concrete floors, paving, and landscaping. Periodic indoor air monitoring and groundwater monitoring.

Start Date: 01/31/2001	Primary Cost:	$0	Source: Private
End Date: 01/30/2029	Secondary Cost:	$0	Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$8,537	$0	$0	$8,490	$0

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$40,000	$0	$0	$40,000	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$9,211	$0	$0	$9,210	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$40,000	$0	$0	$35,658	$0

Cooperative Agreement Number V995259-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Design	$9,041	$0	$0	$9,040	$0
Totals:	$106,789	$0	$0	$102,399	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Kentwood Landfill
4900 Walma Avenue
Kentwood , MI

County: Kent
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: F1
State Site ID#: 41000039
State Site Score: 33

LOCATION
The Kentwood Landfill occupies 72 acres in the city of Kentwood, Kent County, Michigan, at 4900 Walma Avenue. The site is bordered to the east by Plaster Creek.

SITE HISTORY
The site was placed on the National Priorities List on September 8, 1983. Until 1972, the site was used as an open dump. From 1972 until 1975, Kent County operated the site as a municipal landfill. It remains uncertain whether the landfill received hazardous wastes; no documentation has been found which definitively answers this question. The county installed a leachate collection system, but maintenance problems led to contamination of nearby Plaster Creek with leachate containing organic compounds, heavy metals, and cyanide.

The city of Kentwood and Kent County conducted a Remedial Investigation/Feasibility Study (RI/FS) and evaluated the measures needed to control leachate and protect groundwater. The Record of Decision (ROD) was issued on March 29, 1991, requiring an upgrade of the cap to meet the requirements of the Solid Waste Management Act, 1978 PA 641, as amended, extraction and treatment of contaminated groundwater to achieve health-based groundwater cleanup criteria, installation of a leachate outbreak control system, construction of a fence around the site, institutional controls (ICs), and deed restrictions. In August 1991, the city of Kentwood and Kent County signed a Consent Decree for Remedial Design/ Remedial Action (RD/RA) to implement the ROD. Construction of all RA elements was completed in 1995, and the Construction Completion report was submitted December 27, 1995.

The EPA conducted Five-Year Reviews (FYRs) in 1999 and 2004. Findings of both the reviews included: continuing leachate outbreaks at a few locations; lead of uncertain origin in a residential well, at intermittent and low concentrations; perched leachate in the northwest corner of the main (northern) landfill, as well as in the southwest end of the southern extension; a submerged gas vent; small areas of vegetative cover erosion; and a small area of fence in need of repair.

On June 2, 2009, the EPA approved an exemption to the existing ICs (deed restriction preventing construction of buildings and the presence of humans for any purpose other than operation and maintenance [O & M] of the remedy) to allow a public library to be constructed within approximately 50 feet of the solid waste fill boundary. The EPA required the potentially responsible parties (PRPs) to complete a limited methane investigation and implement a methane monitoring plan for the area between the solid waste fill and the proposed library building. The investigation found that methane gas was present in the subgrade at concentrations up to 40 percent by volume. Construction of the library building began in the spring of 2009, including engineering controls to address methane migration. The EPA and MDEQ are working together to assist the PRP with determining acceptable methane gas mitigation measures for the area of the site by the library building.

The Third FYR was completed by the EPA on October 23, 2009. The EPA determined that the remedy is protective of human health and the environment in the short term and that long-term protectiveness requires compliance with effective ICs that must be maintained, monitored, and enforced. The MDEQ has a different interpretation of how the remedy is being implemented, level of protectiveness, and compliance with the ROD. The MDEQ agrees that the remedy is likely protective in the short term because although aluminum, arsenic, and lead have been detected in residential wells, there is no information to suggest that the residential wells are being used as drinking water supplies. Site chemical monitoring of the groundwater indicates that after 15 years of active remediation, contamination (volatile organic compounds and metals) persists, and at perimeter monitoring locations, contamination is increasing. Deed restrictions and a groundwater use ordinance have been executed to prevent use of groundwater.

In response to the recommendations from the IC Study to determine if the isolation zone needs to be expanded, the PRPs sampled additional existing monitoring wells to verify the boundaries of the contaminated groundwater plume in June 2011. Draft summary of the groundwater sampling event indicates that contaminated groundwater has migrated in a radial pattern from the landfill in both upgradient and downgradient locations.

The PRPs completed vertical aquifer profiling of the upper aquifer and aquitard at the landfill ravine perimeter and shallow water sampling in the surrounding wetlands in June 2011. The study identified the continued contamination of the upper aquifer that discharges via leachate breakouts to the Plaster Creek. However, amendments to Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), relating to groundwater surface water interface pathway which became effective in June 2012 were evaluated and it was determined that no additional response activities would be required beyond improved leachate collection and achievement of the groundwater cleanup standards.

The Fourth FYR Report was signed on October 20, 2014. Recommendations for follow-up actions included addressing landfill gas migration to the adjacent public library and Department of Public Works Building, ongoing leachate breakouts into the Plaster Creek Ravine, and improvement of collection system operation to allow all extraction points to operate continuously and improve the reduction of contaminant concentrations outside of the waste.

In 2015, the PRPs voluntarily designed and installed a supplemental leachate collection system in the Consumer’s Energy ravine between the original and southern extension landfills. The system consists of media and pipe drains to collect leachate migrating from the southern extension landfill into the ravine. The collected leachate is piped to the onsite pre-treatment plant for discharge to the local publicly owned treatment works. The supplemental collection system has improved leachate collection in the Consumer’s Energy ravine, however, additional collection is still necessary to eliminate leachate breakouts into the ravine.

In 2015, the PRPs designed and installed an active landfill gas collection system for the areas public library and Kent County Department of Public Works building. The system consists of modified landfill gas vents into gas collection wells with flaring of the collected gases. The system was started up in late 2015. Evaluation of the performance of the system is ongoing as the PRPs have submitted a limited amount of construction and operational data.

In 2016, the PRPs completed a landfill gas migration study for the areas northeast of the public library (original landfill) and east of the Public Works building (southern extension).

The investigation confirmed migration of landfill gases beyond the solid fill boundary in both locations. The PRPs installed monitoring gas probes and have begun design of active landfill gas extraction to address these areas. The construction completion of active gas extraction system was achieved in December 2017. The PRPs voluntarily monitored indoor air in nearby residential buildings and the Public Works building. Methane gas was not detected during indoor air monitoring events.

The original estimated duration of operation of the extraction and treatment systems was nine years; however, the system has currently been operating for more than twice the estimated duration of years without achieving the ROD's cleanup goals. The extraction and treatment systems will need to operate for a significant duration until the volume of leachate within the landfill is reduced and kept under control to eliminate leachate and contaminated groundwater breakouts at the landfill perimeter.

SITE STATUS

In August 2017, the PRPs finalized the expansion of the active gas collection and control system. The system includes shallow and deep extraction wells at nine locations at the western edge of the Original and Southern Extension Landfill areas. Construction completion of the active gas collection system was achieved in December 2017 and the system has been operational ever since. Eleven new shallow and deep gas probes were installed west of the nine newly installed extraction wells area to monitor effectiveness of the active gas collection system. The PRPs have been collecting weekly methane readings from monitoring probes and extraction probes.

The MDEQ continues to advocate for elimination of leachate outbreaks and reduction of leachate within the landfilled wastes. The PRPs are continuing to consider additional leachate collection from the landfill.

ENFORCEMENT STATUS

Two PRPs have assumed responsibility for conducting and paying for remediation of the site: the city of Kentwood and Kent County. They have an agreement that the county pays 80 percent and the city pays the remaining 20 percent of site costs. Under various agreements with the EPA, these PRPs have covered most of the remedial costs for this site. The PRPs continue to conduct site work and pay for site costs, which are limited now to groundwater treatment and monitoring, O & M, and agency oversight costs. Pursuant to the Municipal Landfill Cost-Share Grant Program, the state provided 50 percent cost-share to the PRPs for the remedial and O & M costs for the site incurred from July 1996 through 2005.

The above PRPs are liable under the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, as amended. Because of their association with the deposition of the wastes on the site, they may also be liable under Part 201, of the NREPA.

SPECIAL CONSIDERATIONS

The site was eligible for the state's Municipal Landfill Cost-Share Grant Program which reimbursed 50 percent of eligible costs incurred from July 1996 to 2005. In total, Kent County has received $1,548,763 in such funds.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 03/29/1991**

The ROD was issued on March 29, 1991, requiring an upgrade of the cap to meet the requirements of the Solid Waste Management Act, 1978 PA 641, as amended; extraction and treatment of contaminated groundwater to maintain health-based groundwater cleanup criteria; installation of a leachate outbreak control system; construction of a fence around the site; ICs; and deed restrictions. The state concurred with the ROD and participated in negotiation of the RD/RA Decree.

Response Accomplishments: Completed

Negotiations RI/FS negotiations.

Start Date: 05/15/1985	Primary Cost:	$0	Source: Private
End Date: 11/15/1985	Secondary Cost:	$0	Source: Federal

Remedial Investigation Investigation of the groundwater.

Start Date: 12/13/1985	Primary Cost:	$2,500,000	Source: Private
End Date: 03/29/1991	Secondary Cost:	$13,000	Source: Federal

Negotiations RD/RA negotiations.

Start Date: 04/16/1991	Primary Cost:	$0	Source: Private
End Date: 08/28/1991	Secondary Cost:	$0	Source: Federal

Remedial Design Private (PRP) expenditures are unknown.

Start Date: 11/27/1991	Primary Cost:	$0	Source: Private
End Date: 03/17/1994	Secondary Cost:	$237,000	Source: Federal

Remedial Action RA consisted of an upgrade of the cap to meet the requirements of the Solid Waste Management Act, 1978 PA 641, as amended; extraction and treatment of contaminated groundwater to maintain health-based groundwater cleanup criteria; installation of a leachate outbreak control system; construction of a fence around the site; ICs; and deed restrictions.

Start Date: 03/17/1994	Primary Cost:	$5,000,000	Source: Private
End Date: 12/27/1995	Secondary Cost:	$194,000	Source: Federal

5 Year Review The EPA conducted the review and their report concluded that the remedy was protective of human health and the environment.

Start Date: 06/08/1999	Primary Cost:	$0	Source: Federal
End Date: 10/15/1999	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

Findings: continuing leachate outbreaks at a few locations; lead of uncertain origin in a residential well, at intermittent and low concentrations; perched leachate in the northwest corner of the main (northern) landfill, as well as in the southwest end of the southern extension; a submerged gas vent; small areas of vegetative cover erosion; and a small area of fence in need of repair. Issues still being addressed.

Start Date: 06/01/2004	Primary Cost:	$0	Source: Federal
End Date: 09/30/2004	Secondary Cost:	$0	Source:

Remedial Investigation

On January 21, 2009, soil gas concentrations of methane were discovered to be greater than 5 percent (the lower explosive limit) in soil borings located within the footprint of the proposed public library. The EPA required the PRPs to complete a limited methane gas investigation and monitoring plan which documented methane concentrations in soil gas at concentrations 49 to 60 percent by volume.

Start Date: 01/21/2009	Primary Cost:	$5,000	Source: Private
End Date: 09/01/2009	Secondary Cost:	$0	Source:

Remedial Action

On June 2, 2009, the EPA approved an exemption to the existing ICs (deed restriction preventing construction of buildings and the presence of humans for any purpose other than O & M of the remedy) to allow a public library to be constructed within approximately 50 feet of the solid waste fill boundary.

Start Date: 03/10/2009	Primary Cost:	$0	Source:
End Date: 06/02/2009	Secondary Cost:	$0	Source:

5 Year Review

A FYR was completed by the EPA on October 23, 2009. The EPA determined that the remedy is protective of human health and the environment in the short term and that long-term protectiveness requires compliance with effective ICs that must be maintained, monitored, and enforced. The MDEQ has a different interpretation of how the remedy is being implemented, level of protectiveness, and compliance with the ROD.

Start Date: 07/21/2009	Primary Cost:	$0	Source:
End Date: 10/23/2009	Secondary Cost:	$0	Source:

Remedial Investigation

The PRPs submitted a work plan to investigate the groundwater to surface water interface discharge of leachate and contaminated groundwater from the landfill into the wetlands surrounding the site and Plaster Creek. Field work was completed in June 2011 and summary of the work was submitted in December 2011.

Start Date: 10/12/2009	Primary Cost:	$60,000	Source: Private
End Date: 12/01/2011	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Design The PRPs designed a landfill gas mitigation system for the area between the solid fill boundary and the new library. Additional design work was completed to provide capture of leachate from the southern extension landfill that is discharging to the Consumers Energy ravine and into the stormwater handling system for the ravine.

Start Date: 09/14/2010	Primary Cost:	$100,000	Source: Private
End Date: 08/31/2015	Secondary Cost:	$0	Source:

5 Year Review The EPA determined the site to be protective of human health and the environment in the Fourth FYR Report, signed on October 20, 2014. A summary of recommendations for follow-up actions includes addressing landfill gas migration to the adjacent public library and Department of Public Works Building, ongoing leachate breakouts into the Plaster Creek Ravine, and improvement of collection system operation to allow all extraction points to operate continuously and improve the reduction of contaminant concentrations outside of the waste.

Start Date: 11/01/2013	Primary Cost:	$0	Source: Federal
End Date: 10/20/2014	Secondary Cost:	$0	Source: Private

Remedial Design Design of the expansion of the active landfill gas collection system to control migration of the landfill gases.

Start Date: 08/01/2016	Primary Cost:	$0	Source:
End Date: 08/31/2017	Secondary Cost:	$0	Source:

Response Accomplishments: In Progress

Remedial Action PRP-lead construction of the landfill gas mitigation system and improvements to the contaminated groundwater and leachate collection system. Construction of an active gas collection system and supplemental leachate collection in the Consumer's Ravine was completed in 2015. The PRPs have supplied limited construction and operation documentation; construction completion has not yet been awarded for either system.

Start Date: 01/01/2015	Primary Cost:	$500,000	Source: Private
End Date: 07/31/2018	Secondary Cost:	$0	Source:

Remedial Investigation In response to the Five Year Review recommendation, the PRPs investigated the potential landfill gas migration north of the public library and east of the Public Works building. Methane concentrations up to 60% were identified as various locations. Field work has been completed but summary documentation of the investigation has not yet been submitted.

Start Date: 01/01/2016	Primary Cost:	$50,000	Source: Private
End Date: 07/31/2018	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: In Progress

Remedial Action Construction of the expanded active landfill gas system. Final construction completion reports have not been submitted.

Start Date: 09/25/2017 Primary Cost: $0 Source:

End Date: 07/31/2018 Secondary Cost: $0 Source:

Response Accomplishments: Ongoing

Operation and Maintenance The EPA estimates that O & M for this landfill will continue for at least 30 years, for an approximate total of $5,000,000. Average annual cost is $167,000. O & M costs estimated by the PRPs for 2009 through 2012 ranged from $300,000 to $500,000. Significant capital costs are necessary to upgrade aged, failing infrastructure as well as for landfill gas mitigation systems to protect the public library and other adjacent buildings.

Start Date: 03/26/1996 Primary Cost: $500,000 Source: Private

End Date: 01/01/2026 Secondary Cost: $0 Source: Federal

Response Accomplishments: Future Need

5 Year Review FYRs are planned to be conducted every five years.

Start Date: 01/01/2019 Primary Cost: $0 Source:

End Date: 10/23/2019 Secondary Cost: $0 Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$8,148	$0	$8,148	$8,148	$8,148

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$16,583	$0	$0	$16,583	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$13,706	$0	$0	$13,706	$618

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$30,115	$0	$0	$30,115	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$27,489	$0	$0	$27,489	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$20,321	$0	$0	$20,321	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$177	$0	$0	$176	$0

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$35,000	$0	$0	$30,842	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$70,000	$0	$0	$63,825	$0
Totals:	$221,538	$0	$8,148	$211,204	$8,766

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Organic Chemicals, Inc.
3291 Chicago Dr., SW
Grandville , MI

County: Kent
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: 9P
State Site ID#: 41000051
State Site Score: 41

LOCATION
Organic Chemicals, Inc. is located at 3291 Chicago Drive SW, Grandville, Kent County, Michigan. The site occupies five acres of land approximately three quarters of a mile southeast of the Grand River.

SITE HISTORY
Starting in the early 1930s, the site was used for petroleum refining, transport, and storage. A succession of petroleum-related industries operated on the property until its purchase in 1968 by Spartan Chemical. Spartan Chemical bought the property to be used by its subsidiary, Organic Chemicals, Inc., for solvent reclamation and chemical manufacturing. In 1979, Organic Chemicals, Inc. became the owner of the property by conveyance of deed from Spartan Chemical.

Ongoing operations included recycling approximately 100,000 gallons of used solvents (such as paint thinners) per month and manufacturing specialty chemicals used in pharmaceuticals and industry. Between 1968 and 1980, company records indicate process waste and cooling water was discharged containing listed and characteristically hazardous materials into a seepage lagoon located on the property. In November 1979, an employee of Organic Chemicals, Inc. spilled 2,200 gallons of lacquer thinner. Some of the spilled thinner was recovered and disposed of into the seepage lagoon. Discharge of wastewater into the seepage lagoon ceased in 1980 because a pre-treatment facility was constructed on-site. Soils beneath the former lagoon were found to be heavily contaminated with hazardous materials. In September 1981, 280 cubic yards of lagoon sludge were excavated and removed. That same year the MDEQ directed Organic Chemicals, Inc. to conduct a hydrogeological study to determine the effect of past disposal practices on the groundwater. This study indicated the groundwater was contaminated with site-related volatile organic compounds (VOCs). Organic Chemicals, Inc. closed the seepage pond in 1980 and installed the wastewater pre-treatment facility. Remedial investigation (RI) data indicate that this seepage lagoon was a major source of non-petroleum hazardous waste contamination at the site. The EPA placed Organic Chemicals, Inc. on the National Priorities List in September 1983.

In 1986, the Michigan Department of Natural Resources investigated a complaint that Organic Chemicals, Inc. personnel were illegally disposing of hazardous wastes at the facility. As a result of this investigation, the EPA cited Organic Chemicals, Inc. as being in violation of the Resource Conservation and Recovery Act, 1976 PA 94-580, as amended (RCRA), which regulates the handling and disposal of hazardous wastes, and fined the company for these violations. In 1987, Organic Chemicals, Inc., in cooperation with the MDEQ, voluntarily conducted an investigation. Approximately 150 buried drums were discovered and removed from near the southwest corner of the warehouse building. Groundwater samples from monitoring wells near the burial location and soil samples from the bottom of the excavated area showed VOC contamination. Organic Chemicals, Inc. was not able to obtain a RCRA permit and went bankrupt before the RCRA closure could be performed. Organic Chemicals, Inc. was never decommissioned or properly closed and

subsequently abandoned.

The EPA, in cooperation with the MDEQ, began an RI at the site in April 1989. The first phase of this investigation indicated that the most significant area of contamination at the site is a plume of upper groundwater contamination under the location of the former seepage lagoon. The RI identified contaminants of concern, determined the extent of this contamination in the upper groundwater system, and assessed the risks associated with these contaminants.

On September 30, 1991, the EPA issued a Record of Decision (ROD) for an interim groundwater extraction and treatment system. The potentially responsible party (PRP) group installed and operated a groundwater extraction well and water treatment system pursuant to this ROD.

On January 17, 1997, the EPA issued a second ROD for the final groundwater and soil remedy. The ROD called for the continued operation of the groundwater extraction well and treatment system remedy, and expansion of the system if necessary, as well as excavation and/or solidification of contaminated soils. In 1997, after the PRPs received a letter from the MDEQ Surface Water Quality Division, informing them that their treated groundwater discharge failed effluent toxicity tests and was, therefore, out of compliance, the PRPs turned the extraction system off and to date, it has not been reactivated.

The PRPs completed their Remedial Action (RA) for contaminated soil at the site. The soil RA used existing soil data obtained from the RI and allowed excavation of heavily contaminated soils as identified in the RI. These excavations did not remove all the contaminated soils, but removed some contaminated soils. After excavation, the site-wide risk was recalculated. This RA did not address all the highly contaminated soils of the site, since VOCs were not chemicals of concern for soils. The PRPs failed to address the numerous Organic Chemicals, Inc. facility subsurface pipes containing RCRA hazardous waste or the pre-treatment facility that contains heavily contaminated water and sludge.

The EPA drafted an Explanation of Significant Differences (ESD) and the Preliminary Close Out Report, both of which were signed on September 30, 2003. A Five-Year Review (FYR) was conducted and signed September 30, 2004. The MDEQ's review of the EPA FYR found that the report did not accurately describe the remaining contamination problems at the site. Contamination remains above human health-based risk criteria.

The site is zoned for industrial use. The site has been sold to JJ Trucking and redeveloped. Commercial development has been active in the immediate areas and most of the adjacent land has commercial buildings.

Groundwater continues to exceed the required cleanup objectives of the ROD and Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, criteria at the alternate point of compliance. The PRPs are not monitoring the groundwater for all the contamination emanating from the former Organic Chemicals, Inc. facility. In an attempt to accelerate the groundwater remediation, the PRPs implemented an in-situ enhanced biodegradation Groundwater Pilot Study in May 2010. An emulsified oil was injected into the shallow groundwater aquifer.

The MDEQ and EPA worked with the PRPs to execute Institutional Controls (ICs) in the form of a Restrictive Covenant to institute use restrictions of the soils in the area which was executed and recorded by Kent County on December 13, 2013.

A Fourth FYR was completed in 2014 concluding the site is protective in the short-term.

Long-term protectiveness requires: compliance with ICs, specifically for the soils; update the Site Operations and Maintenance (O & M) Plans to prevent moving site buildings' floor slabs and concrete to prevent human health exposures to contaminated soils, facility piping, and waste that remain underneath, and to ensure the soils underneath all site buildings are not disturbed and no erosion is taking place; investigate the potential vapor intrusion threat posed by contaminants in soil and groundwater; and, develop and implement an IC Implementation and Assurance Plan.

SITE STATUS

MDEQ Superfund staff has documented to the EPA numerous technical concerns and compliance issues at the former Organic Chemicals, Inc. facility. The most immediate concerns are the direct contact and indoor air human health exposures that are occurring at the former Organic Chemicals, Inc. facility which has been redeveloped by JJ Trucking, and the contaminated groundwater flowing beneath the building located on the adjacent property.

The PRP continues to monitor the groundwater and submits an annual post shutdown groundwater monitoring report to the EPA and the MDEQ.

ENFORCEMENT STATUS

On January 6, 1992, the EPA issued a Unilateral Administrative Order (Order). The Order required the PRPs to institute the RA at the site. On September 21, 1992, the EPA executed a de minimis Order with 100 PRPs providing for payment of past costs in the amount of $1,384,714.

On June 5, 1995, the EPA issued a general notice letter and information request to an additional five PRPs. The PRP group stopped implementing the groundwater pump and treat (P & T) interim action. The EPA completed the RI and Feasibility Study (FS). The PRP group will implement the final site groundwater remedy.

The EPA negotiated with Total Petroleum to implement the soils remedy as outlined in the ROD. On March 16, 1994, the state notified Total Petroleum of their liability for the petroleum-related contamination at the facility. This notification was reissued March 1, 1996, under Part 201.

The MDEQ may eventually need to require the PRPs to remediate the site to a level that complies with Part 201 cleanup requirements if the RAs pursuant to Superfund are not adequate.

SPECIAL CONSIDERATIONS

The Organic Chemicals, Inc. facility was unable to obtain a RCRA hazardous waste treatment, storage, and disposal permit and subsequently tried to obtain a RCRA closure which was denied in 1991. The company subsequently filed for bankruptcy. The RCRA closure activities were never completed. The Organic Chemicals, Inc. site has existing piping from the production of pharmaceutical intermediates and solvent recovery. Organic Chemicals, Inc. facility piping exists throughout the facility connecting the chemical buildings, former aboveground storage tanks, solvent recovery buildings, and pre-treatment facility. These pipes contain both listed and characteristically hazardous wastes and act as a potential and actual continual source of VOCs to the groundwater. The concentrations and spatial distributions of VOCs found during the RI/FS were indicating hot spots in the soils throughout the site. The EPA has not required the Organic Chemicals, Inc. Soils RA to include remediation of the VOC-contaminated soils present on-site.

There is also significant petroleum-related contamination caused by past refinery operations and leakage from bulk storage terminals. The Comprehensive Environmental Response,

Compensation, and Liability Act, 1980 PL 96-510, as amended, "petroleum exclusion rule" prevented the EPA from addressing petroleum-related contamination at the Organic Chemicals, Inc. facility. To address oil-related contamination at the site, the state notified Total Petroleum of their liability at Organic Chemicals, Inc. under Part 201. Total Petroleum removed and backfilled four seepage lagoons near the Organic Chemicals, Inc. property in 1998. There was no closure certification for the removal of the lagoons, and no further effort has been made by Total Petroleum to address the petroleum contamination. The former refinery piping is also in existence at and around the Organic Chemicals, Inc. facility.

OPERABLE UNITS

00	Entire Site
01	Interim Action, Contaminated Groundwater
02	Final Remedy, Contaminated Groundwater & Soil Remedy

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The EPA conducted a FYR of the site, concluding that the remedies selected for this site remain protective of human health and the environment. The EPA recommended that an alternate point of compliance for groundwater be granted, assuming that the PRPs obtained enforceable land use controls and demonstrated that the groundwater is naturally attenuating and that the contaminated soil was remediated in accordance with the Operable Unit (OU) 2, Final Remedy, Contaminated Groundwater & Soil Remedy, ROD.

Start Date: 03/01/1999 Primary Cost: $0 Source: Federal
End Date: 09/15/1999 Secondary Cost: $0 Source:

5 Year Review A Second FYR was conducted by the EPA in fiscal year (FY) 2004, and signed September 30, 2004. The Second FYR did not address all contamination problems at the site. Contamination still exists above risk-based criteria. The report indicates, "The remedy is protective of human health and the environment in the short term and measures are being put in place to ensure protectiveness in the long term."

Start Date: 11/03/2003 Primary Cost: $0 Source: Federal
End Date: 09/30/2004 Secondary Cost: $0 Source:

5 Year Review A Third FYR was conducted by the EPA in FY 2009, and signed September 25, 2009. The Third FYR did not address all contamination problems at the site. Contamination still exists above risk-based criteria in the soil and at the alternate point of compliance. The report indicates the remedy is protective of human health and the environment in the short term, and long-term protectiveness requires compliance with effective ICs, specifically for the soils.

Start Date: 07/16/2009 Primary Cost: $0 Source:
End Date: 09/25/2009 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review A Fourth FYR was conducted by the EPA in FY 2014, and signed September 23, 2014. The Fourth FYR did not address all contamination problems at the site. Contamination still exists above risk-based criteria in the soil and at the alternate point of compliance. The report indicates the remedy is protective of human health and the environment in the short term, and long-term protectiveness requires compliance with effective ICs, specifically for the soils.

Start Date: 01/06/2014	Primary Cost:	$0	Source:
End Date: 09/23/2014	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance Long-term monitoring of groundwater alternate point of compliance and groundwater/surface water interface. Costs are estimated at $7,000/year. Vinyl chloride and benzene exceedances have been documented during the O & M period greater than maximum contaminant levels at the alternate point of compliance.

Start Date: 10/01/2002	Primary Cost:	$35,000	Source: Private
End Date: 09/30/2027	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

5 Year Review The EPA will conduct a FYR.

Start Date: 01/01/2019	Primary Cost:	$0	Source:
End Date: 09/23/2019	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Interim Action, Contaminated Groundwater

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/1991**

The Operable Unit 1, Interim Action, Contaminated Groundwater, ROD required the capture and treatment of the on-site contaminated groundwater.

Response Accomplishments: Cancelled

Remedial Action The PRPs designed, constructed, and operated the groundwater P & T system from 1995 through 1997. They aborted operation of the groundwater pump and treat system in 1997 due to high effluent toxicity which was in violation of the state of Michigan water quality standards.

Start Date: 05/09/1995	Primary Cost:	$20,000	Source: Private
End Date: 07/11/1997	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Interim Action, Contaminated Groundwater

Response Accomplishments: Completed

Remedial Investigation Initial investigation of soil and groundwater contamination.

Start Date: *04/22/1988* Primary Cost: $822,000 Source: Federal
End Date: *09/30/1991* Secondary Cost: $0 Source:

Interim Response Excavation and removal of 150 buried drums.

Start Date: *04/22/1988* Primary Cost: $0 Source: Private
End Date: *09/30/1991* Secondary Cost: $0 Source:

Remedial Design Design of the on-site groundwater P & T system. The system was damaged during the soil removal action and is no longer functional. This is a violation of the ROD which indicates that this system must be maintained and functional.

Start Date: *05/01/1992* Primary Cost: $60,000 Source: Private
End Date: *02/09/1994* Secondary Cost: $0 Source:

OPERABLE UNIT 02: Final Remedy, Contaminated Groundwater & Soil Remedy

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 01/17/1997**

Excavation of contaminated site soils, continuation and expansion of groundwater extraction and treatment.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 09/30/2003**

The ESD allows the continued shutdown of the groundwater extraction and treatment system while the Alternate Point of Compliance is being studied. It also allows soil to be disposed of off-site without treatment.

Response Accomplishments: Completed

Remedial Investigation Investigation of the extent of soil contamination and the nature and extent of groundwater contamination.

Start Date: *04/22/1988* Primary Cost: $1,357,000 Source: Federal
End Date: *02/05/1997* Secondary Cost: $0 Source:

Remedial Design Design of the soil removal.

Start Date: *01/01/1998* Primary Cost: $250,000 Source: Private
End Date: *10/01/2001* Secondary Cost: $0 Source:

OPERABLE UNIT 02: Final Remedy, Contaminated Groundwater & Soil Remedy

Response Accomplishments: Completed

Remedial Action Soil removal is complete but not adequate. Alternate point of compliance for the groundwater contamination has been proposed by the PRPs. Costs are from the ROD estimates.

Start Date: 10/01/2001 Primary Cost: $96,000 Source: Private

End Date: 06/30/2003 Secondary Cost: $0 Source:

Remedial Action As a response to the continuing exceedance of vinyl chloride and benzene at the alternate point of compliance, the PRP's consultant proposed a pilot study for enhancing remediation of source area (former seepage lagoon) groundwater and capillarity fringe soils. The pilot study consists of injection of an emulsified soy-lactate solution by low pressure pumping or gravity using direct push probing. The pilot study may have been successful in achieving slights reductions of contamination, however, pushing of the contamination beyond the study zone is suspected.

Start Date: 05/17/2010 Primary Cost: $0 Source:

End Date: 05/15/2015 Secondary Cost: $0 Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$687	$0	$0	$687	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$28,942	$0	$0	$28,942	$0

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$75,000	$0	$0	$75,000	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$82,065	$0	$0	$81,697	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995258-03 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$23,588	$0	$0	$23,587	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$11,997	$0	$0	$11,997	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$25,492	$0	$0	$25,492	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$11,476	$0	$0	$11,476	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$10,000	$0	$0	$8,317	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$127,000	$0	$0	$126,106	$0

Cooperative Agreement Number V995339-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$62,887	$0	$0	$62,887	$0
Totals:	$459,134	$0	$0	$456,189	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Sparta Landfill
10322 Alpine Avenue
Sparta , MI

County: Kent
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: 3N
State Site ID#: 41000060
State Site Score: 28

LOCATION
The Sparta Landfill site is a 27-acre, closed, solid-waste landfill located one-mile southeast of Sparta, Michigan. The area surrounding the site is rural.

SITE HISTORY
The site is owned by Kent County and Sparta Township and was operated by Kent County from 1972 to 1977. The landfill accepted municipal and household refuse. In 1977, the landfill was closed and inadequately capped with a three-foot sand cover. In 1979, organic solvents including benzene, toluene, ethylbenzene, and carbon disulfide were found in groundwater samples from on-site and nearby residential wells.

Four contaminated residential wells were replaced by Kent County in 1979. In 1982, nine monitoring wells were installed at the site as part of a hydrogeologic investigation performed by the MDEQ. The site was nominated to the National Priorities List in 1983. In 1991, the site was fenced and posted against trespassing by the Kent County Department of Public Works (DPW) under the direction of the MDEQ.

The EPA has identified the Kent County DPW and Sparta Township as potentially responsible parties (PRPs) for this site. The PRPs signed a Consent Order with the EPA in September 1993, agreeing to perform a remedial investigation/feasibility study (RI/FS). The PRPs and the MDEQ negotiated an Administrative Order by Consent (Order) for a "presumptive remedy" that required the installation of a clay cap compliant with Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). The Order was signed on February 7, 1994, and the landfill cap was completed in July 1996.

The RI was initiated in August 1996 and completed in 2000 to determine the nature and extent of groundwater and surface water contamination, including the potential threat to public health. The EPA approved a revised groundwater monitoring plan and focused FS submitted by the county in 2000.

The EPA issued a Record of Decision (ROD) on September 27, 2000, which specified a "no further action" remedy for the site but required long-term groundwater monitoring. The MDEQ did not concur with the EPA proposed remedy of "no-action" because it does not comply with Part 201, Environmental Remediation, of the NREPA. The major concerns with the EPA selected remedy are that it does not adequately address the contaminated groundwater discharge to the Rogue River, does not adequately restrict use of groundwater with contamination above drinking water standards, and does not provide for a suitable alternate water supply for the area affected by the plume.

The EPA and the Kent County DPW signed an Administrative Order by Consent on September 26, 2002, for implementation of the long-term monitoring program.

The First Five-Year Review (FYR) for this site was completed and signed by the EPA in

September 2007. The FYR recommended implementation of Institutional Controls (ICs) and development of a landfill gas monitoring plan and a contingency plan for the site.

The Second FYR Report was signed in August 2012. The Report indicated that the remedy is protective of human health and the environment in the short term because all known exposure pathways have been eliminated and ICs that protect the integrity of the landfill cap and other remedial components and prohibit site groundwater use are in place. The Review also recommended to expand the current IC to include a parcel in the southeast corner that could potentially be impacted by the plume.

In 2015, the MDEQ staff performed Mann-Kendall trend analysis evaluation for groundwater data collected at Sparta Landfill Site from 2007 through the current date. Based on the analysis, it was recommended to re-evaluate the hydrology of the landfill, particularly in the broader context of the potential hydraulic influence of the wetlands south and west of the Site; evaluate potential ammonia discharge from the Site; and update the current monitoring plan.

SITE STATUS

Currently, the groundwater at the site is being monitored quarterly and the landfill cap is being maintained by Kent County DPW. The MDEQ continues to review and provide written comments on the groundwater monitoring reports. The county has developed a long-term monitoring plan for the site. The state is continuing to fund monitoring of the nearby residential wells at a cost of approximately $3,600 per year.

The EPA has identified Sparta Landfill as a site that is "ready for anticipated use".

On April 29, 2016, MDEQ staff provided issues recommended for inclusion in the upcoming FYR Report. On June 2, 2017, EPA and MDEQ staff along with the PRP and their consultant conducted the FYR Site inspection.

EPA signed the FYR Report on August 8, 2017. The issues in the FYR Report consisted of: Fallen tree branches on the fence (O & M issue); IC needed for a small corner parcel; Evaluate whether landfill gas/methane is migrating to nearby residences (conduct a soil/gas investigation for methane and continue monitoring for methane gas in wells as elevated levels of dissolved methane in groundwater were discovered from the January 2017 hydrogeological investigation); Evaluate potential ammonia discharge from the Site; Shallow wells may exist near the Site that need to be identified and properly abandoned if found.

In June 2017, MDEQ approved the "Revised Work Plan for Methane Soil Vapor Sampling" prepared by FTCH consultants on behalf of the PRP. The investigation for both the soil vapor investigation and the existing vapor point monitoring was completed in August 2017. The results showed "normal" concentrations of methane in the existing vapor points and no detectable methane in the perimeter soil vapor points was observed. The results are being compiled into a report.

ENFORCEMENT STATUS

Kent County completed the capping activities under an Order with the state of Michigan. The groundwater remedial investigation (RI) was conducted under a Consent Order with the EPA. The state had attempted to take enforcement action lead to implement the selected remedy. The MDEQ began negotiations with Kent County for implementation of a remedial action that meets the requirements of the ROD and the requirements of Part 201. However, these negotiations were not successful. Subsequently, the EPA and Kent County DPW signed an Order on September 26, 2002.

SPECIAL CONSIDERATIONS
Kent County received a total of $364,417.35 under the Municipal Landfill Cost-Share Grant Program, which represents 50 percent of the eligible response activities (operation and maintenance and RI/FS) costs incurred from fiscal year (FY) 1996 through FY 2002. Kent County also received an insurance settlement of $3,125,000 for response activities at this site. As a result, Kent County repaid the $364,417.35 in grant funds to the state in March 2005.

OPERABLE UNITS

00	Entire Site
01	Soil, Design, and Installation of Landfill Cap
02	Groundwater

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 09/27/2000**

The EPA issued a "No Action" ROD, with groundwater monitoring remedy, without state concurrence.

Response Accomplishments: Completed

5 Year Review The First Five-Year Review for this site was completed and signed by the EPA in September 2007. The Five-Year Review recommended implementation of Institutional Controls, development of a landfill gas monitoring plan, and completion of a contingency plan for the site.

Start Date: 09/30/2006 Primary Cost: $0 Source: Federal
End Date: 09/30/2007 Secondary Cost: $0 Source:

5 Year Review The Second FYR Report was signed in August 2012. The Report indicated that the site is protective of human health and the environment in the short term because all known exposure pathways have been eliminated and ICs that protect the integrity of the landfill cap and other remedial components and prohibit site groundwater use are in place.

Start Date: 07/08/2011 Primary Cost: $0 Source:
End Date: 08/07/2012 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

The Third FYR was conducted in 2017 as hazardous wastes still remain on site. On August 8, 2016, MDEQ received a letter from EPA announcing the start of the FYR. On April 29, 2016, MDEQ staff provided to EPA a list of issues recommended for inclusion in the FYR Report. EPA signed the FYR Report on August 8, 2017. The issues in the FYR consisted of: Fallen tree branches on the fence (O & M issue); IC needed for a small corner parcel; Evaluate whether landfill gas/methane is migrating to nearby residences (conduct a soil/gas investigation for methane and continue monitoring for methane gas in wells as elevated levels of dissolved methane in groundwater were discovered from the January 2017 hydrogeological investigation); Evaluate potential ammonia discharge from the Site; Shallow wells may exist near the Site that need to be identified and properly abandoned if found.

On June 2, 2017, EPA and MDEQ staff along with the PRP and their consultant conducted the FYR Site inspection.

EPA signed the FYR Report on August 8, 2017. The issues in the FYR consisted of: Fallen tree branches on the fence (O & M issue); IC needed for a small corner parcel; Evaluate whether landfill gas/methane is migrating to nearby residences (conduct a soil/gas investigation for methane and continue monitoring for methane gas in wells as elevated levels of dissolved methane in groundwater were discovered from the January 2017 hydrogeological investigation); Evaluate potential ammonia discharge from the Site; Shallow wells may exist near the Site that need to be identified and properly abandoned if found.

The FYR Report concluded that the Site remedy is protective of human health and the environment because the implemented remedy is functioning as intended and all exposure pathways have been eliminated.

Start Date: 08/08/2016	Primary Cost:	$0	Source:
End Date: 08/08/2017	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

5 Year Review

Start Date: 07/08/2021	Primary Cost:	$0	Source:
End Date: 07/08/2022	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Soil, Design, and Installation of Landfill Cap

Response Accomplishments: Completed

Remedial Action Kent County installed the landfill cap as a presumptive remedy for the landfill.

Start Date: 09/30/1995 Primary Cost: $1,779,738 Source: Private

End Date: 09/30/1996 Secondary Cost: $0 Source:

OPERABLE UNIT 02: Groundwater

Response Accomplishments: Completed

Remedial Investigation Kent County implemented the RI pursuant to the 1993 Consent Order.

Start Date: 09/30/1996 Primary Cost: $770,070 Source: Private

End Date: 09/30/2000 Secondary Cost: $0 Source:

Remedial Design Kent County conducted the design of the long-term groundwater monitoring system.

Start Date: 10/30/2002 Primary Cost: $0 Source:

End Date: 09/30/2004 Secondary Cost: $0 Source:

Response Accomplishments: Ongoing

Operation and Maintenance Kent County continues to monitor the groundwater at the site. The MDEQ continues to review and provide written comments on the groundwater monitoring reports.

Start Date: 09/30/2003 Primary Cost: $300,000 Source: Private

End Date: 09/30/2020 Secondary Cost: $3,600 Source: State

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$8,798	$0	$8,798	$8,798	$8,798

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$47,587	$0	$0	$47,587	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$12,288	$0	$0	$12,288	$726

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$2,765	$0	$0	$2,765	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$17,419	$0	$0	$17,419	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$7,874	$0	$0	$7,874	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$12,405	$0	$0	$12,405	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$40,000	$0	$0	$38,212	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$75,000	$0	$0	$74,943	$0
Totals:	$224,136	$0	$8,798	$222,291	$9,524

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Spartan Chemical
2539 28th Street SW
Wyoming , MI

County: Kent
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: EP
State Site ID#: 41000119
State Site Score: 43

LOCATION
The Spartan Chemical Company is located at 2539 28th Street SW in the city of Wyoming, Kent County, Michigan. Commercial and industrial businesses border the site to the north, south, and west. Residential properties and a school are located east and northeast of the site. A school is also located adjacent to the property.

SITE HISTORY
The Spartan Chemical Company was a bulk chemical transfer and repackaging plant from 1952 to 1991. During its operation, the Spartan Chemical Company handled a variety of chemicals including aromatic solvents, napthas, alcohols, ketones, ethers, chlorinated solvents, and lacquer thinners. Prior to 1963, the company discharged its wastewater to the groundwater. Both above and underground storage tanks were used to store chemicals at the Spartan Chemical Company.

In 1975, groundwater contamination was detected during dewatering operations at a facility adjacent to the Spartan Chemical Company. The groundwater was contaminated with compounds including benzene, toluene, ethylbenzene, xylenes, and 1,1,1-trichloroethane. At that time, the Spartan Chemical Company was the only known handler of solvents in the area.

In 1984, the Spartan Chemical Company signed a consent order with the MDEQ agreeing to conduct an investigation and cleanup of the contaminated groundwater. After investigation of the site, the owner of the Spartan Chemical Company installed a groundwater extraction and treatment system. The treatment system consisted of a modified air stripper (originally designed to operate in the deep vacuum mode) and an incinerator for treatment of off-gases, with discharge of treated groundwater to the city of Wyoming's Publicly Owned Treatment Works (POTW).

The Spartan Chemical Company filed for bankruptcy in February 1992. For about one year, the MDEQ assumed responsibility for the continued operation and maintenance (O & M) of the groundwater treatment system as well as semiannual groundwater sampling. In 1993, the groundwater treatment system was shut down because the POTW refused to continue accepting treated groundwater from the site due to permitting issues.

This site is different than most Superfund sites because the typical Superfund process, including a Remedial Investigation (RI) Report, Feasibility Study (FS) Report, Proposed Plan, and Record of Decision (ROD) were not completed before construction of the treatment system. However, when the Spartan Chemical Company went bankrupt, it was necessary to complete the Superfund process to allow the state to receive federal funding under Superfund.

The MDEQ completed an RI/FS summary document in November 1992. A Proposed Plan went out for public comment in November 1992. The Proposed Plan recommended continuation of the existing groundwater treatment system as an interim cleanup action.

The interim ROD for this site was signed by the EPA and the MDEQ in June 1993. The MDEQ retained a contractor to complete the design work needed to modify the existing treatment system. The design work was terminated due to the likelihood that excessive levels of contamination, detected during additional RI fieldwork conducted during 1994, would significantly alter the treatment needs. The RI study focused on characterization of the site soils with additional groundwater characterization. This phase of the RI was completed in 1997. At that time, the EPA did not believe that there was enough information on the groundwater to support selection of a recommended alternative. It was decided that a remedy would move forward on the soil contamination while additional data were gathered to select a remedy for the groundwater. A focused FS, addressing the contaminated soil, was completed in October 1997. An Interim Action ROD selecting soil treatment using soil vapor extraction (SVE) was signed by both the EPA and the MDEQ in April 1998.

The MDEQ received federal funding in September 1998 for design of the SVE soil treatment system. The final design was completed in 2000. In September 1999, the EPA approved federal funding for the construction of the SVE system which began in the summer of 2000. Construction of the SVE system was completed in January 2001 and was scheduled to begin its 90-day Start-up and Demonstration period in April 2001. Due to problems in obtaining the necessary permit to discharge the process water to the city's Clean Water Plant, the Start-up and Demonstration period did not begin until September 2001. Upon start-up of the system in September 2001, it was discovered that operation of the system caused an exceedance of the local noise ordinance for both daytime and nighttime periods. Actions were taken to remedy the situation in the fall of 2001, but it was determined that permissible nighttime noise levels were still being exceeded. Due to the fact that the system cannot operate during winter months, the system was again shut down for the winter. In April 2002, work was started to remedy the noise issues with the system. A stack silencer was installed in the system in October 2002. This installation successfully remedied the noise issues and the 90-day Start-up and Demonstration period was officially begun. The system was again shut down for the winter months in late November 2002 and was restarted on April 1, 2003. Due to all the delays encountered, the initial twelve-month operation of the system was completed in September 2004. The EPA refused to fund the operation of the SVE system in 2005, so state funds were expended to continue operating the system. In 2006, the system was no longer effeciently removing volatile organic compounds (VOCs) from the site soils and the system was shut down. Though the SVE removed an estimated 20,000 pounds of VOCs, there still remains a large source area that will continue to impact the groundwater at the facility and that will continue to impact groundwater quality.

The MDEQ received federal funding to further characterize the groundwater contamination and evaluate cleanup options in March 1999. The additional investigation activities were initiated in 2000 and included the installation and sampling of monitoring wells, soil sampling, soil vapor sampling, treatability tests, and groundwater monitoring for the evaluation of natural attenuation as a potential remedy. A draft Technical Memorandum on the additional field investigations was submitted in September 2001. Additional sampling to support the RI was completed by the MDEQ in April 2003. The MDEQ also collected an additional round of groundwater samples in June and July 2005.

The final Additional RI Technical Memorandum addressing groundwater was submitted to the EPA on April 22, 2004. The Final FS Addendum for the groundwater was submitted to the EPA on May 10, 2004. The MDEQ submitted a final version of a draft Proposed Plan to the EPA presenting the final cleanup plan for the site on May 2, 2005, after gathering some additional information to support the evaluation of alternatives being considered. The EPA sent a response to the draft Proposed Plan in December 2005 requesting additional information. The MDEQ submitted a revised Proposed Plan in 2006.

An office building, warehouse, drum/tank storage building, storage/maintenance buildings, tank farm area, and loading dock were demolished in 2006 as part of site restoration activities. Two warehouses still remain. An inactive groundwater treatment system (air stripper) formerly located in the northwest corner of the site was also demolished in 2006. Thirty-four aboveground storage tanks were also removed from the site during the demolition activities. Funding for these restoration activities was provided by Kent County utilizing Brownfield Grant Money.

Soil samples collected from the central source area in 2006 confirmed that concentrations above soil saturation levels persist in some areas. These saturated soils continue to provide a source for further groundwater contamination and potential impact to the drinking water and surface water pathway. The 2006 soil gas study across the former plant site also indicated that remaining VOC levels could also present inhalation risks for any future site development. However, the final remedial action that will address the drinking water and the surface water pathway may also address the vapor intrusion pathway.

A final ROD addressing both soil and groundwater contamination was issued by the EPA on September 26, 2007. The major components of the selected remedy in the final ROD include the following remedial activities:

1. Institutional Controls Restricting Groundwater Use and Land Use.
2. Excavation and Off-site Disposal of Highly Contaminated Soils.
3. Expansion of the SVE System for Mitigation of Vapors.
4. Air Sparging/SVE.
5. In-situ Chemical Oxidation.
6. Contingency for Enhanced In-situ Bioremediation (if necessary).
7. Monitored Natural Attenuation (MNA).

The selected remedy is site-wide in scope and addresses all contaminated media; i.e., soil and groundwater, at the facility. A limited portion of the soils on the site are believed to contain principal threat wastes because of the high concentrations of highly mobile solvents that are present. Such soils that cannot be efficiently treated on-site will be excavated and disposed of off-site. The remaining contaminated soils and groundwater will be treated in-situ.

The EPA and the MDEQ agreed in late 2009 on an approach to address the remedial design (RD). Though funds to implement the RD were requested by the MDEQ in 2009, it was not made available by the EPA until 2010. In December 2012, the MDEQ and EPA agreed with the designation of complete for the RD for all of the Remedial Actions (RA) activities except the contingency for the enhanced in-situ bioremediation and potential modifications to the monitored natural attenuation.

RA activities began in early 2015 and actual on-site activies began in July 2015. However, during the initial phases of remedy implementation, discolored soils (e.g., purple, green and red) were identified which were not sufficiently explained by the conceptual site model. Sampling results indicated metals and VOCs present in surficial soils in excess of direct contact and soil volatilization criteria. Site work was temporarily halted to reassess the change in site conditions and further actions are being discussed with the EPA. A limited number of test pits were completed across the historic process area and samples collected for laboratory analysis. This work required supplied air personal protection equipment (PPE) for all employees within the exclusion zone to minimize their exposure risk. Routine employee air monitoring and community air monitoring were conducted.

SITE STATUS
The 2015 characterization effort revealed that existing data does not sufficiently identify the nature and extent of contamination at the site. To reduce risk of remedy failure, remedial action was postponed until a more thorough characterization could be conducted and appropriate remedial technologies can be re-evaluated. To reduce risk to the community prior to remedial action, an interim cover consisting of a geosynthetic clay liner and clean fill was placed over impacted areas of the site to prevent contact with soils, volatilization, and leaching to groundwater. Additional characterization efforts and a pilot test for the removal of the highly impacted fill are expected to take place in 2018.

A Five-Year Review (FYR) was completed in 2017. The site protectiveness was deferred until VI to adjacent structures and investigation of polychlorinated biphenyls (PCBs) and soils contaminated with metals is completed. Recommendations for follow up actions included investigation of VI, the extent of PCB and metals in soils onsite, and review of institutional controls (ICs).

ENFORCEMENT STATUS
The Spartan Chemical Company filed for bankruptcy in February 1992. There are no other known liable parties. A third party was paying the taxes for previous years in an attempt to assume property ownership. However, in early 2003 it was discovered that the property was going through foreclosure and would be deeded to the county. The MDEQ obtained an easement in June 2003. A restrictive covenant was placed on the property in October 2003 by Kent County, the property owner. The restrictive covenant prohibits use of the groundwater and establishes a restricted area of the site where excavation of soil, building demolition, and building construction are prohibited unless prior approval is granted by the MDEQ.

SPECIAL CONSIDERATIONS
Technologies for the groundwater remedy include in-situ chemical oxidation, groundwater extraction and treatment, air sparging with SVE, enhanced in-situ bioremediation, MNA, and surfactant-flushing with groundwater treatment.

OPERABLE UNITS

00	Entire Site
1	Plant Property Soils
2	Groundwater

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/26/2007**

This ROD selects the final cleanup plan for the site, which includes both soil and groundwater cleanup actions.

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Design Federal funding has been received for the RD for the entire site including soil and groundwater. This federal funded RD began in 2010 and was completed in 2014.

Start Date: *02/01/2010*	Primary Cost:	$1,250,000	Source:	Federal
End Date: *12/24/2014*	Secondary Cost:	$0	Source:	

5 Year Review Site protectiveness was deferred until VI to adjacent structures and investigation of PCBs and soils contaminated with metals is completed. Recommendations for follow up actions included investigation of VI, the extent of PCB and metals in soils onsite, and review of ICs.

Start Date: *11/01/2016*	Primary Cost:	$30,000	Source:	Federal
End Date: *09/26/2017*	Secondary Cost:	$0	Source:	

Response Accomplishments: Future Need

5 Year Review

Start Date: *01/03/2022*	Primary Cost:	$30,000	Source:	
End Date: *09/26/2022*	Secondary Cost:	$0	Source:	

OPERABLE UNIT 1 : Plant Property Soils

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 04/09/1998**

This was an interim action ROD to remediate contaminated soils using SVE.

Response Accomplishments: Completed

Remedial Investigation State lead.

Start Date: *10/01/1992*	Primary Cost:	$691,000	Source:	Federal
End Date: *04/09/1998*	Secondary Cost:	$0	Source:	

Remedial Design This was a state lead RD.

Start Date: *09/30/1998*	Primary Cost:	$100,245	Source:	Federal
End Date: *03/31/2000*	Secondary Cost:	$0	Source:	

Remedial Action State lead operation of the SVE system.

Start Date: *06/30/2000*	Primary Cost:	$1,770,300	Source:	Federal
End Date: *02/28/2006*	Secondary Cost:	$180,700	Source:	State

OPERABLE UNIT 1 : Plant Property Soils

Response Accomplishments: Completed

Remedial Design Final RA design was completed in 2012.

Start Date: 12/03/2007	Primary Cost:	$150,000	Source: State
End Date: 12/31/2012	Secondary Cost:	$100,000	Source: Federal

Response Accomplishments: In Progress

Remedial Action Partial federal funding was received on October 1, 2014, in the amount of $3,179,700. Additional federal funding in the amount of $2,036,700 was received June 11, 2015. The balance is still pending at this time. Excavation of source material and installation of redesigned SVE system began in the summer of 2015; however, site conditions identified previously unknown contamination and work has been temporarily placed on hold. Pilot testing of methods to excavate highly impacted soils that are characteristically hazardous are planned for 2018.

Start Date: 07/01/2015	Primary Cost:	$8,828,240	Source: Federal
End Date: 01/01/2019	Secondary Cost:	$980,915	Source: State

Remedial Design Investigation to delineate fill material and deep aquifer contamination because of data limitations and unknown site conditions discovered during the RA work that began in 2015. Work is 100% Federally funded. Partial award of $580,369 has been recieved.

Start Date: 09/01/2016	Primary Cost:	$1,740,731	Source: Federal
End Date: 12/31/2019	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

Operation and Maintenance Three years operation of SVE system to complete soil remediation (three years at $150,000 for a total of $450,000). Currently on hold pending outcome of pilot test for soil removal and further discussions with EPA.

Start Date: 10/01/2020	Primary Cost:	$150,000	Source: State
End Date: 09/30/2023	Secondary Cost:	$0	Source:

OPERABLE UNIT 2 : Groundwater

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 06/29/1993**

This was an interim action ROD that called for continued operation of the existing groundwater treatment system that was installed by the Spartan Chemical Company in 1988. There were no capital costs associated with this remedy and O & M cost was estimated at $6,000 per month.

OPERABLE UNIT 2 : Groundwater

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 1 **Effective 07/11/1995**

This Explanation of Significant Difference (ESD) modified the June 29, 1993, interim action ROD to postpone the design of the groundwater treatment system modifications until after all source area and groundwater data can be adequately evaluated.

Response Accomplishments: Completed

Remedial Investigation State lead RI.

Start Date: 10/01/1992 Primary Cost: $1,245,905 Source: Federal
End Date: 04/01/2007 Secondary Cost: $80,000 Source: State

Remedial Design Preliminary RD work done by DLZ; work revisited as part of the 2007 ROD.

Start Date: 09/26/1993 Primary Cost: $500,000 Source: Federal
End Date: 12/31/2007 Secondary Cost: $0 Source: State

Response Accomplishments: Future Need

Remedial Action Install and implement remedial activities including air sparging with ozone and chemical injection. Currently waiting EPA funding.

Start Date: 01/01/2019 Primary Cost: $2,970,000 Source: Federal
End Date: 12/01/2020 Secondary Cost: $330,000 Source: State

Long Term Remedial Action O & M of the groundwater sparge system and monitoring groundwater concentrations.

Start Date: 08/01/2020 Primary Cost: $900,000 Source: Federal
End Date: 08/01/2022 Secondary Cost: $100,000 Source: State

Operation and Maintenance O & M estimated at $200,000 per year.

Start Date: 08/01/2022 Primary Cost: $800,000 Source: State
End Date: 02/01/2026 Secondary Cost: $0 Source:

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995884-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$1,807,000	$180,700	$0	$1,802,698	$0
Remedial Design	$190,245	$0	$0	$186,659	$0

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995884-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$1,936,905	$0	$0	$1,898,648	$0

Cooperative Agreement Number V995884-02 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Design	$1,480,137	$0	$0	$1,480,137	$0

Cooperative Agreement Number V00E01389 : Open

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$6,197,315	$980,915	$0	$1,083,117	$139,984

Cooperative Agreement Number V00E02053 : Open

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Design	$580,369	$0	$0	$146,392	$146,392
Totals:	$12,191,971	$1,161,615	$0	$6,597,651	$286,376

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E01982 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$30,000	$0	$0	$30,000	$30,000
Totals:	$30,000	$0	$0	$30,000	$30,000

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: State Disposal Landfill
3954 East Beltline Avenue
Grand Rapids , MI

County: Kent
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: BS
State Site ID#: 41000062
State Site Score: 31

LOCATION
The State Disposal Landfill, Inc. site is located at 3954 East Beltline Avenue in a mixed residential and agricultural zoned area.

SITE HISTORY
The State Disposal Landfill, Inc. was a licensed waste disposal facility from 1966 until 1976. During this time the landfill accepted residential, commercial, and other wastes. Unconfirmed reports of liquid industrial waste disposal at the site are noted in the MDEQ files. Contaminants were detected in surface soils, surface water, sediments, perched water (leachate), landfill gas, and groundwater. In surface soils, surface water, and sediments, multiple inorganic constituents were detected above state and federal standards. Some semi-volatile organic compounds and pesticides were detected above upstream levels in surface water and sediments. Sediments were found to contain one volatile organic compound (VOC) in excess of upstream levels. Perched groundwater contains VOCs, multiple metals, and cyanide above federal and state standards. VOCs were detected in one or more of the landfill gas samples. Chemicals detected at elevated concentrations include lead, zinc, iron, thallium, trichloroethylene, vinyl chloride, benzene and perfluoronated compounds.

The site presented an acute public health concern because the groundwater was contaminated above acceptable state standards in downgradient residential wells and the Plainfield Township municipal water supply wells (i.e., the wells of the Versluis well field). The affected homes were provided with alternate water supplies and were subsequently hooked to municipal water main extensions in May and November 1991. The township installed an additional well field and used the contaminated wells only during peak demand times and were treated prior to distribution. In 1994, the potentially responsible party (PRP) began cost-sharing this treatment with the township.

The landfill is currently owned by S.C. Holdings, Inc., a subsidiary of Waste Management of North America. Waste Management of North America submitted several versions of a Remedial Action Plan (RAP) that the MDEQ determined was not administratively complete. After several years of negotiations failed to result in an approvable RAP, Waste Management of North America notified the MDEQ that they no longer wished to negotiate an Administrative Order by Consent under which to implement response actions at the site. In the summer of 2005, the PRPs implemented a voluntary interim response which resulted in the capping of the site and installing gas vents and a leachate collection system.

A Certificate of Completion was issued on October 2, 2012, documenting the remedial investigation/feasibility study (RI/FS) had been completed. The Certificate of Completion forgave Waste Management of North America years of outstanding costs associated with managing the site, with the understanding Waste Management of North America would effectively monitor the groundwater-to-surface water interface pathway going forward, would perform its other operation and maintenance (O & M) obligations, including monitoring the effectiveness of the Landfill Gas Monitoring System for methane gas, and would assure

effective deed restrictions and institutional controls are in place.

The MDEQ received the 2016 Annual Environmental Monitoring Report for the State Disposal Landfill site. This report presents the results of the environmental monitoring and inspection and maintenance activities conducted in 2016. Improvements have been made toward the collection of methane in the upper vadose zone at the landfill, however, the improvements to the groundwater monitoring network have not been initiated.

Although municipal water has been extended to areas where the underlying aquifer is known to be impacted by landfill contamination, Kent County (in cooperation with Plainfield Township) has been working toward identifying properties within and outside of this area that may contain groundwater wells impacted by landfill contamination. The PRPs provided an updated residential “Water Supply Well Survey” in 2016 that evaluated areas limited to where the PRPs believe its plume is known to exist.

Plainfield Township sampled the Versluis well field wells in March 2016 confirming detections made earlier by EPA (as part of the Unregulated Contaminant Monitoring Rule Monitoring). The results of the Plainfield Township sampling were above the recent (May 2016) EPA Lifetime Health Advisory (LTHA) value concentration for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) (i.e., 70 parts per trillion [ppt] combined concentrations). The township shut off the Versluis well field and began pumping exclusively from the East and West well field wells for providing municipal water. The Township also sampled the East and West well fields with analytical results of PFOS and PFOA concentrations less than the LTHA value.

MDEQ staff requested that Waste Management of North America include perfluorinated chemicals (PFCs) in the annual groundwater monitoring for the State Disposal Landfill to assist in determining the source area for the PFCs found in the Versluis Wellfield. Low levels of PFCs were detected in several groundwater monitoring wells above the LTHA value in groundwater monitoring wells at the State Disposal Landfill. Additional groundwater sampling for PFCs was conducted in 2017 and private residential wells downgradient of the State Disposal Landfill were also sampled for PFCs.

SITE STATUS

In 2017, three residential private wells were sampled and low levels of Perfluorobutanesulfonic acid and Perfluorohexanesulfonic acid were detected. Waste Management of North America denies that State Disposal Landfill is a significant contributing source of PFAS contamination to the Versluis well field. Additional residential wells east and south of the State Disposal Landfill are being sampled by Waste Management of North America for PFCs.

MDEQ is planning an investigation to assess potential sources of PFCs in the groundwater which have migrated to the Versluis Wellfield. The investigation will be conducted in early 2018.

MDEQ has requested that Waste Management sample 27 additional residential wells to the east of State Disposal. Waste Management has agreed to sample only a portion of these wells, so MDEQ will need to sample the remaining wells that Waste Mangement does not.

Additional funding is needed to complete the drilling program and residential well sampling discussed above.

ENFORCEMENT STATUS

S.C. Holdings, Inc. is a PRP under both the Comprehensive Environmental Response,

Compensation, and Liability Act, 1980 PL 96-510, as amended, and Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The state signed an Administrative Order by Consent (Order) with the PRPs in August 1994 to conduct an RI/FS. The PRPs agreed to develop the RAP. The 1994 agreement provided for past as well as future oversight costs for the RI/FS. S.C. Holdings, Inc. continued to pay the state's oversight costs for review of RAP submittals.

Although an approvable RAP was never submitted and negotiations to implement a document to ensure continued progress occurred at the site failed, a Certificate of Completion was issued and past outstanding costs were forgiven. Documented in the Certificate of Completion, costs were forgiven with the understanding that future progress at the site would continue.

SPECIAL CONSIDERATIONS

One residential well near the landfill (i.e., 4628 E Beltline Ave. NE, Grand Rapids) is being sampled quarterly because concentrations of site contaminants are detectable in the well water. The sampling is being done quarterly by the Kent County Health Department through a contract with the MDEQ. The 2016 results are below Part 201 residential drinking water criteria (per Part 201) for the parameters being monitored (which have not included PFOS and PFOA).

One additional residential well near the landfill (i.e., 4660 E Beltline Ave NE, Grand Rapids) will be sampled annually beginning in 2017. The sampling is being done by the Kent County Health Department through a contract with the MDEQ. The parameters to be monitored will not include PFOS and PFOA.

The Versluis Well Field (municipal wells) consists of five production wells: Production Well No. 1, Production Well No. 2, Production Well No. 3, Production Well No. 4, and Production Well No. 5. As an interim response, an air stripper was constructed for treatment of the groundwater extracted by the Versluis well field. Waste Management of Michigan, Inc. (a responsible party) in conjunction with Plainfield Township sampled the water from the five production wells. Water was also tested from the air stripper “raw water” and air stripper "treated water." The 2015 results (monthly May through September) of all production wells and “raw water” were below Part 201 residential drinking water criteria for the parameters being monitored (which have not included PFOS and PFOA). Also, comparison of the raw water samples collected before the air stripping towers to the effluent samples collected after the air stripping towers may indicate that the VOCs are being removed from the extracted groundwater to below detection. The Versluis Well Field was shut down from production in 2015 and will remain so until decisions are made in regard to the discovery of PFOS and PFOA.

OPERABLE UNITS

00	Entire Site
01	Landfill
02	Groundwater

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Cancelled PRP

Negotiations Waste Management of North America advised the MDEQ that they no longer wished to pursue an Order under which to perform remedial actions at the site.

Start Date: 01/30/2003	Primary Cost:	$30,000	Source: State
End Date: 10/01/2004	Secondary Cost:	$0	Source:

Response Accomplishments: Completed

Bottled Water See "alternative water" comments for cost estimates.

Start Date: 01/15/1990	Primary Cost:	$0	Source: State
End Date: 12/30/1992	Secondary Cost:	$0	Source:

Remedial Design Design of a landfill cap, leachate collection system, and gas venting system was conducted without benefit of an approved RAP. No change in groundwater response. Dates estimated.

Start Date: 06/01/2004	Primary Cost:	$0	Source: Private
End Date: 01/02/2005	Secondary Cost:	$0	Source:

Remedial Action Having ended negotiations on an Order with the MDEQ, the PRPs proceeded with landfill cap, leachate collection system, and gas venting system construction without benefit of an approved RAP. No changes in groundwater response. The MDEQ and the PRP met in March 2008 negotiations did not resolve disputes regarding the need for additional investigation.

Start Date: 01/02/2005	Primary Cost:	$0	Source: Private
End Date: 03/06/2006	Secondary Cost:	$0	Source:

Response Accomplishments: In Progress

Interim Response MDEQ staff will conduct a hydrogeogical investigation to determine the source of Perfluoronated Compounds to the Versluis Wellfield and assess Groundwater/Surface Water impacts.

Start Date: 09/30/2017	Primary Cost:	$130,000	Source: State
End Date: 09/30/2018	Secondary Cost:	$0	Source: <None>

OPERABLE UNIT 01: Landfill

Response Accomplishments: Completed

Remedial Investigation The state provided oversight of the RI/FS performed by the PRPs. Secondary costs were state contractual oversight costs.

Start Date: 04/30/1992	Primary Cost:	$0	Source: Private
End Date: 08/30/1995	Secondary Cost:	$81,000	Source: State

OPERABLE UNIT 01: Landfill

Response Accomplishments: Completed

Interim Response Removal of three buried drums found during test pitting.

Start Date: *07/01/1994* Primary Cost: $0 Source: Private
End Date: *07/03/1994* Secondary Cost: $0 Source:

Interim Response The PRP completed a voluntary interim response which included installation of a landfill cap, gas venting, and leachate collection system.

Start Date: *04/01/2005* Primary Cost: $0 Source: Private
End Date: *09/30/2005* Secondary Cost: $0 Source:

OPERABLE UNIT 02: Groundwater

Response Accomplishments: Completed

Remedial Investigation

Start Date: *04/15/1989* Primary Cost: $0 Source: Private
End Date: *11/30/1996* Secondary Cost: $0 Source:

Alternate Water

Start Date: *04/15/1992* Primary Cost: $100,000 Source: State
End Date: *12/30/1993* Secondary Cost: $0 Source:

Interim Response The PRPs signed an agreement with the township to cost-share for the treatment of contaminated groundwater at the township well field. Given the termination of the administrative order with this PRP, tracking an agreement that the department was not a party to is being terminated as well.

Start Date: *08/15/1994* Primary Cost: $0 Source: Private
End Date: *08/15/2014* Secondary Cost: $0 Source:

Response Accomplishments: Ongoing

Operation and Maintenance O & M with annual reports discussing landfill cap, leachate collection system, and landfill gas collection system and updated residential well survey report. Note: 160,000 is an estimated PRP cost for 2017 alone.

Start Date: *10/02/2012* Primary Cost: $160,000 Source: Private
End Date: *10/02/2022* Secondary Cost: $0 Source:

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Wash King Laundry
M-37
Baldwin , MI

County: Lake
MDEQ District Location: Cadillac
Managed By: RRD-Superfund

Federal Site Code: B3
State Site ID#: 43000007
State Site Score: 29

LOCATION
The former Wash King Laundry site (Site) is located along M-37 in Pleasant Plains Township, Lake County, about 1,500 feet south of the Pere Marquette River and about three miles south of Baldwin, Michigan. The former Wash King Laundry building has been razed. Current Site boundaries are generally defined by the Pere Marquette River to the north, Star Lake Road (76th Street) to the south, by the C & O Railroad to the west, and by a line approximately 300 feet east of highway M-37 on the east.

The Pere Marquette River is classified as a "Blue-Ribbon Trout Stream" and "Wild and Scenic River" and that is the downstream boundary of the Site. The area is very accessible and is a popular destination for vacationers, outdoor recreationalists, and anglers.

SITE HISTORY
Wash King Laundry (WKL) was a privately-owned Laundromat/dry cleaning facility in operation between 1962 and 1991 in Baldwin, Lake County, Michigan. Liquid waste was discharged to a series of unlined wastewater lagoons located approximately 500 feet west-southwest of the building. The dry cleaning operations used tetrachloroethylene, also known as PCE. PCE was stored at the building in a (leaking) underground storage tank, and discharged to the lagoons via wastewater.

At the time the Record of Decision (ROD) was published in 1993, the Pere Marquette Subdivision Plat, which comprises the Site, included 123 residential lots. Several commercially developed lots are within the Site, along M-37. Approximately 30 private wells were impacted. A community water supply well (and backup well) was installed and affected residents were required to hook up. There are currently 20 homes and three businesses utilizing the community water well(s).

The ROD called for off-site disposal of contaminated lagoon sediments, and a groundwater pump and treatment system. With the closing of the laundromat and dry cleaning operations, the water in the lagoons seeped into the ground (the lagoons dried up) and sediment subsequently was viewed as surface soils. Pre-design sampling of surface soils in the lagoon area and of the groundwater was completed during fiscal year 1995 and the data indicated remediation of the lagoons was neither necessary nor an appropriate expenditure of state and federal funds.

An Explanation of Significant Difference (ESD) was signed by the EPA with concurrence of the MDEQ, and included the following: no excavation of the lagoons; use of soil vapor extraction (SVE) for treatment of contaminated vadose zone soils under and around the Wash King Laundry building; groundwater extraction with treatment for organic contaminants; no deed restrictions on the area to be remediated; and drainage and removal of sumps in the Wash King Laundry building, along with demolition of the building. Expected remediation times were five years for soil and ten years for groundwater.

The SVE and groundwater treatment systems were completed and deemed operational and

functional in April 2002.

In 2006, the MDEQ assisted the EPA in conducting a Long-Term Monitoring Network Optimization Evaluation (Optimization Evaluation). On September 29, 2006, the MDEQ authored the First Five-Year Review (FYR), wherein many of the recommendations from the Optimization Evaluation were included. Both the Optimization Evaluation and the First FYR recommended additional activities to ensure protectiveness. Those activities include supplementing the existing groundwater monitoring well network to better characterize the extent of contaminated groundwater, conducting a capture zone study, delineating and more aggressively addressing a PCE source area (beneath the former WKL building), and installing additional optimally located and higher yielding groundwater extraction wells. Susequent Five-Year reviews acknowledged additional source area soils remained and required further evaluation. The source area soils were deemed Operable Unit (OU) 2 in 2014.

The MDEQ received grants or grant amendments in 2007, 2010, 2012, 2014, and 2016 to fund source area delineation; better characterize site contamination; to improve control of contamination migration; and, to implement an in-situ technology to further remediate (the primary, most concentrated) source area soils beneath the former WKL building in low permeability glacial till. The delineation of the primary source area near the former WKL building was conducted in 2008, 2009, and 2014, revealing elevated levels of PCE remain.

The groundwater remedy has been augmented with 27 additional monitoring wells to better characterize the full (horizontal and vertical) extent of contamination, and to allow an evaluation of ongoing remedial action(s) effectiveness. Three new extraction wells were installed to improve control and containment of contaminant migration, and are slowly reducing the footprint and/or magnitude of impacted groundwater. Implementation of the in-situ biological component to address source area soils beneath the former WKL building supplemented the groundwater pump and treat remedial effort. A total of 67 injection wells were installed in 2008 and an in-situ biological solution was injected over a period of two years. Although the in-situ component did reduce groundwater PCE concentrations from 32,000 micrograms per liter (ug/L) to around 4,500 ug/L, they have remained stable at the latter concentration. The contaminated groundwater and till unit release low concentrations of vapors containing volatile organic compounds (VOCs).

The primary source area characterization was summarized in a Remedial Investigation/Focused Feasibility Study (RI/FFS) report dated August 2014. The FFS served the purpose of initial screening of remedial alternatives.

SITE STATUS

In April 2012, following the ten-year Long-Term Remedial Action (LTRA) period, the state became solely responsible for funding the ongoing treatment systems. Operation and maintenance (O & M) of the pump and treat remedy is ongoing, and extraction well maintenance/rehabilitation is conducted annually to maintain effective capture and containment of contaminated groundwater. The MDEQ continues to monitor groundwater quality via sampling, and also to confirm that treated groundwater discharge does not have a harmful impact. The SVE system has been shut down and no longer operates. Vapor wells were installed in September 2016 and April 2017 and air samples are being collected on a quarterly basis. Initial results of the vapor sampling indicate that all VOC's are below applicable criteria. Annual costs for O & M are approximately $160,000.

The glacial till beneath the former laundromat, seepage lagoons, and the piping run between those areas have been designated by the EPA as OU2. The 2016 grant from the EPA funded the RI and a report summarizing those results was completed in June. The FS is

currently being finalized via an additional grant in 2017 from the EPA. The MDEQ will complete a Proposed Plan and ROD for OU2 following the completion of the Feasibility Study (FS).

ENFORCEMENT STATUS
In October 1991, Wash King Laundry filed for bankruptcy. The Site is an orphan site.

SPECIAL CONSIDERATIONS
Without addressing the remaining source areas, O & M of the remediation system(s), including monitoring will be infinite. Institutional controls (ICs) will be required and (re)development of several parcels of property will be unlikely.

OPERABLE UNITS

00	Entire Site
02	Source Areas

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 03/31/1993**
EPA concurrence; state initiated the ROD. The remedy consists of off-site disposal of contaminated lagoon sediments and groundwater treatment.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 07/01/1996**
O & M costs were not provided in the ESD. The overall change in remedy included adding SVE for treatment of soils at the Wash King Laundry building, elimination of lagoon excavation, updating cleanup criteria, elimination of treatment for inorganics in the groundwater, change of discharge location, removal of deed restrictions, and adding the possible demolition of the Wash King Laundry building.

Response Accomplishments: Completed

Alternate Water The potentially responsible party provided a municipal-type water supply for the affected homes and businesses.

Start Date: 01/01/1983	Primary Cost:	$35,000	Source: Private
End Date: 01/01/1984	Secondary Cost:	$0	Source:

Remedial Investigation State lead RI/FS.

Start Date: 09/10/1987	Primary Cost:	$555,813	Source: Federal
End Date: 03/31/1993	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Design State lead remedial design.

Start Date: 09/21/1993	Primary Cost:	$692,487	Source: Federal
End Date: 01/14/1998	Secondary Cost:	$0	Source:

Remedial Action The Remedial Action (RA) work is complete and the RA Report was received by the MDEQ in July 2003.

Start Date: 09/28/1998	Primary Cost:	$2,131,773	Source: Federal
End Date: 08/30/2003	Secondary Cost:	$236,864	Source: State

Long Term Remedial Action The ten-year LTRA period ended this year; and the state has assumed 100 percent costs for O & M.

Start Date: 04/17/2002	Primary Cost:	$1,170,000	Source: Federal
End Date: 04/16/2012	Secondary Cost:	$130,000	Source: State

5 Year Review The state received funding from the EPA to conduct the FYR. On September 29, 2006, the MDEQ authored the First FYR, wherein many of the recommendations from the Optimization Evaluation were added. Both the optimization report and the FYR recommended that some additional activities would be necessary to ensure protectiveness. Those activities include supplementing the existing groundwater monitoring well network, conducting a capture zone study, delineating and addressing an additional PCE source area, and installing additional extraction wells if deemed appropriate.

Start Date: 03/28/2006	Primary Cost:	$10,000	Source: Federal
End Date: 09/29/2006	Secondary Cost:	$0	Source:

5 Year Review The cost for completing the Five-Year Review was funded by a grant from the EPA. In order for the remedy to continue to be considered protective of human health and the environment, ICs (e.g., groundwater protection zones, well-drilling restrictions) are needed to prevent exposure to contaminants until soil and groundwater cleanup standards are achieved. Recommendations and follow-up actions identified within this report also need to be completed to further define the extent of impact. Long-term protectiveness will be achieved once the pump and treat system reaches cleanup levels (e.g., Maximum Contaminant Levels, state standards, etc.) in the groundwater.

Start Date: 03/01/2011	Primary Cost:	$0	Source: Federal
End Date: 09/29/2011	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

The cost for completing the FYR was funded by a grant from the EPA. The remedy at OU1 currently protects human health and the environment because there is no exposure to contaminated groundwater or soil. However, in order for the remedy to be protective in the long term, the following actions need to be taken to ensure protectiveness: Conduct a vapor intrusion investigation, prepare an Institutional Control Implementation and Assurance Plan; implement ICs; develop a long-term stewardship (LTS) plan or amend the existing O & M Plan to incorporate LTS procedures; complete a decision document requiring ICs; and, conduct the OU2 Supplemental RI/FS.

Start Date:	*02/16/2016*	Primary Cost:	$20,000	Source: Federal
End Date:	*09/23/2016*	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance

A groundwater pump and treat remedial system consisting of five extraction wells operates continuously to contain migration of, and to treat, contaminated groundwater. Groundwater is extracted at a rate of about 300 gallons per minute. The SVE system has been shut down. The in-situ biosolution injection system no longer injects a biosolution, but rather, only nutrient enriched treated groundwater. Each of the 67 injection wells receives approximately 225 gallons per week.

The extraction wells are on an annual maintenance/rehabilitation program to maintain desired maximum effectiveness and zone of capture. Groundwater samples are collected from the treatment system to monitor effectiveness and to ensure that treated discharged water does not impact the aquifer. Annual O & M costs are approximately $160,000.

As the pump and treat system ages, repairs and maintenance costs continue. Non-routine repairs in the past year total approximately $40,000.

Start Date:	*04/17/2012*	Primary Cost:	$160,000	Source: State
End Date:	*04/17/2042*	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

5 Year Review

Start Date:	*11/25/2020*	Primary Cost:	$0	Source:
End Date:	*06/30/2021*	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: Source Areas

Response Accomplishments: In Progress

Remedial Investigation

The investigation of the remaining source areas beneath the former site building was completed and an RI/FFS Report dated August 2014 summarized the findings. Cost associated with this activity was $100,500. In the fall of 2016, additional investigation ($99,500) was completed to define the extent of remaining source areas beneath the former piping run and wastewater seepage lagoons and an OU2 RI report was completed in June 2017. A FS is currently being finalized; and, a proposed plan and ROD or OU2 will be completed following the FS.

Start Date: 02/01/2014	Primary Cost:	$200,000	Source: Federal
End Date: 02/16/2019	Secondary Cost:	$0	Source:

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005950-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Long Term Remedial Action	$2,390,982	$239,098	$0	$2,249,327	$0
Remedial Action	$2,368,637	$236,864	$0	$2,370,417	$0
Remedial Design	$692,487	$0	$0	$692,487	$0
Remedial Investigation	$555,813	$0	$0	$555,813	$0

Cooperative Agreement Number V00E1307 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$100,561	$0	$0	$100,561	$0

Cooperative Agreement Number V00E01514 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$20,000	$0	$0	$20,000	$0

Cooperative Agreement Number V00E01983 : Open

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$232,868	$0	$40,000	$141,157	$118,871
Totals:	$6,361,348	$475,962	$40,000	$6,129,762	$118,871

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E192-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$20,000	$0	$0	$19,080	$0

Cooperative Agreement Number V965855-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$10,000	$0	$0	$9,885	$0
Totals:	$30,000	$0	$0	$28,965	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Metamora Landfill
1811 Dryden Road
Metamora , MI

County: Lapeer
MDEQ District Location: Lansing
Managed By: RRD-Superfund

Federal Site Code: H9
State Site ID#: 44000005
State Site Score: 36

LOCATION
The Metamora Landfill site (the site) is located in Metamora Township, Lapeer County, Michigan, about 1/2 mile east of the village of Metamora. The area is rural agricultural with housing developments interspersed. There are approximately 20 homes near the site with residential water supply wells, that are located north (generally downgradient) of the site. Some additional development is taking place.

SITE HISTORY
The now-capped Metamora Landfill is about 25 acres in size; there is no bottom liner. The landfill was closed in 1980 for failure to meet requirements under the Solid Waste Management Act, PA 641 of 1978, as amended. Although licensed to receive only general refuse, large amounts of industrial wastes (e.g., tens of thousands of 55-gallon drums) were also disposed of at the site. Remediation at the site has been handled through two discrete actions called operable units (OUs). OU1, Drummed Waste and Contaminated Soil, addressed the remediation of drummed waste and contaminated soils in two (Drum Area 1 and Drum Area 4) of the five known drum areas on-site. OU2 includes Landfill Capping and Monitored Groundwater Natural Attenuation.

Magnetometer studies and other investigations suggested as many as 20,000 drums of waste existed in the fill. Limited excavation and sampling of drums in two areas of the site were conducted in 1982. Various solvents, paint sludge, and other organic compounds were found. Sampling of monitoring wells began in August 1984. The site was placed on the National Priorities List on October 15, 1984.

OU1 (Drummed Waste and Contaminated Soil) removal activity entailed the excavation and off-site incineration of drummed waste and contaminated soils from Drum Areas 1 and 4. During the course of Drummed Waste and Contaminated Soil removal, it was discovered that the original estimate of the number of buried drums had been grossly underestimated. By December 1990, approximately 25,000 drums and 12,500 tons of contaminated soils had been excavated from just those two areas. The state's excavation activity was terminated in December 1990 due to a funding shortfall. In addition, as a result of difficulties encountered in finding incineration capacity for the types of wastes uncovered at the Metamora Landfill, approximately 9,600 85-gallon over-packed drums and 4,100 30-gallon and 16-gallon plastic drums containing excavated waste were staged on-site. In May 1991, a group of potentially responsible parties (PRPs), known as the Metamora Landfill Settling PRP Group (MLSPG) entered into a Consent Decree (Decree) with the EPA to complete the drum removal and to perform the OU2 (Landfill Capping and Monitored Groundwater Natural Attenuation) remedial action (RA). Approximately $4,133,087 of state funds and $29,742,834 in federal funds were allocated to this project as of December 1993.

The PRPs completed the RA for Drum Areas 1 and 4 in 1994 and shipped excavated drums and only the most heavily contaminated soils to off-site licensed incinerators. The excavated soils that were not as heavily contaminated were placed under the landfill grading layer during 1998 in preparation for final cap construction in 1999.

Groundwater contamination is present in multiple aquifers, including the bedrock aquifer in which nearby residential wells are installed. The contamination is not fully defined in any of the aquifers but, at locations explored and/or sampled, it is known to extend approximately 3/4 of a mile north of the landfill and over 200 feet below ground surface. Various industrial-type organic chemicals and heavy metals are present in groundwater, and it is expected that the buried industrial waste will act as a continual source of contamination. A Record of Decision (ROD) Amendment for Landfill Capping and Monitored Groundwater Natural Attenuation OU was signed in 2001, changing the remedy for groundwater to monitored natural attenuation (MNA), and maintained that landfill gas must be controlled at the landfill boundary. In April 2002, the MDEQ concurred with the ROD Amendment, contingent upon and with the understanding that an adequate long-term groundwater monitoring system would be installed to properly evaluate the MNA remedy.

In fall 2007, 1,4-Dioxane was first detected in a residential well located north of the northeast portion of the landfill. By 2013, the number of residential wells being impacted with contamination from the landfill had risen to as many as ten; however, the concentrations were below the criterion of 85 micrograms per liter (µg/l). In 2016 the criterion for 1,4-Dioxane was revised and lowered to 7.2 µg/L and residences with 1,4-Dioxane present in their water supply were supplied and/or offered alternate drinking water.

Landfill gas is migrating beyond the property landfill boundaries above the lower explosive limits, which is inconsistent with the ROD; but sampling in the off-site gas probes that have been installed suggest the extent may be limited.

The MDEQ has submitted numerous documents and conducted management level meetings and conference calls with the EPA in an effort to ensure the ROD and ROD Amendment for the Landfill Capping and Monitored Groundwater Natural Attenuation OU were implemented; to encourage addressing and implementing the issues and recommendations of the Third Five-Year Review (FYR) from 2004, Fourth FYR in 2009, and the Fifth FYR in 2014; and to be protective of public health in the short and long term.

The last FYR completed by the EPA in 2014 recognized that long-term protectiveness cannot be obtained without land and groundwater use restrictions. The EPA has not yet required the PRPs to fully define the extent of impacted groundwater or methane.

In July 2015, the EPA required additional investigation; however, subsequent work plans submitted by the MLSPG were inadequate and do not meet the intent of the required additional investigation. An additional vertical profile boring was conducted in early 2016 at a previously under-investigated area, and results indicated elevated levels of benzene and 1,4-Dioxane in several intervals of the shallow and intermediate aquifers, extending to 197 feet or more below ground surface.

A hydrogeologic investigation conducted in 2015 pursuant to a proposed sand and gravel mining operation northeast of the site indicated the presence of 1,4-Dioxane beyond any monitoring points associated with the landfill, and further downgradient than some residential wells being sampled. Such data confirms migration pathways exist beyond the established monitoring network.

SITE STATUS

The current groundwater monitoring network is not consistent with MNA guidance. The need for proper groundwater use restrictions for all aquifers continues to be emphasized by the MDEQ. The MDEQ continues to assert the groundwater monitoring network does not define the extent of contamination and that the monitoring being conducted is inconsistent

with MNA remedies. A completed exposure pathway exists and 1,4-Dioxane continues to migrate within the aquifer used as the drinking water source for area residents.

The MLSPG continues in discussions with Metamora Township regarding a possible extension of the municipal water supply to the affected residents and bottled water is supplied/offered to affected residents. Additional investigation is being planned and access is being negotiated with property owners down-gradient of the landfill.

ENFORCEMENT STATUS
In May 1991, a group of PRPs, known as the MLSPG, liable under the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, as amended, entered into a Decree with the EPA to complete RA for the Drummed Waste and Contaminated Soil OU (source control) and for the Landfill Capping and Monitored Groundwater Natural Attenuation OU (landfill capping and addressing impacted groundwater). The state completed cost-recovery actions against the PRPs in 1999 and has recovered a large portion of past state expenditures.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site
01	Drummed Waste and Contaminated Soil
02	Landfill Capping & Monitored Groundwater Natural Attenuation

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The initial FYR concluded that the remedies selected were protective of human health and the environment.

Start Date: 06/15/1993 Primary Cost: $0 Source:
End Date: 08/24/1993 Secondary Cost: $0 Source:

5 Year Review The Second FYR report was completed on September 14, 1999.

Start Date: 06/15/1999 Primary Cost: $0 Source:
End Date: 09/14/1999 Secondary Cost: $0 Source:

5 Year Review The Third Five-Year Review report was authored by the EPA and concluded that the remedies are protective of human health and the environment and that there are no exposure pathways. The report recognized that there are outstanding issues relating to installing an adequate groundwater monitoring network and delineating the extent of elevated concentrations of methane.

Start Date: 05/13/2004 Primary Cost: $0 Source:
End Date: 09/27/2004 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The Fourth FYR authored by the EPA concluded the remedy is protective of human health and the environment in the short term. There are no current exposure pathways and the remedy appears to be functioning as designed. Long-term protectiveness for groundwater would be assessed in the next FYR.

The report also indicated that the MDEQ has a different interpretation than the EPA on how the remedy is being implemented, level of protectiveness, and compliance with the ROD Amendment; and, included MDEQ's comments as an attachment to the report. MDEQ documented its disagreement with where the site stands for this Fourth FYR in a letter dated August 17, 2009.

Start Date: 01/30/2009	Primary Cost:	$0	Source:
End Date: 09/23/2009	Secondary Cost:	$0	Source:

5 Year Review The FYR completed in 2014 by the EPA concluded the remedy was protective of human health and the environment in the short term, and would be protective long term if groundwater use restrictions were implemented for properties located north of the landfill. The MDEQ has a different interpretation, based upon the review. Additional site characterization is required in order to determine appropriate groundwater use restrictions.

Start Date: 03/18/2014	Primary Cost:	$0	Source:
End Date: 09/18/2014	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

5 Year Review Date for next FYR of site.

Start Date: 02/04/2019	Primary Cost:	$0	Source:
End Date: 09/30/2019	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Drummed Waste and Contaminated Soil

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/02/1986**

In September 1986, the EPA signed a ROD requiring remediation of two of five detected drum disposal areas. This removal action, known as the Drummed Waste and Contaminated Soil OU, was mobilized in May 1989, and completed in 1994. Several thousand drums of waste and thousands of tons of contaminated soil were incinerated off-site at a licensed incinerator.

OPERABLE UNIT 01: Drummed Waste and Contaminated Soil

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 09/05/1991**

This Explanation of Significant Differences (ESD) occurred due to the lack of available capacity by off-site incinerators. The significant difference between the ROD and the ESD is the location of the incinerator unit. On-site incinerators were demonstrated to be a safe and proven technology.

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 08/28/1996**

This amendment replaces off-site incineration of Drum Area 1 and Soil Staging areas soils by relocating these soils to the south slope of the landfill and including them under the Landfill Capping and Monitored Groundwater Natural Attenuation OU landfill cap. This remedy includes installation of a groundwater collection and treatment system as well as long-term groundwater monitoring.

Response Accomplishments: Completed

Remedial Action In 1986, the EPA signed a ROD (OU Drummed Waste and Contaminated Soil ROD) requiring remediation of two of the detected drum areas. This removal action was initiated by the state in June 1989, and included the excavation and off-site incineration of drummed waste and contaminated soil from Drum Areas 1 and 4.

Start Date: 01/01/1982	Primary Cost:	$28,702,704	Source: Federal
End Date: 10/28/1994	Secondary Cost:	$2,874,382	Source: State

Remedial Investigation Remedial Investigation to determine the nature of the drummed wastes and contaminated soils.

Start Date: 03/15/1985	Primary Cost:	$1,258,705	Source: State
End Date: 07/15/1990	Secondary Cost:	$927,563	Source: Federal

Remedial Design The design of a removal action for several thousand drums of waste and thousands of tons of contaminated soils for incineration off-site at a licensed incinerator.

Start Date: 01/15/1987	Primary Cost:	$625,678	Source: Federal
End Date: 01/15/1988	Secondary Cost:	$0	Source:

Remedial Action In May 1991, a group of PRPs entered into a Decree with the EPA to complete the RA. The PRPs completed the RA in 1994 and shipped excavated drums and the most heavily contaminated soils off-site to a licensed incinerator.

Start Date: 05/01/1991	Primary Cost:	$0	Source:
End Date: 12/31/1994	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: Landfill Capping & Monitored Groundwater Natural Atten

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/28/1990**

The ROD consists of: (1) groundwater treatment through extraction utilizing precipitation/flocculation, air stripping, and recharge of the treated groundwater back into the shallow aquifer, and (2) containment of the landfill contents through a 90-centimeter clay cover meeting the requirements of Michigan Act 64, utilizing a passive gas collection system and flaring.

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 09/27/2001**

The ROD Amendment includes an MNA alternative to groundwater remediation. The MDEQ concurrence is contingent upon an adequate groundwater monitoring network being installed. Well installation to complete an adequate monitoring well network still has not been completed.

Response Accomplishments: In Progress

Remedial Design An adequate long-term groundwater monitoring network has not been completed, and additional groundwater monitoring wells are needed to better evaluate and delineate the extent of contamination originating from the landfill. In addition, the extent of methane migrating away from the landfill needs to be fully evaluated to determine if enhancements to the landfill cap system are necessary to meet objectives of the ROD of not allowing landfill gas to migrate beyond the landfill boundaries. Additional investigation is being planned and access is currently being negotiated.

Start Date: 05/01/1998	Primary Cost:	$0	Source: Private
End Date: 03/19/2020	Secondary Cost:	$0	Source:

Remedial Action Construction of the landfill cap is complete. Landfill gas monitoring is being conducted semi-annually; however, the agencies have discussed the inability of the passive gas system in reducing landfill gas concentrations, but there is not currently a plan to address methane migrating beyond the landfill. Additional gas probes are required to fully delineate the extent of elevated methane levels. The extent of impacted groundwater has not been delineated and an adequate long-term groundwater monitoring network does not exist; however, additional investigation is planned and access to those locations is currently being negotiated.

Start Date: 05/01/1998	Primary Cost:	$0	Source: Private
End Date: 03/19/2020	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: Landfill Capping & Monitored Groundwater Natural Atten

Response Accomplishments: Ongoing

Operation and Maintenance

Operation and Maintenance (O & M) for the landfill is being conducted. Although neither the groundwater or methane monitoring networks are adequate to determine the extent of impact, monitoring is being conducted for both methane and groundwater. The state did not concur with the O & M plan being implemented. Annual sampling of residential wells in the area is also conducted, with low-level contamination associated with the landfill being identified in several area drinking water wells; however, the concentrations are below the current cleanup criteria. The settling group was asked if they would take over the annual sampling; however, to date they prefer to have the state of Michigan continue with the program and reimburse us for the associated costs.

Start Date: 10/01/2002	Primary Cost:	$0	Source: Private
End Date: 10/01/2032	Secondary Cost:	$0	Source:

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005836-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$31,553,785	$2,874,382	$0	$31,553,785	$0
Remedial Design	$62,541	$0	$0	$62,541	$0
Remedial Investigation	$2,209,551	$1,258,705	$0	$1,262,216	$0
Totals:	$33,825,877	$4,133,087	$0	$32,878,542	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$2,010	$0	$2,010	$2,010	$2,010

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$95,756	$0	$0	$94,501	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$20,269	$0	$0	$20,269	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$21,462	$0	$0	$21,462	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$31,235	$0	$0	$31,235	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$11,070	$0	$0	$11,070	$0

Cooperative Agreement Number V995258-03 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$8,635	$0	$0	$8,634	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$26,421	$0	$0	$26,421	$6,819

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$13,735	$0	$0	$13,735	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$200,000	$0	$0	$199,884	$0
Totals:	$430,592	$0	$2,010	$429,220	$8,829

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Grand Traverse Overall Supply
10725 Cherry Bend Road
Greilickville , MI

County: Leelanau
MDEQ District Location: Cadillac
Managed By: RRD-Superfund

Federal Site Code: 3G
State Site ID#: 45000004
State Site Score: 41

LOCATION
The Grand Traverse Overall Supply Company (GTOS) site is located in Greilickville, Michigan, approximately one and one-half miles north of the city limits of Traverse City just west of Highway M-22, on the north side of Cherry Bend Road and south of Cedar Creek. The area surrounding the GTOS facility is primarily residential. The Norris Elementary School is directly east of the site while the Elmwood Volunteer Fire Department is located to the south. Private residences border the site to the west. The West Arm of the Grand Traverse Bay is located approximately 600 feet east of the site.

SITE HISTORY
The facility, originally known as Pick Wick Wipers, began operating in 1948 and, in 1950, became Grand Traverse Overall Supply Company. Dry cleaning operations began around 1968. Until December 1977, the laundry and process wastes from dry cleaning operations were discharged to seepage lagoons and a dry-well on the site. Cooling water used in dry cleaning operations was discharged to Cedar Creek from 1968 to 1978. In December 1977, the company began discharging to the sanitary sewer system, and the lagoons and dry-well were abandoned. Dry cleaning was discontinued in 1987. When perchloroethylene (PCE), trichloroethylene (TCE), and 1,2-dichloroethene were detected in the water supply of Norris Elementary School in 1978, the likely source was traced to the GTOS.

Follow-up investigation revealed that ten private drinking water wells were impacted. The contaminated private wells were replaced by new wells that extended into a deeper uncontaminated semi-confined aquifer. The Michigan Department of Natural Resources (MDNR) performed some investigative work during the 1980s and the site was placed on the National Priorities List in 1983.

The EPA conducted the remedial investigation (RI) at the site between 1988 and 1991. The RI concluded that no significant contamination was present at the time of the investigation. The concentrations of TCE and PCE detected in residential wells near the site had dropped sharply since the initial sampling in 1978. For example, the maximum concentrations of TCE and PCE detected in residential wells sampled in 1978 were 600 parts per billion (ppb) and 740 ppb, respectively. The maximum concentrations of these two compounds detected in 1990 were estimated at 0.14 ppb of TCE and 0.24 ppb PCE. The MDNR was concerned that the RI did not adequately characterize the extent of contamination at the site. Of particular concern to the MDNR was the absence of samples to evaluate possible vertical stratification of contamination within the aquifer. When resolution of the MDNR's concerns was not achieved, the MDNR declined to concur with the EPA Record of Decision (ROD), signed in February 1992, which determined that no-action with limited monitoring was the appropriate response to contamination at the site.

A Baseline Environmental Assessment was performed in 1996 prior to the sale of the site. Significant concentrations of PCE were detected in soil samples collected from beneath the GTOS building. Water samples collected from sumps inside the building (formerly used to contain/separate dry cleaning solvents) detected high concentrations of TCE and PCE.

PCE was also detected in a tap water sample; however, the concentration found, 2.0 ppb, was less than the drinking water criterion of 5 ppb under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA).

The MDEQ received, in 1998, a citizen's inquiry regarding the quality of drinking water in the vicinity of the GTOS site. The local health department sampled area residential wells but no contaminants from GTOS were found.

In 1998, the MDEQ obtained funds from the EPA to perform the Five-Year Review (FYR) at the site to determine the effectiveness of the selected remedy. Determining that additional information was needed for the review, the MDEQ obtained $250,000 from the State to conduct an RI at the GTOS site in conjunction with the FYR. Phase I of the RI was undertaken from October 2001 into early December 2001. The Phase I investigation included collection of groundwater samples from the existing monitoring wells and vertical aquifer sampling from up to 21 locations around the former GTOS facility and the Norris Elementary School. The groundwater samples were analyzed for volatile organic compounds (VOCs) and heavy metals. The results indicated that the initial response to the former lagoons had remediated the contaminant plume located behind the building during the EPA-funded RI in the late 1980's. However, a second groundwater plume of VOCs, at concentrations which exceeded NREPA groundwater criteria, was detected originating from contaminated soils located under the facility building and migrating east/southeast toward the west arm of Grand Traverse Bay. Based upon this discovery, the MDEQ obtained an extension from the EPA to complete the FYR.

In August 2002, a state-funded Phase II investigation was conducted at the site. Phase II involved additional vertical aquifer sampling in an attempt to delineate the plume width, and collection of soil gas samples along the shoreline. The final portion of Phase II was completed in January 2003. This involved the installation of three permanent monitoring wells, the collection of residential well samples from properties adjoining and downgradient of the site, and collection of soil gas samples from the Harbor West Condominium complex located at the edge of the bay. All of this information was included in a Phase II Technical Memorandum document.

The FYR report was completed in June 2004 and submitted to the EPA. The FYR report stated the current No Action remedy was not protective of human health and the environment and recommended additional investigation to delineate the extent of the plume, remediation of the groundwater plume, and development of a mixing zone determination if the investigation documented contaminants of concern discharging into the bay above groundwater/surface water interface (GSI) criteria of the NREPA. The EPA declined to accept the final report as written by the MDEQ.

The EPA decided, based upon the information gathered from the MDEQ's 2001 and 2002 investigations, to undertake and continue remedial activity at the site. The EPA's initial response was to conduct indoor air sampling at the GTOS facility in early March 2005. A second and third air sampling investigation were conducted at the adjacent Norris Elementary School in early April and late August 2005. Based upon the preliminary analytical results, levels of TCE and PCE in soil beneath the former GTOS building and the school exceeded indoor air screening criteria and represented a potential indoor air threat. Air monitoring levels within Norris Elementary School, however, did not exceed current protective health screening criteria. To prevent further contamination migration from the contaminated soils under the GTOS building to the school, the EPA installed a soil vapor extraction (SVE) treatment system in November 2005. The EPA operated and maintained the SVE system for one year. In April 2007, the MDEQ took over the operation and

maintenance (O & M) of the SVE system until August 2008.

During the summer of 2005, the EPA conducted vertical aquifer sampling to complete the delineation of the groundwater plume from the GTOS building to the west arm of Grand Traverse Bay. Based upon the initial findings of the vertical aquifer sampling investigation, monitoring wells were installed to complete the groundwater monitoring network and GSI sentinel monitoring network. Monitoring well installation was completed in December 2005 and the EPA conducted a round of groundwater sampling. The MDEQ undertook groundwater sampling in October 2006, May 2007, November 2007, and May 2008. In October 2006, the EPA conducted an additional indoor air investigation in the West Bay Covenant Church, located south of the GTOS site. The EPA conducted a limited indoor air investigation in several condominium buildings in the Harbor West Condominium property located east and downgradient of the GTOS site along the shore of the bay, in early 2007, as well as a second indoor air sampling event at the church.

In June 2007, the EPA decided to undertake a remedial action to remediate the GTOS site. The EPA developed both human and ecological risk assessment reports which were completed in September 2007. This was followed by the development of both a feasibility study (FS) and proposed Plan in November 2007. Both were presented to the public in a public meeting held at the end of November.

A draft ROD was developed in January 2008 and was finaled and signed in March 2008. The selected remedy included the following to be undertaken by the EPA Emergency Removal Program: demolition of the GTOS Company building (completed in late December 2007) with installation of a security fence around the site and excavation of contamination source soils. A partial excavation was completed in the spring of 2008. Operation of the current SVE system was maintained by the MDEQ through July 2008 and was resumed by the EPA in August 2008. The remedy also included the installation of a groundwater pump and treat (P & T) system to remediate the groundwater contamination.

The initial round of groundwater sampling of the contamination plume and air sampling for buildings located over the plume was conducted by the EPA in June 2009. Additional source area soil sampling was also conducted in June 2009 to assist the Petition to Delist Hazardous Waste (Petition) review process.

In June 2009, the EPA submitted a Petition to the MDEQ to determine if the remaining on-site source contamination soils are not considered a hazardous waste and can be excavated and disposed of in a local landfill. The MDEQ review of the information provided in the Petition was completed and approval of the Petition was granted in June 2010.

With MDEQ approval of the Petition, the EPA developed a ROD Amendment to address the remaining on-site contaminated source area soils. The ROD Amendment was signed in April 2011 along with an amended state superfund contract (SSC). The excavation of the remaining contaminated soils was completed in November 2011.

The remaining requirement from the 2008 ROD was the installation of a groundwater P & T system. The EPA developed the final design for the groundwater P & T system, which included a source area in-situ bioremedy not in the initial groundwater pump and treatment design. This revised design was reviewed and approved by the MDEQ in June 2012.

Construction of the groundwater pump and treatment system began in November 2012. The new P & T system began the one year operation shakedown phase in June 2013.

The Remedial Action Completion Report Groundwater System document was completed by the EPA contractor on February 7, 2014. Both the EPA and MDEQ agreed the pump and

treatment system achieved operational and functional status as documented in the Operational and Functional Determination letter dated September 29, 2014. The ten-year Long-Term Remedial Action (LTRA) for the pump and treatment system began on October 1, 2014.

Based upon review of the collected air vapor data, which for several years did not detect any contaminant concentrations, air vapor sampling at the West Bay Covenant Church, located south of the GTOS site, was ended in December 2014.

Between April and July 2015, SulTRAC conducted a Remedial Action (RA) at the GTOS site to treat groundwater and soil at the source. In situ treatment included enhanced reductive dechlorination by injecting zero-valent iron and organic carbon substrates, and bioaugmentation. An additional ten RA monitoring wells were installed at the site to monitor groundwater treatment performance. Starting in the June 2015 quarter, these RA monitoring wells have been gauged for static water levels and have been sampled for analysis of VOCs. These RA monitoring wells have also been sampled for additional parameters specific to evaluating the performance of in situ groundwater treatment.

The in-situ bioremedy injections to treat the remnant contamination source area soils began in spring of 2015 with the installation of six nested monitoring well locations within the source area to monitor the effectiveness of the in-situ remedy. The actual bioremedy injections were performed in April and May 2015. The 2015-16 quarterly collected groundwater data confirmed significant reduction in VOCs concentration near the source area. However, the concentration of contaminants of concerns remain above the drinking water criteria.

Quarterly air vapor sampling continued in 2015 for the former Norris Elementary School and the Harbor West Condominiums as these properties overlie the groundwater contamination plume. In August 2014, EPA-Environmental Response Team initiated the vapor intrusion (VI) study at the condominium located downgradient of the GTOS property. The VI study was begun to characterize the presence of VOC contamination at the condominium and assist in determining if there is an indoor air impact at the residences. Between 2014-2017, EPA-Environmental Response Team has collected soil-gas, crawl space, indoor air and ambient air data. Technical memorandums prepared by EPA-Environmental Response Team were submitted to MDEQ and Michigan Department of Health and Human Services. EPA’s remedial branch is also collecting quarterly soil-gas data at the GTOS property, former school property and the condominium since 2008. Based on the MDEQ site specific VI Criteria, concentrations of VOCs detected in indoor air samples and sub-slab samples at the residential property, indicate that the VI pathway is fully evaluated and do not pose an immediate risk to human health.

Early 2016, an orange discoloration was noticed at the P & T system outfall, on the creek rocks. Although the P & T system effluent discharge is clear, an orange discoloration is still present at the outfall. This orange discoloration appears to be the same iron bacteria growth that has been observed in the air stripper trays. The chlorine treatment has been somewhat effective at reducing the iron bacteria growth within the treatment system. However, chlorination does not reduce the concentration of dissolved iron or total organic carbon. Conditions for iron bacterial growth could remain favorable at the outfall. Iron bacterial growth doesn’t have any known detrimental impact on human health and environment. The EPA and the MDEQ continue to monitor the orange discoloration.

SITE STATUS

Under the 2008 ROD Remedy, the First FYR which was prepared by the EPA with assistance from the MDEQ was finalized on May 17, 2017 . Issues related to land use and groundwater use restrictions, Vinyl Chloride (VC) migration to Grand Traverse Bay and

pump & treat system effectiveness were acknowledged. The EPA and the MDEQ are working on these issues to resolve them in a timely manner.

The EPA continued the quarterly groundwater sampling and operation of the SVE system at the GTOS site through 2017 in accordance with the 2008 ROD. 2016 and 2017 quarterly groundwater data shows concentrations of contaminants of concerns at the GTOS Property have decreased substantially following source area removal and remedial activities. Analytical results of contaminants of concerns from the 2017 samplings indicate that contaminants of concerns plumes downgradient (condominium area) of the GTOS Property continues to decrease gradually as a result of natural attenuation processes. In addition, to better understand the GSI pathway (this also address the VC migration to Grand Traverse issue) and emerging contaminant pathway, EPA collected pore water samples in the Grand Traverse Bay and groundwater samples for 1,4 Dioxane. Low levels of contaminants of concerns were detected from five out of eight pore water samples collected for VOC analysis during the December 2016 sampling event. 1,4-Dioxane was not detected above the Method Detection Limit of 2.8 µg/L in the shallow and deep monitoring wells (ET-MW-5, MW-108, MW-111, MW-101, MW-109 and MW-110) sampled during the March 2017 sampling event.

Based on soil-gas, crawl space and indoor air data, indoor air monitoring program at the condominium area conducted by EPA was ended in early 2017. However, EPA will continue to monitor soil-gas probes and groundwater on a quarterly basis to evaluate the risk. During one of the early 2017 quarterly sampling events, an elevated level of methane was detected near the condominium . This initiated the investigation to determine source and extent of the methane gas by EPA Emergency Response Branch in July 2017. Early investigation indicated that some residential structures are located near buried, decomposing sawdust that is generating the high level of methane. EPA completed investigation activities in August 2017 to delineate the extent of a buried sawdust layer beneath the area where high levels of methane gas are accumulating around the condominium complex. The sawdust layer is likely related to historical sawmill operations which occurred at the condominium complex property dating back to the early 1900s. To address this issue, EPA decided to install a passive ventilation system as a part of the long-term resolution. EPA started the construction in early November 2017 and completed in December 2017. EPA has also initiated additional investigative activities to determine if any actions related to the GTOS remedial site may have contributed to the threat posed by the methane gas accumulation at the condominium complex. EPA has been coordinating with representatives from the US Geological Survey and other State agency partners in developing plans for the additional investigation.

Recently, EPA proposed revising the quarterly monitoring plans (groundwater and soil-gas) and evaluating whether the SVE and P & T systems are necessary to protect human health and environment. Currently, both agencies are in process of evaluating the groundwater data and SVE data. This will also benefit to address the P & T system effectiveness issue stated in the First FYR after the 2008 ROD.

ENFORCEMENT STATUS

As part of the 2008 ROD, development of site Institutional Controls, in the form of Restricted Covenants (RCs), will be required. Development of the RCs for the GTOS site, as well as all properties overlying the contaminated groundwater plume began at the end of 2013 with the initial draft of the RCs. Development and discussions on the RCs continued through 2015.

SPECIAL CONSIDERATIONS

During 2007, after Cintas abandoned the facility, the former GTOS property tax reverted to the township due to the non-payment of property taxes. The adjacent vacant house property also tax reverted to the township.

In early 2013, a potential buyer for the GTOS property expressed interest in purchasing the property from the township. The buyer also expressed an interest in purchasing the now abandoned Norris Elementary School property from the Traverse City School District and the property of the vacant house which was demolished in December 2012. The purchase of all three of these parcels was completed on June 30, 2014. In October 2014, the three parcels were combined into one property for redevelopment purposes and given a new legal description in the deed.

Prior to the purchase of these parcels, the EPA developed an Agreement for Release of Waiver Lien, dated June 25, 2014. This granted the new owner protection from the EPA pursuing any cost recovery for payment of the past RAs conducted at the site.

OPERABLE UNITS

00	Entire Site
01	Off-Site Groundwater Plume

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 03/01/2008**

In 2008, the EPA finalized a second ROD for the GTOS site. The remedy includes the following: demolition of the GTOS building; excavation of the source soil contamination which underlie the building; continued O & M of the SVE system installed in 2005; air monitoring of building overlying the groundwater contamination plume; and quarterly groundwater monitoring of the in-place monitoring network to track the groundwater contamination plume and monitor GSI at the bay shoreline, and installation of a groundwater P & T system.

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 04/08/2011**

The EPA developed this ROD Amendment to address the remaining on-site source-area contaminated soil. The remaining contaminated soil was excavated from October through November 2011.

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The state prepared a FYR that concluded that the site remedy was not protective of human health and the environment. The EPA disagreed and did not accept the report.

Start Date: *05/01/2003*	Primary Cost:	$30,000	Source: Federal
End Date: *06/18/2004*	Secondary Cost:	$0	Source:

Emergency The EPA funded installation of an SVE system to prevent further contamination migration from contaminated soils under the facility to Norris Elementary School. The EPA operated the system until April 1, 2007, when the state took over operation.

Start Date: *10/10/2005*	Primary Cost:	$2,697,000	Source: Federal
End Date: *04/01/2007*	Secondary Cost:	$0	Source:

Interim Response The building was demolished and removed in late 2007. The EPA Emergency Removal Branch conducted a partial excavation of the source area contaminated soils from the former building site in 2008.

Start Date: *09/01/2007*	Primary Cost:	$0	Source: <None>
End Date: *07/15/2008*	Secondary Cost:	$0	Source:

Interim Response Excavation and removal for the remaining on-site source area contaminated soils was conducted from October through November 2011.

Start Date: *10/01/2011*	Primary Cost:	$0	Source:
End Date: *12/01/2011*	Secondary Cost:	$0	Source:

5 Year Review Under the 2008 ROD Remedy, the First FYR was finalized May 11, 2017. The FYR was prepared by the EPA with assistance from the MDEQ.

Start Date: *05/17/2016*	Primary Cost:	$0	Source: Federal
End Date: *05/11/2017*	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

5 Year Review Under the 2008 ROD Remedy, the Second FYR process should begin in May 2021. The FYR will be developed by the EPA with assistance from the MDEQ.

Start Date: *05/17/2021*	Primary Cost:	$0	Source:
End Date: *05/11/2022*	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Off-Site Groundwater Plume

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 02/03/1992**

The selected remedy for the ROD was no action. The state did not concur with the remedy. This has now been replaced by the new ROD for the entire site executed in 2008.

Response Accomplishments: Completed

Alternate Water

Former owner/operator of GTOS paid for replacement of several private wells affected by the groundwater contamination. The replacement activity was included in a lawsuit filed against the potentially responsible party. No state funding was involved.

Start Date: 01/01/1979	Primary Cost:	$0	Source: Private
End Date: 12/01/1979	Secondary Cost:	$0	Source:

Remedial Investigation

The EPA conducted an RI/FS.

Start Date: 04/09/1987	Primary Cost:	$1,340,000	Source: Federal
End Date: 02/03/1992	Secondary Cost:	$0	Source:

Remedial Investigation

Sampled all existing monitor wells, vertical aquifer sampling, installation of three additional monitoring wells, soil gas survey, and residential well sampling.

Start Date: 01/01/2001	Primary Cost:	$250,000	Source: State
End Date: 01/31/2003	Secondary Cost:	$0	Source:

Remedial Investigation

Further investigations to delineate the vertical and horizontal extent of the plume boundary; establish optimal locations for and installation of GSI compliance wells; and develop and implement a work plan for performing a site-wide groundwater monitoring investigation. Installation of treatment system to address the groundwater plume.

Start Date: 01/02/2005	Primary Cost:	$0	Source: Federal
End Date: 12/30/2006	Secondary Cost:	$0	Source:

Remedial Investigation

After one year of groundwater monitoring and sampling by the EPA, the MDEQ took over this task conducting groundwater sampling every six months (October 2006, May 2007, November 2007, and May 2008) until funding for this task was spent. Future quarterly groundwater sampling will be conducted by the EPA under the March 2008 ROD.

Start Date: 10/01/2006	Primary Cost:	$100,000	Source: State
End Date: 09/30/2008	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Off-Site Groundwater Plume

Response Accomplishments: Completed

Operation and Maintenance

The MDEQ took over the O & M of the treatment system after the EPA completed installation. The MDEQ operated the SVE system until August 1, 2008, when the EPA resumed O & M under the new ROD remedy for the site.

Start Date: 04/01/2007	Primary Cost:	$200,000	Source: State
End Date: 08/01/2008	Secondary Cost:	$0	Source:

Remedial Action

As part of the ROD remedy, the EPA resumed O & M of the SVE system in August 2008. Completed ROD requirements in 2013 included the installation and startup of the groundwater P & T system to remediate the groundwater contamination plume and excavation of the remaining on-site source area contaminated soil. In 2009, the EPA began the quarterly groundwater sampling and air vapor monitoring and sampling for those buildings overlying the groundwater contamination plume. The remaining on-site source area contaminated soil was excavated in 2011. Since October 1, 2014, the required state match for this remedial action is provided through a SSC between the State and the EPA.

Start Date: 08/01/2008	Primary Cost:	$3,056,051	Source: Federal
End Date: 09/30/2014	Secondary Cost:	$339,561	Source: State

Remedial Action

The EPA added an in-situ bioremedy component into the design of the groundwater treatment system to address the remaining soil contamination in the source area soils. The In-Situ bioremedy injections to treat the remnant contamination source area soils began in spring of 2015 with the installation of six nested monitoring well locations within the source area to monitor the effectiveness of the in-situ remedy. The actual bioremedy injections were performed in April and May 2015. State match for this work is provided through amendment #2 to the SSC for this site.

Start Date: 04/22/2015	Primary Cost:	$1,791,900	Source: Federal
End Date: 07/23/2015	Secondary Cost:	$199,100	Source: State

Remedial Investigation

EPA's contractor conducted methane monitoring at existing soil vapor monitoring points, condominium unit interiors, and condominium crawlspaces located near the soil vapor monitoring points.EPA's contractor completed a soil gas investigation of the condominium grounds in July and August 2017. EPA's contractor also completed investigation activities in August 2017 to delineate the extent of a buried sawdust layer beneath the area where high levels of methane gas are accumulating around the condominium complex.

Start Date: 06/05/2017	Primary Cost:	$200,000	Source: Federal
End Date: 08/31/2017	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Off-Site Groundwater Plume

Response Accomplishments: Completed

Emergency

EPA Emergency Response Branch is installing a passive ventilation system with the capacity to make it active if necessary. Pilot study testing to evaluate viable alternatives for mitigating the accumulation of dangerous levels of methane gas has also been completed by EPA's contractor and full-scale design of methane engineering controls was completed in December 2017.

Start Date:	*10/02/2017*	Primary Cost:	$607,000	Source: Federal
End Date:	*12/19/2017*	Secondary Cost:	$0	Source:

Response Accomplishments: In Progress

Long Term Remedial Action

LTRA of the SVE system and P & T groundwater system began on October 1, 2014. The initial overall cost listed above is based on the 2013 second amendment to the SSC. The state will pay 10 percent of this cost; 90 percent of the cost will be paid by the EPA for the ten-year LTRA operation period.

Start Date:	*10/01/2014*	Primary Cost:	$1,512,000	Source: Federal
End Date:	*10/01/2024*	Secondary Cost:	$168,000	Source: State

Response Accomplishments: Ongoing

Monitoring

In August 2014, in support of the ongoing VI study near GTOS property, the EPA/Environmental Response Team issued Work Assignment to assist the EPA Remedial Response Team during the performance of the VI study at the Harbor West Condominiums downgradient to the GTOS Site. From August 2014 to March 2017 field activities (total 6 activities) included sample collection from previously installed soil vapor probes, crawl spaces and first floor of units (indoor air), and ambient locations. In addition to this effort, the EPA/Remedial Response Team is also collecting vapor samples quarterly from only soil vapor probes located near buildings 3 and 4.

Start Date:	*08/01/2014*	Primary Cost:	$0	Source: Federal
End Date:		Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

Operation and Maintenance

The LTRA will be completed in October 2024, and if the site cleanup has not achieved the ROD cleanup criteria by 2024 then the state will take over the O & M responsibility of the pump and treatment system until groundwater cleanup objectives have been achieved (estimated for ten years). The projected O & M annual costs are estimated at $200,000 per year for a total of $2,000,000 for ten years of O & M operation.

Start Date:	*10/01/2024*	Primary Cost:	$2,000,000	Source: State
End Date:	*06/01/2034*	Secondary Cost:	$0	Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$1,440	$0	$1,440	$1,440	$1,440

Cooperative Agreement Number V985560-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$30,000	$0	$0	$29,993	$0

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$20,000	$0	$0	$20,000	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$15,839	$0	$0	$15,839	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$8,580	$0	$0	$8,580	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$7,442	$0	$0	$7,442	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$6,012	$0	$0	$6,012	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$4,735	$0	$0	$4,735	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$59,925	$0	$0	$58,670	$0

Cooperative Agreement Number V995339-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$4,995	$0	$0	$4,995	$0
Totals:	$158,968	$0	$1,440	$157,706	$1,440

STATE SUPERFUND CONTRACTS

For Operable Unit 00 : Entire Site : Open

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Action	$7,066,612	$706,662	$574,435	$0
Totals:	$7,066,612	$706,662	$574,435	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Rasmussen's Dump
9040 Spicer Road
Brighton , MI

County: Livingston
MDEQ District Location: Lansing
Managed By: RRD-Superfund

Federal Site Code: B4
State Site ID#: 47000025
State Site Score: 32

LOCATION
The Rasmussen's Dump site encompasses approximately 33 acres situated south of an unpaved secondary road (Spicer Road) about 40 miles west of Detroit and 5 miles south of Brighton, in Green Oak Township, Livingston County, Michigan. Woods, open fields, and rural residences surround the property. The Rasmussen's Dump site is located immediately east of the adjacent Spiegelberg Landfill Superfund site.

SITE HISTORY
The Rasmussen's Dump accepted domestic and industrial wastes during the 1960s and early 1970s, which were stockpiled and formed a ridge-like crest across the southern portion of the site and property. There were also areas of drummed waste and other industrial waste disposal areas on-site. Numerous incidents of burning were reported during the dump's operation. Several attempts were made by the county and state to bring the Rasmussen's Dump into compliance with state laws, but the dump was never properly capped and closed prior to termination of landfill operations in 1977. Sand and gravel mining, which began after closure in 1977, undermined the landfill and resulted in the redistribution of fill and drummed waste.

Groundwater contamination (i.e., chlorobenzene, 1,2-dichloroethylene, 1,1,1-trichloroethane, toluene, ethylbenzene, trichloroethylene, benzene, vinyl chloride, and methylene chloride) was detected in 1981 by the Michigan Department of Natural Resources (MDNR); now known as the Michigan Department of Environmental Quality. The EPA's Field Investigation Team conducted a site inspection in 1982 and the site was placed on the Federal National Priorities List of hazardous waste sites in 1983. The EPA and the MDNR commenced a remedial investigation (RI) and feasibility study (FS) at the site in 1984. The EPA Emergency Response Team removed approximately 3,000 drums and 250 yards of contaminated soil from the top and south face of the dump. The RI and subsequent investigations identified contaminated soil, buried drums, and surface and groundwater contamination areas.

In early 1987, several thousand yards of contaminated soil were sold by the property owner. The state obtained an injunction prohibiting further mining activities or interference by the property owners. The potentially responsible parties (PRPs) were required to return the soils to the site to be addressed in the final remedy.

An administrative order for removal of buried drums was signed by the EPA and the PRPs. Fieldwork for the removal action was conducted primarily during December 1989 and January 1990. In July and August 1990, 651 drums of polychlorinated biphenyls (PCB)-containing waste were excavated and disposed of off-site.

An FS was issued in January 1990. A Record of Decision (ROD) for the site was issued in March 1991. The final remedy required installation of a cap on the site, groundwater extraction and treatment, long-term control and maintenance of the site, and residential well monitoring until the remedy was shown to be operational and effective. The remedial design (RD) phase was conducted from 1992 to 1994 and construction of the landfill cap began in

April 1994 and was completed in September 1995. The construction of the groundwater treatment system began in July 1995 and was completed in September. The final inspection for the site was conducted in February 1996. Residential well monitoring by the PRPs was discontinued in 1997. However, the MDEQ continues the drinking water monitoring by collecting water samples from those residential wells closest to the site.

In an effort to define the capture zone of the extraction wells, additional investigation was conducted in 2000 which revealed the extraction system was not fully capturing the groundwater contamination. Results of the additional vertical aquifer sampling indicated that vinyl chloride was present at a location and depth not previously identified. A ROD Amendment was signed in 2001 which changed the groundwater extraction/treatment system remedy to an in-situ ozone/oxygen oxidation system.

Two separate contaminated groundwater plumes exist: one is referred to as the southern plume, whereas the other is referred to as the northern plume. Due to migration of the northern plume, a new Rasmussen residential drinking water well was necessary and installed in 2008. The Five-Year Reviews (FYRs), including the most recent Fourth Five-Year Review (FYR) completed in March 2015, recognized the outstanding Site issues and included recommendations to address them.

SITE STATUS
The northern plume was better defined with additional wells installed in 2015; however, unresolved ambiguous groundwater flow (and contaminant transport) patterns remain in the northwest corner of the Site. The full extent of the southern plume has not been defined and it extends onto an adjacent property. The continued migration of the southern contaminated groundwater plume, and biosparge treatment system(s) deficiencies are not consistent with the ROD, which required preventing off-site migration of contamination.

There is no plan in place to conduct additional investigation or to supplement the biosparge system.

A Declaration of Restrictive Covenant for the Rasmussen property which describes the land and groundwater use restrictions was completed in 2017.

It is unclear if the EPA will require the extent of the southern plume to be defined, as recommeded in previous reviews of this site, or if Institutional Controls will be required on the adjacent property where the southern plume has migrated.

ENFORCEMENT STATUS
None.

SPECIAL CONSIDERATIONS
Using state funding, the Drinking Water and Radiological Protection Division annually collects drinking water samples from four residential wells in the vicinity of the Rasmussen's Dump site.

OPERABLE UNITS

00	Entire Site
1	RI/FS Soil/Groundwater

OPERABLE UNITS

2	Groundwater and landfill cap

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 03/28/1991**

Michigan Act 64 clay cap. Deed restrictions. Soil costs: Capital $2,940,247. Annual Operation and Maintenance (O & M) for soil: $53,043. Capital expenditure for groundwater remedy is estimated at $2,740,000. The present worth for annual O & M for groundwater pump and treat system is $4,580,000.

Response Accomplishments: Completed

Remedial Investigation

An RI was initiated by the state in 1984, along with the risk assessment. The RI identified soil, buried drums, and surface and groundwater contamination. The RI was funded by both the EPA and the MDNR, which provided $249,482 in advance match.

Start Date: *05/30/1984*	Primary Cost:	$866,000	Source: Federal
End Date: *03/28/1991*	Secondary Cost:	$409,962	Source: State

Interim Response

In January 1985, the EPA conducted a removal of approximately 3,000 drums of solid and liquid waste and 250 cubic yards of PCB-contaminated soils. A fence was constructed by the state in 1986.

Start Date: *01/15/1985*	Primary Cost:	$506,000	Source: Federal
End Date: *06/15/1986*	Secondary Cost:	$52,150	Source: State

Remedial Design

The RD for soil remediation was conducted by the PRPs. The federal RD expenditures for the Operable Unit 1 (OU), RI/FS Soil/Groundwater, were estimated at one-half of the $145,000 expended.

Start Date: *06/30/1992*	Primary Cost:	$72,500	Source: Private
End Date: *06/30/1994*	Secondary Cost:	$72,500	Source: Federal

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Action The remedial action (RA) was conducted by the PRPs. The construction of the landfill cap began in April 1994 and was completed in September 1995. The final inspection for the site was conducted in February 1996.

Start Date: *03/16/1995*	Primary Cost:	$0	Source: Private
End Date: *11/27/1996*	Secondary Cost:	$56,000	Source: Federal

5 Year Review This FYR recommendations supported changing the remedy from groundwater pump and treat to in-situ ozone/oxygen oxidation.

Start Date: *01/01/2000*	Primary Cost:	$0	Source: Federal
End Date: *08/28/2000*	Secondary Cost:	$0	Source:

5 Year Review A Second FYR report was completed on August 28, 2005. The MDEQ identified concerns with groundwater monitoring at the site, including concerns about plume migration onto the Spiegelberg Landfill Superfund Site.

Start Date: *10/01/2004*	Primary Cost:	$0	Source:
End Date: *08/28/2005*	Secondary Cost:	$0	Source:

5 Year Review The RA is protective in the short term, but long-term protectiveness will not be achieved until groundwater cleanup standards are met, the northern and southern plumes of contamination are fully characterized and delineated, and restrictive covenants are implemented for Rasmussen's Dump Site as well as a portion of the Spiegelberg property.

Start Date: *10/20/2009*	Primary Cost:	$0	Source:
End Date: *03/18/2010*	Secondary Cost:	$0	Source:

5 Year Review The FYR completed in 2015 found the remedial action is protective in the short term because no exposure to groundwater contamination is occurring. Long-term protectiveness will not be achieved until groundwater cleanup standards are met, the northern and southern groundwater contaminant plumes are fully characterized and delineated, and restrictive covenants are recorded for the Rasmussen's Dump site and a portion of the adjacent Spiegelberg property.

Start Date: *09/01/2014*	Primary Cost:	$0	Source:
End Date: *02/03/2015*	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

5 Year Review

Start Date: *09/02/2019*	Primary Cost:	$0	Source:
End Date: *03/18/2020*	Secondary Cost:	$0	Source:

OPERABLE UNIT 1 : RI/FS Soil/Groundwater

Response Accomplishments: Completed

Remedial Design The RD for groundwater pump and treat was conducted by the PRPs. The pump and treat phase was conducted following the OU, RI/FS Soil/Groundwater, for the soil. The federal expenditures for the OU2, Groundwater and Landfill Cap, RD were estimated to be one-half of the $145,000 expended by the EPA.

Start Date: 02/14/1992	Primary Cost:	$0	Source: Private
End Date: 03/31/1995	Secondary Cost:	$72,500	Source: Federal

OPERABLE UNIT 2 : Groundwater and landfill cap

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 07/20/2001**

The original extraction/treatment system was not effective. In-situ ozone/oxygen oxidation sparging replaces the pump and treat system from the original ROD. Additional monitor wells and sparge points were added in 2002/2003 to supplement the monitoring and treatment systems. Groundwater samples continue to be collected on a quarterly basis to evaluate the effectiveness of the treatment system.

Response Accomplishments: Completed

Remedial Investigation Results from the quarterly groundwater monitoring indicated that the southern plume on the Rasmussen property may be migrating onto the adjacent Spiegelberg Landfill property and, therefore, four borings were installed and monitor wells were subsequently installed in August 2004 at two of those locations to better delineate the western extent of impacted groundwater.

Start Date: 10/01/1999	Primary Cost:	$0	Source: Private
End Date: 01/14/2006	Secondary Cost:	$0	Source:

Response Accomplishments: In Progress

Remedial Action The PRPs initiated installation of the in-situ ozone/oxygen oxidation treatment system in the summer of 2000. Two seperate sparging zones were installed; one to address the northern plume and the second to address the southern groundwater contaminant plume. The first phase of the systems was operating in early 2001, then supplemented in 2003 based on analytical results of groundwater samples collected from monitor wells and vertical aquifer sampling at other locations. Migration of the southern contaminant plume continues; however, both sparge systems remain in operation and are expected to be required to operate for the foreseeable future.

Start Date: 07/15/2000	Primary Cost:	$0	Source: Private
End Date: 03/01/2022	Secondary Cost:	$0	Source:

OPERABLE UNIT 2 : Groundwater and landfill cap

Response Accomplishments: Ongoing

Operation and Maintenance The O & M of the landfill cap is being conducted by the PRPs and maintenance will be needed in perpetuity.

Start Date: 01/01/1995 Primary Cost: $0 Source: Private

End Date: 01/01/2025 Secondary Cost: $0 Source:

Operation and Maintenance The O & M of the groundwater treatment system is being conducted by the PRPs. The ozone sparge lines have cracked repeatedly during the course of O & M, presumably because they were only buried 18 inches below grade, and are subject to freeze-thaw conditions. In the summer of 2012, the sparge lines were lined with Teflon tubing to alleviate this issue. Additional sparge lines were recognized as a potential need to adequately address contamination that is continuing to migrate off-site.

Start Date: 11/28/1996 Primary Cost: $0 Source: Private

End Date: 11/28/2026 Secondary Cost: $0 Source:

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005777-02 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$1,133,847	$249,482	$0	$1,100,132	$0
Totals:	$1,133,847	$249,482	$0	$1,100,132	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$1,063	$0	$1,063	$1,063	$1,063

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$7,555	$0	$0	$7,555	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$1,545	$0	$0	$1,545	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$9,736	$0	$0	$9,736	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$5,574	$0	$0	$5,574	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$15,280	$0	$0	$15,280	$242

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$41,738	$0	$0	$41,403	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$125,000	$0	$0	$121,428	$0
Totals:	$207,491	$0	$1,063	$203,583	$1,304

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Shiawassee River
M59 to State Road
Howell , MI

County: Livingston
MDEQ District Location: Lansing
Managed By: RRD-Superfund

Federal Site Code: 1D
State Site ID#: 47000027
State Site Score: 41

LOCATION
The Shiawassee River Superfund site includes the former Cast Forge Company facility on M-59 west of the city of Howell, and extends in and along the South Branch of the Shiawassee River, downstream in a northerly direction approximately eight miles to Steinacker Road. The site includes the plant property, polychlorinated biphenyl (PCB) contaminated riverbed sediments, as well as associated floodplain and wetland soils and sediments.

SITE HISTORY
Since 1969, the Cast Forge Company manufactured aluminum cast wheels at the facility. Until 1973, wastewater contaminated by hydraulic fluids containing PCBs was discharged by the Cast Forge Company into the South Branch of the Shiawassee River. From 1973 to 1977, wastewater was discharged into a large on-site lagoon. Discharges from this lagoon, as well as periodic overflows, contaminated nearby wetlands and subsequently, the South Branch of the Shiawassee River.

In 1978 and 1979, the state detected high levels of PCBs in soils and sediments on and near the site. In November 1979, the state filed suit against the Cast Forge Company for PCB contamination of the environment. The case was settled through a Consent Judgment in June 1981. Under that settlement, the company removed the lagoon, cleaned up the bulk of the PCB-contaminated soils and sediments on the facility property, and provided $750,000 to the state for removal of sediments from the river. The state began dredging the South Branch of the Shiawassee River in June 1982. The first mile downstream of the plant was hydraulically dredged, removing approximately 2,600 pounds of PCBs, prior to exhausting the available funds. Due to PCBs remaining on the Cast Forge Company property and in the river, the EPA listed the Shiawassee River site on the National Priorities List in September 1983.

In October 1987, a remedial investigation/feasibility study (RI/FS) was initiated. RI activities included: soil sampling to determine the nature and extent of contamination; surface water and sediment sampling; stream morphology studies to assess contamination patterns and movement; groundwater sampling; testing of fish and wildlife to determine if PCBs are concentrating in their tissues; and preparation of a site risk assessment. The initial RI report on the findings of the above studies was finalized in January 1992. An ecological risk assessment was completed in June 1995. It concluded that the primary health risk associated with this site is from the consumption of fish caught in the contaminated stretch of the river. Advisories issued by state health officials against consumption of fish from the river remain in effect. These include all fish species in the river stretch from M-59 downstream to Byron Road and carp from M-59 downstream to Owosso, Michigan.

The initial FS was completed in December 1997. A proposed plan to address site contamination was released by the state for public comment in August 1998, and a public meeting was held near the site on September 10, 1998. While the state was in the process of drafting the Record of Decision (ROD) for the selected remedy, the EPA notified the state

that additional studies would be needed before the ROD could be issued.

In order to expedite the new RI/FS, the EPA became the lead agency. Additional sampling was completed in 1999 by an EPA contractor. The analytical data were compiled into a draft RI/FS which was submitted to the MDEQ in May 2000. The MDEQ submitted comments to the document on June 10, 2000. In October 2000, the EPA proposed the Surface Weighted Average Concentration Method for evaluating the effectiveness of the cleanup. The method was reviewed by the MDEQ and was found to be adequate in concept but improperly applied. The most serious flaw was that the method, as applied, did not determine the presence of additional hotspots.

The EPA completed the RI/FS in March 2001 and prepared a proposed plan for public review and comment by early summer 2001. The EPA signed the ROD September 28, 2001. The ROD called for the excavation and disposal of PCB-contaminated soil at the former Cast Forge Company facility, within the river, and within the floodplain.

The MDEQ submitted a ROD non-concurrence letter to the EPA in 2003. The main issues in disagreement were the target cleanup levels within the river and floodplain, and the portion of the river and floodplain to be remediated. The EPA levels are 5.0 parts per million (ppm) within the river and 10 ppm within the floodplain; whereas the MDEQ levels are 0.33 ppm and 5.0 ppm, respectively. Also, the entire site encompasses the facility and approximately eight miles downstream; however, the EPA proposed to address only the first mile and one transect point at #25 within the next half-mile.

During May 2003, the EPA, via their potentially responsible party's (PRP's) contractor, began identifying the hotspots within the first 1.5 miles north of the facility. The PRPs were issued a Unilateral Order to perform investigation and remediation. The PRPs refused to perform the necessary additional investigation and remediation based on the 1981 Consent Judgment which placed responsibility on the MDEQ for any further cleanup beyond the amount specified in the Consent Judgment. The EPA through their counsel decided that the PRPs must commence and then file suit against the MDEQ for incurred costs. The initial results of the sampling indicate that the hotspot areas are more extensive than previously identified, and new hotspots have been found. The sampling event was considered to be invalid due to erratic sample results. Therefore, the EPA requested that the investigation be repeated. The repeat sampling event was conducted during the week of July 7-11, 2003.

During the same time period, the MDEQ, with a Level of Effort contractor, completed sampling from the 1.5 mile point downstream to the Shiawasseetown Dam. A total of 349 samples, including 37 duplicate samples were collected. Of the samples, 104 sediment samples were above the preliminary remediation goal of 0.33 ppm and 26 floodplain samples were detected above the preliminary remediation goal of 5.0 ppm. A total of 52 samples were collected and submitted for a dioxin screen. Eight of the 52 samples found dioxins in excess of method detection limits. Of those, three were above background levels, but below the MDEQ Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, Residential and Commercial I Direct Contact Criteria. Additional sampling was completed and the results indicated that the PCBs are more widespread than previously identified.

The EPA and the PRPs agreed upon an amount for the remediation, and the PRPs gave that amount to the EPA to conduct the work. In October 2004, the EPA's contractor began the remediation of the PCBs at the site and 1.5 miles downstream. Excavation and removal of identified hotspots was completed within six floodplain areas before all work was discontinued due to snow/melt and flooding. The remainder of the work, which included the placement of three temporary coffer dams for sediment removal, was completed in August

2005. A total of 795 cubic yards of contaminated soil was excavated from the facility property: 1,590 cubic yards from sediment; and 1,755 cubic yards from the floodplain. The area covered included the first mile downstream and one hotspot at transect #25 within the next half-mile. Post remediation monitoring was, in theory, planned to monitor if natural recovery of the river is occurring; however, a formal plan has not been developed or implemented.

The MDEQ received $1 million in Clean Michigan Initiative funds to conduct additional sampling and remediation at the site. This included verification sampling at the facility after the EPA-conducted remediation. Results indicate that PCBs remain on-site within the area of the EPA removal. Current state funding has been used to further delineate those spots around the facility, and the first mile downstream from the facility. Sampling began early 2006 and by September, the sampling was completed in the first mile of the river. Samples have also been collected around the facility. A second set of samples was collected based on the previous analytical results, to help determine the extent of contamination. A report of the findings was submitted for review in February 2007. Additional removal was determined necessary by the MDEQ.

The EPA concluded the site's First Five-Year Review (FYR) on August 27, 2009. Results of that review are documented in a FYR Report available on the EPA's website. In that report, the EPA concluded that while they consider the remedy currently protective in the short term, additional monitoring must be conducted to ascertain whether natural attenuation of the PCBs is occurring. The MDEQ has consistently taken the position that natural attenuation is not occurring, even after the additional removal activities that occurred in 2004 and 2005. The results from the 2011 caged catfish sample and analysis event and other sediment and surface water data collected in 2013 strongly indicate that monitored natural attenuation is not occurring.

The Second FYR was completed in August 2014. The conclusions of that report are that the remedy currently protects human health because exposure pathways that could result in unacceptable risk to humans are being controlled; the remedy, however, is not protective of the environment.

The PRPs submitted an un-approvable technical memorandum in 2014, an un-approveable draft Long-Term Monitoring Plan (LTMP) in 2015, and have failed to submit an accurate Conceptual Site Model as well. Collaborative discussions held to ensure these documents were submitted did not result in meaningful progress.

SITE STATUS

In order for the remedy to be considered protective, comprehensive monitoring data are needed to show that PCB concentrations in sediments are decreasing as intended by the ROD. An LTMP needs to be developed and implemented which includes the requirement for natural recovery evaluations.

A plan to identify data gaps and to develop a current, comprehensive Conceptual Site Model for the site remains a work in progress.

Implementation of an LTMP (sampling various media/receptors) is required to aid in identifying what additional remedial actions are warranted in order to meet remediation goals. A natural recovery report was due in September 2016 that evaluates historic data as well as what has been collected during the long-term monitoring program; however, with the unacceptable submissions from the PRPs, what has been proposed regarding sampling efforts, the schedule for implementing an LTMP and determining data gaps has slipped. The MDEQ believes additional remedial action is necessary, based on the data that is available.

ENFORCEMENT STATUS
A Consent Judgment, between the state of Michigan and the Cast Forge Company, was signed in 1981. The EPA has sent notifications to the PRPs that have been identified as potentially liable under the Comprehensive Environmental Response, Compensation and Liability Act, 1980 PL 96-510, as amended (CERCLA). The EPA is handling all CERCLA enforcement actions.

The EPA has issued a Unilateral Administrative Order to Cast Forge, Multifasteners, Hoover Ball Bearing, and Johnson Controls for cost recovery.

The PRPs refused to commence the remedial action (RA) because the Consent Judgment issued in 1981, by the MDEQ, accepted responsibility for cleanup at the site after the initial cleanup at the site occurred. The EPA, through counsel, ordered the PRPs to complete the RA, then seek cost recovery from the MDEQ.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/28/2001**

The ROD calls for the excavation and disposal of PCB-contaminated soil within the floodplain and river sediments of the Shiawassee River. This includes the following: an estimated 795 cubic yards of contaminated soil from the Cast Forge Company facility within floodplains and river sediments; approximately 1,590 cubic yards of sediment within the first mile of the river; and approximately 1,755 cubic yards of soil within the floodplain, including transect #25. This excavation will be performed within the first 1.5 miles downstream of the Cast Forge Company facility. The MDEQ submitted a ROD non-concurrence letter to the EPA in 2003.

Response Accomplishments: Cancelled

Remedial Action Plans to actually begin removal activities in the first stretch of the river were cancelled due to depletion of remaining state funding for cleanup work in Michigan.

Start Date: *03/31/2005* Primary Cost: $0 Source: State

End Date: *01/30/2009* Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Interim Response	Removal of lagoons, soils, and some contaminated sediments.			
Start Date: *01/01/1982*	Primary Cost:	$750,000	Source:	Private
End Date: *12/30/1982*	Secondary Cost:	$0	Source:	
Remedial Investigation	State lead.			
Start Date: *01/01/1987*	Primary Cost:	$1,294,760	Source:	Federal
End Date: *12/30/1997*	Secondary Cost:	$0	Source:	
Remedial Investigation	EPA lead supplemental RI.			
Start Date: *01/01/1999*	Primary Cost:	$20,240	Source:	Federal
End Date: *09/28/2001*	Secondary Cost:	$0	Source:	
Remedial Action	Investigation and removal of contaminated soils and sediments from selected hotspots for 1.5 miles from plant site downstream. The PRPs provided funding to the EPA to conduct the removal.			
Start Date: *09/01/2002*	Primary Cost:	$594,000	Source:	Private
End Date: *09/25/2005*	Secondary Cost:	$0	Source:	
Remedial Investigation	State conducted further delineation of contaminated sediments to identify PCB hotspots around the facility and the first mile downstream. Tech Memo describing investigation finaled January 2009.			
Start Date: *07/01/2003*	Primary Cost:	$906,000	Source:	State
End Date: *03/31/2005*	Secondary Cost:	$0	Source:	
5 Year Review	First FYR conducted wherein the EPA determined site was protective in the short term. The EPA required that monitoring needs to be evaluated as well as whether fish consumption advisories were working to make a long-term protectiveness determination.			
Start Date: *10/30/2008*	Primary Cost:	$0	Source:	
End Date: *08/27/2009*	Secondary Cost:	$0	Source:	

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The Second FYR was completed on August 25, 2014. While the remedy currently is protective of human health because exposure pathways that could result in unacceptable risks to humans are currently being controlled, the remedy is not protective of the environment. Ecological receptors may still be exposed to unacceptable risks posed by PCB contamination. In order for the remedy to be protective, comprehensive monitoring data is needed to show that PCB concentrations in sediments are decreasing as intended by the ROD. A comprehensive LTMP needs to be developed and implemented which includes the requirement for natural recovery evaluations and submittal of natural recovery reports on a five-year basis. Continued compliance with and maintenance of existing institutional controls will be ensured, including restrictive covenants, current zoning, and fish advisories.

Start Date: 03/27/2014 Primary Cost: $0 Source:
End Date: 08/25/2014 Secondary Cost: $0 Source:

Response Accomplishments: Future Need

Remedial Action This is a placeholder and estimate regarding possibly necessary identification and removal of contaminated soil/sediments from the plant site, and from the floodplains and river sediments adjacent to and downstream of the Cast Forge property in order to achieve RA objectives. Negotiations are ongoing between the agencies and the PRPs. A source of funding for any future work has not been identified at this point in time.

Start Date: 06/15/2018 Primary Cost: $12,000,000 Source: Private
End Date: 02/09/2019 Secondary Cost: $0 Source: <None>

5 Year Review Third FYR.

Start Date: 03/04/2019 Primary Cost: $0 Source:
End Date: 08/26/2019 Secondary Cost: $0 Source:

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005933-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$1,294,760	$0	$0	$1,294,760	$0
Totals:	$1,294,760	$0	$0	$1,294,760	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$9,535	$0	$9,535	$9,535	$9,535

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$32,796	$0	$0	$32,109	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$1,302	$0	$0	$1,302	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$14,101	$0	$0	$14,101	$715

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$10,000	$0	$0	$2,840	$0

Cooperative Agreement Number V995339-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$41,900	$0	$0	$41,861	$0
Totals:	$109,632	$0	$9,535	$101,747	$10,249

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: G & H Landfill
3160 23 Mile Rd. and Ryan Rd.
Utica , MI

County: Macomb
MDEQ District Location: Southeast MI
Managed By: RRD-Superfund

Federal Site Code: 70
State Site ID#: 50000009
State Site Score: 33

LOCATION
The G & H Landfill is located on the southwest corner of 23 Mile and Ryan Roads. The 70-acre landfill is situated approximately 1/4 mile to the north and east of the nearby Clinton River. The former Rochester Utica State Recreation Area is located approximately 1/2 mile south of the site.

SITE HISTORY
Operation at the G & H Landfill began in the mid-1930s. The site accepted both municipal refuse and liquid and solid industrial wastes. From approximately 1955 to 1967, industrial wastes were disposed of in pits and lagoons and consisted of solvents, paints, oils, and process sludges. Disposal of industrial wastes in the landfill continued until 1967 when the state of Michigan prohibited acceptance of such wastes. The site operated as a refuse landfill from 1967 until it closed in 1974. The site was added to the National Priorities List in 1983.

Emergency actions were taken in 1982, 1983, 1986, and in 1987 through 1991 by the EPA to contain, collect, and dispose of polychlorinated biphenyl (PCB) contaminated oil from seeps discharging from the landfill. The EPA also provided treatment for the seep liquids in wetlands south of the landfill prior to their discharge (via drains) to the Clinton River. The EPA fenced the property in 1988.

A remedial investigation (RI) was conducted by the EPA from 1983 to 1990 with results showing that the landfilling practices had caused contamination of surface soils, sub-surface soils, surface water, sediments, and groundwater. Approximately 108 different chemicals on the EPA Target Contaminant List were detected in groundwater, surface water, and soil samples at the site. Benzene, toluene, ethylbenzene, and xylene (BTEX) compounds showed the greatest areal extent of contamination with concentrations as high as 10,000 parts per million. Polynuclear aromatic hydrocarbons (PNAs) and PCBs were the other organic compounds most often detected and at the highest concentrations. Groundwater contamination on the property consists of BTEX, PNAs, and chlorinated volatile organic compounds (VOCs). BTEX and chlorinated VOCs were also detected in residential and commercial well water in the vicinity of the site. Surface water and sediment contamination consisted of BTEX and PNA compounds.

A Record of Decision (ROD) was signed in December 1990. The selected remedy required installation of a hazardous waste landfill cap and fully encompassing slurry wall system, collection and treatment of contaminated groundwater and leachate, connection of residential homes to the municipal water system, replacement of wetlands, and deed restrictions limiting use of the land and groundwater. In 1992, the EPA issued an Explanation of Significant Differences (ESD) which: 1) reduced thickness in frost protection; 2) a reduction in slurry wall locations and lengths; and 3) revisions of some cleanup standards.

In 1996, the potentially responsible party (PRP) steering group initiated construction

activities at the site including installation of a hazardous waste cap over the landfill area, construction of a groundwater treatment system, and restoration of wetlands. The remedy was completed by the fall of 1999. The site tax-reverted to the state. The ongoing operation and maintenance (O & M) phase began in the fall of 1999.

The First Five-Year Review (FYR) was signed by the EPA on September 5, 2001. The report concluded that the remedy is currently protective of human health and the environment. The report identified several problems with the remedy such as leachate discharge into an area of site mitigated wetlands, landfill cap drainage during high rain events resulting in orange-stained pooled water, groundwater capture along the west side of the water main may not be successful, some invasive species have been identified in the mitigated wetlands.

The Second FYR was signed by the EPA on September 27, 2006. The report concluded that the remedy is currently protective of human health and the environment in the short-term but long-term protectiveness of the remedy is dependent upon the continued effectiveness of the groundwater extraction and treatment system in maintaining an inward hydraulic gradient and removing contaminants from the site. Long-term protectiveness is also dependent upon the implementation of the institutional controls (ICs) listed in the Consent Decree, and will be subject to an IC study and IC Plan to ensure they are adequately implemented, maintained, and monitored.

The Third FYR was signed by EPA on September 13, 2011. The protectiveness of the remedy at the site could not be determined until further evaluation of the groundwater/leachate extraction system was completed. Recommendations for follow-up action included development of contingency plans to achieve physical and hydraulic containment at the south wall of Phase II of the landfill, at the southwest corner of Phase II of the landfill, along the Detroit Water and Sewerage Department water main, and at the toe of Phase III of the landfill; development and execution of a sampling and analysis plan for the orange-colored liquids discharging from the Phase III area of the landfill; evaluation of the monitoring network and the site-specific list of compounds currently being monitored to determine the adequacy of the monitoring program; and development and execution of an IC study to determine whether ICs are in place and effective.

In response to the recommendation for follow-up action from the 2011 FYR, the PRPs have completed testing of the aquifer characteristics to improve groundwater and leachate extraction, for demonstrating hydraulic control, and achievement of remediation system performance requirements. The PRPs installed piezometers along the Phase III toe drain to evaluate the performance of the drain and verify that leachate is not migrating away from the Phase III landfill and to the Clinton River and the former Rochester Utica State Recreation Area.

The PRPs were required by the EPA to prepare corrective action work plans to address the failed physical and hydraulic containment of the remedy as well as the suspected inability to attain groundwater cleanup standards in the required 30-year time period. The EPA issued the enforcement letter in November 2013 and corrective action work plans were submitted in December 2013. Final work plans were approved by the EPA and MDEQ in January 2015. Corrective actions planned for the site include installation of an additional 1,500 linear feet of slurry wall to isolate the drinking water force main that runs through the site, installation of supplemental leachate collection at the existing slurry wall, improved maintenance of the collection system, and evaluation and optimization of the groundwater and leachate monitoring program.

During the time period between 2013 and the approval of the final corrective action plans

(January 2015), the PRPs collected additional site data to facilitate the design of the corrective actions.

The design for supplemental collection system for the existing barrier wall was approved in July 2016 and construction began in August 2016. As of January 2017, the supplemental collection system has been constructed and is in the startup period for operation. A 95% design of the additional 1,500 linear feet of slurry wall to isolate one side of the drinking water force main was submitted in April 2015. The agencies found the submittal deficient and did not approve the design. Supplemental investigation to identify the appropriate confining layer depth was completed in January 2016. In May 2016, an initial meeting with the Great Lakes Water Authority (owner of the water main) occurred and additional concerns were raised regarding construction of a slurry wall in close proximity to the water main. The PRPs completed a structural, vibration, and dewatering analysis for construction near the water main.

The Fourth FYR report was signed by EPA on April 22, 2016. The review concluded that the site is currently protective of human health and the environment because all potentially affected properties surrounding the site have been connected to the municipal water supply, and the Regulations Governing Water Supplies in Macomb County (Article V, Section 5.1) prohibit construction of new water supplies (i.e., private wells) without first receiving a permit issued by the County Health Department. In order for the remedy to be protective in the long term, however, the following actions were recommended: complete implementation of the corrective action plans addressing improvements to the groundwater collection system performance and monitoring program, finalize and record appropriate restrictive covenants, develop a long-term stewardship plan or an amendment to the operation and maintenance plan that will outline procedures for inspecting and monitoring compliance with the institutional controls, and complete the methane gas investigation and propose corrective measures to reduce elevated methane concentrations at perimeter gas probes.

An investigation conducted in July and August 2016 confirmed the presence of methane along the northern property boundary of the Site at 23 Mile Road, toward the residential development and from the toe of the Phase I landfill that exceeded MDEQ action levels. Therefore, the PRP Group prepared a voluntary corrective action plan to address the presence of landfill g0as at the Site boundary to provide continued protection of the residents north of 23 Mile Road. The design consists of a passive ventilation trench or a passive ventilation barrier to prevent the potential risk of soil gas migrating beyond the Site boundary at concentrations that exceed 1.25 percent per volume. The passive ventilation trench consists of a porous media trench and two perforated pipes situated along the northern toe of the Phase I Landfill, approximately 2,000 feet in length, and would be completed to a depth slightly below the water table elevation to intercept potential landfill gas migration pathways in the vadose zone. The objective of the soil gas passive ventilation trench is to prevent the future migration of methane beyond the Site boundary through the subsurface at concentrations that exceed 1.25 percent per volume. Final version of passive ventilation trench design was approved for construction in January 2017.

SITE STATUS

The slurry wall analysis was presented in a January 2017 meeting with the EPA, MDEQ, Army Corps of Engineers, and the Great Lakes Water Authority. The PRPs attempted to demonstrate unacceptable risk to the water main by construction of the new slurry wall. The MDEQ and Army Corps of Engineers did not agree with the conclusions from the PRP’s analysis and advocated that protection of the water main is of higher priority than damage to the existing water main leachate collection system that has failed to meet performance standards. The slurry wall design has not been resubmitted for review.

Passive ventilation trench construction activities were initiated in June 2017 and construction completion of the passive ventilation trench was achieved in November 2017. During the passive ventilation trench construction, unexpected and unmanaged waste was encountered in the passive ventilation trench alignment. As a result, samples were collected to characterize and to determine the extent of the waste. Sampling activities confirmed Toxic Substances Control Act, Resource Conservation and Recovery Act (RCRA) and municipal waste were present in the passive ventilation trench alignment and extended beyond the property line. The PRPs installed 15 additional soil gas monitoring probes to better evaluate the potential for methane migration through utility corridors from these waste materials. Recently submitted methane monitoring results suggest no methane migration north of 23 Mile Road. Biweekly monitoring continues to evaluate effectiveness of the passive ventilation trench. Approximately, 11,850 cubic yards of total waste was excavated and stockpiled for appropriated disposal. Additional waste remains beyond the perimeter fence in the Right of Way of 23 Mile Road. Based on review of historical aerial photographs, it does not appear that waste was placed under or north of 23 Mile Road.

ENFORCEMENT STATUS
The EPA signed a Decree with 48 separate companies that are PRPs. The companies known as the G & H PRP Steering Group are liable under the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, as amended, and Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The G & H PRP Steering Group also signed a Decree with the state for reimbursement of past costs, future oversight costs, and natural resource damages.

In April 2001, the G & H PRP Steering Group completed a supplemental environmental project that included bollards around the mitigated wetlands and a picnic shelter with picnic tables in the former Rochester Utica State Recreation Area. This project was performed in compensation for not having the state land open to the public when required by the Decree.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 12/21/1990**

The selected remedy required installation of a hazardous waste landfill cap and a fully encompassing slurry wall, collection and treatment of contaminated groundwater and leachate, connection of residential homes to the municipal water system, replacement of wetlands, and deed restrictions limiting use of the land and groundwater.

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 03/13/1992**

Components of the ROD remedy were changed as described below:
(1) Provision for a reduction in the thickness of the frost protection layer of the landfill cap.
(2) Provision to modify the source containment system, which was a physical barrier in the original ROD, to a hydraulic barrier with the removal of the slurry wall construction around the entire site. Instead, the ESD provided for a slurry wall partially along the east side, along the southern side (which gaps at the Detroit water and sewer line), and then partially along the west side of the landfill.
(3) Revision of cleanup standards for tetrachloroethene, vinyl chloride, and 1,1-dichloroethane.

Response Accomplishments: Completed

Bottled Water Provision of bottled water until municipal water extension was completed.

Start Date: 01/30/1982	Primary Cost:	$0	Source: Federal
End Date: 08/11/1982	Secondary Cost:	$0	Source: Private

Interim Response A chain link and snow fence was constructed around the oil seep area, and three overflow dams were installed to direct the flow of surface water around the oil seep area.

Start Date: 04/15/1982	Primary Cost:	$7,000	Source: Federal
End Date: 06/30/1982	Secondary Cost:	$0	Source:

Interim Response A temporary oil skimmer was installed to prevent the migration of floating oil. Clay barriers were constructed in the path of new oil seeps, and the fence was extended around the perimeter of the new oil seeps.

Start Date: 06/20/1983	Primary Cost:	$40,000	Source: Federal
End Date: 07/18/1983	Secondary Cost:	$0	Source:

Remedial Investigation RI/Feasibility Study.

Start Date: 07/27/1983	Primary Cost:	$2,908,000	Source: Federal
End Date: 12/21/1990	Secondary Cost:	$411,490	Source: State

Interim Response A chain link fence was installed around the perimeter to prevent public access. On-property trails were blocked with earth berms; a gate was installed across the main site entrance along Ryan Road and warning signs were posted. Oil seepage areas were connected by collector trenches.

Start Date: 05/12/1986	Primary Cost:	$231,000	Source: Federal
End Date: 09/30/1986	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Interim Response

A three-mile long chain link fence was installed around the perimeter of the site. A utility shed and aerator were installed at the discharge point of the oil seep area. Oils were periodically recovered and stored. Approximately 2,400 gallons of collected oil were transported to a thermal destruction facility in Chicago, Illinois.

Start Date:	*03/18/1987*	Primary Cost:	$764,000	Source: Federal
End Date:	*03/15/1991*	Secondary Cost:	$0	Source:

Remedial Design

Designs were prepared for the installation of a hazardous waste landfill cap, a partial slurry wall, a collection and treatment system for the groundwater and leachate, mitigation replacement of wetlands, connection of impacted residences to the municipal water system, and deed restrictions to prevent use of the contaminated groundwater.

Start Date:	*09/10/1992*	Primary Cost:	$0	Source: Private
End Date:	*06/20/1995*	Secondary Cost:	$275,000	Source: Federal

Alternate Water

Alternate water in the form of municipal water connections was provided by the PRPs to the remainder of homes within the surrounding area as required within the Decree. Actual costs are unknown.

Start Date:	*01/15/1996*	Primary Cost:	$0	Source: Private
End Date:	*12/30/1996*	Secondary Cost:	$0	Source:

Remedial Action

A hazardous waste landfill cap and partial slurry wall were installed. A collection and treatment system for the groundwater and leachate and a mitigation wetland were also constructed. Impacted residences were connected to the municipal water system, and deed restrictions were sought to prevent use of the contaminated groundwater.

Start Date:	*08/19/1996*	Primary Cost:	$29,000,000	Source: Private
End Date:	*06/21/2000*	Secondary Cost:	$378,000	Source: Federal

5 Year Review

The EPA performed the First FYR in 2001. The FYR site inspection was completed on April 27, 2001 and attended by the EPA, PRPs, and MDEQ. The document was completed and signed on September 5, 2001.

Start Date:	*07/01/2001*	Primary Cost:	$25,000	Source: Federal
End Date:	*09/05/2001*	Secondary Cost:	$0	Source:

5 Year Review

The EPA conducted a Second FYR in 2006. The FYR site inspections were completed on February 14 and April 24, 2006, and attended by the EPA, PRPs, and MDEQ. The document was completed and signed on September 27, 2006.

Start Date:	*01/15/2006*	Primary Cost:	$25,000	Source: Federal
End Date:	*09/27/2006*	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

The FYR site inspection was completed on May 26, 2010, and attended by the EPA, PRPs, and MDEQ. The document was completed and signed on September 13, 2011.

Start Date:	*05/26/2010*	Primary Cost:	$0	Source:
End Date:	*09/13/2011*	Secondary Cost:	$0	Source:

Remedial Investigation

The PRPs developed a corrective action work plan to correct failed physical and hydraulic containment as well as suspected failure to achieve groundwater cleanup standards within 30 years. Landfill gas migration investigation was also completed in 2016.

Start Date:	*01/01/2013*	Primary Cost:	$200,000	Source: Private
End Date:	*08/31/2016*	Secondary Cost:	$0	Source:

5 Year Review

The Fourth FYR site inspection was completed on September 1, 2015, and attended by the EPA, MDEQ, and the PRPs. The document was completed and signed on April 22, 2016.

Start Date:	*05/28/2015*	Primary Cost:	$0	Source:
End Date:	*04/22/2016*	Secondary Cost:	$0	Source:

Response Accomplishments: In Progress

Remedial Design

Remedial design of the supplemental collection system has been completed. Design of the landfill gas mitigation system has been completed. A partial design of the new slurry wall has been completed. Design of a new slurry wall has ceased due to concerns with damaging the 96-inch water main.

Start Date:	*01/16/2015*	Primary Cost:	$300,000	Source: Private
End Date:		Secondary Cost:	$0	Source:

Remedial Action

Construction of the corrective action supplemental collection system began in August 2016. The system has been constructed and is in the start up phase. Construction of the remaining correction action requirements (slurry wall) has not begun. Anticipated costs for the slurry wall are an additional $1,000,000. Construction of the landfill gas mitigation system began in March 2017 at an approximate cost of $1,000,000.

Start Date:	*08/08/2016*	Primary Cost:	$2,000,000	Source: Private
End Date:	*01/31/2018*	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Ongoing

Operation and Maintenance

O & M is expected to last 80 years or more. The primary and secondary costs are based on a yearly projection which will increase with the cost of inflation. The annual projection for a 15-year period is $720,000 for the PRPs and $50,000 for the EPA. The PRP estimated O & M costs are $500,000 per year.

Start Date: 09/15/1999	Primary Cost:	$8,500,000	Source:	Private
End Date: 09/30/2079	Secondary Cost:	$850,000	Source:	Federal

Response Accomplishments: Future Need

5 Year Review

Start Date: 09/01/2020	Primary Cost:	$0	Source:	
End Date: 04/22/2021	Secondary Cost:	$0	Source:	

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$140,000	$0	$0	$140,000	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$19,319	$0	$0	$18,916	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$130,000	$0	$0	$128,462	$0
Totals:	$289,319	$0	$0	$287,378	$0

STATE SUPERFUND CONTRACTS

For Operable Unit 00 : Entire Site **: Closed**

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Investigation	$0	$0	$700,000	$0
Totals:	$0	$0	$700,000	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Liquid Disposal, Inc.
3901 Hamlin Road
Utica , MI

County: Macomb
MDEQ District Location: Southeast MI
Managed By: RRD-Superfund

Federal Site Code: 62
State Site ID#: 50000015
State Site Score: 31

LOCATION
The Liquid Disposal, Inc. site is located at 3901 Hamlin Road in the city of Utica, Michigan. It is within a mixed residential and light industrial area. The site is bordered by the Clinton River and its floodplain to the north, the Shadbush Tract Nature Study Area to the east, an RV and vehicle storage yard and automotive junkyard to the south and west. The RV storage area is directly west of the site and overlies an old unlined landfill.

SITE HISTORY
The site was owned by Ms. June Morgan of Morgan & McClarty, P.C. and was first used for sand and gravel excavation and then as a landfill from 1964 to 1967. Liquid Disposal, Inc. purchased the property in 1967 and began operating a liquid industrial waste incinerator in 1968. Industrial wastes burned in the incinerator included paint thinners, paint sludges, laboratory wastes, and industrial oils contaminated with polychlorinated biphenyls (PCBs). Incoming wastes received from waste generators were stored in above and below ground storage tanks, 55-gallon drums, and lagoons prior to being incinerated.

The contamination problem at the site first became apparent in 1969, when liquid from a sewer line discharged into a marshy area east of Ryan Road. From 1973 to 1981, several violation notices were sent to Liquid Disposal, Inc., because the company was not complying with terms of Michigan Department of Natural Resources (MDNR) permits. In January 1982, the site was closed by the Macomb County Circuit Court after two workers were killed by hydrogen sulfide gas that formed when incompatible chemicals were mixed at the site.

The site was added to the National Priorities List in September 1983. The following contaminants at the site were listed as chemicals of concern exceeding federal and state standards for groundwater: chloroform, methylene chloride, trichloroethylene (TCE), 2-butanone, benzene, bis(2-ethylhexl)phthalate, toluene, phenol, napthalene, barium, cadmium, and lead; and for soils: chloroform, methylene chloride, tetrachloroethylene, TCE, 2-butanone, benzene, toluene, benzo(a)pyrene, bis(2-ethylhexy)phthalate, phenol, napthalene, fluoranthene, PCBs, barium, cadmium, and lead. Tetrahydrofuran is detected within the slurry wall as well as upgradient and downgradient of the site.

The EPA conducted four removal actions between 1982 and 1985. The first removal action was conducted to clean up a spill of PCB-contaminated oil in a tributary of the Clinton River. In the second removal action, the EPA removed and disposed of contaminated liquids at the site, secured the site, and posted warning signs to protect the public from direct contact with chemicals at the site. During a third removal action, the EPA removed and disposed of all liquids and sludges from the lagoons, as well as waste containers and other solid wastes. In 1985, the fourth EPA removal action removed flammable liquids and underground tanks and repaired the leachate collection system of the landfill.

Results of the state-lead remedial investigation (RI) completed in 1987 indicated that contamination from Liquid Disposal, Inc.'s activities existed in on-property and off-property soils and in the shallow groundwater aquifer. The RI also determined that groundwater in

the shallow aquifer migrates to the north and northeast of the property and that no drinking water wells exist in the potentially affected areas. Study results of the Clinton River at that time indicated that contamination exists in fish; but, overall, the chemicals had little impact on the aquatic life of the river. Air quality studies of ambient air detected contamination, but at relatively low levels. The major potential risks associated with the site would be posed by direct contact with contaminated on-property and off-property soils.

The Record of Decision (ROD), signed on September 30, 1987, outlined a cleanup remedy that included on-property land disposal of debris, on-property solidification/fixation of soil and waste, extraction and treatment of groundwater, installation of groundwater monitoring wells, wetland restoration, and landfill slurry wall and cap construction. The potentially responsible party (PRP) steering group implemented the cleanup remedy from December 1993 through the spring of 1996. On August 28, 1995, an Explanation of Significant Difference (ESD) was signed to modify the remedy defined in the ROD. Those changes include the following: the original remedy called for the extraction and treatment of off-site groundwater. This will not be implemented unless the EPA finds that off-site groundwater quality has deteriorated as a result of site-related contamination. The remedy called for the solidification of all on-site soils down to the water table. After stabilizing a ten-foot perimeter, the EPA deemed that total source area solidification is not necessary because the site contamination will be adequately contained by means of a cap, slurry wall, perimeter stabilization, and on-site groundwater extraction. The target cleanup levels for barium and benzene were increased to meet the current maximum contaminant (MCL) levels in 1987. Barium changed from 1,000 parts per million (ppm) to 2,000 ppm and benzene was changed from 0.2 ppm to 5.0 ppm.

The slurry wall has been in place since 1996. The PRPs are unable to achieve a two-foot inward hydraulic head around the slurry wall, and it appears that the slurry wall is failing on the northeast corner. The EPA/MDEQ requested that an investigation be conducted to identify the location of the breach. The investigation was conducted placing vertical aquifer sampling wells along the northeast and north sides of the slurry wall. Barium, a contaminant of concern, was not detected in the downgradient wells, but benzene, another contaminant of concern, was detected in a downgradient well along with high concentrations of chloride.

In September 2002, the relationship between the groundwater plume and groundwater/surface water interface contaminant migration was investigated. The investigation determined that there is a hydraulic connection between the inside of the slurry wall and outside groundwater at the north, south, and east faces of the wall.

In the spring of 2003, the PRPs conducted two additional studies. First, upgradient migration of contaminants at the southeast corner of the slurry wall was investigated where the slurry wall is leaking. The upgradient test determined that there are contaminants of concern upgradient of the site with no conclusion as to the source. Second, a pump test was conducted at a downgradient well. The downgradient pump test determined that the rate of migration is extremely slow based on the soil compaction and type and that no contaminants can or will migrate off-site. The MDEQ did not agree with the PRP's conclusions.

The site is currently owned by the state through tax reversion and is capped and fenced. Periodic groundwater and landfill cap monitoring is performed by the PRP steering group. A groundwater extraction system is currently in place in an attempt to maintain an inward hydraulic gradient across the slurry wall to assure the integrity of the slurry wall surrounding the site source area. However, the specified hydraulic gradient has never been achieved. Attempts at wetland restoration have failed to take hold as required by the ROD.

The second Five-Year Review (FYR) was completed on September 26, 2008. The review concluded that the protectiveness statement could not be made at this time. Further information will be obtained by evaluating the impacts of the lack of an inward gradient at the site, re-evaluate the current list of chemicals of concern, and evaluating the risks associated with a potential upgradient source identified at the site.

The MDEQ received a draft ESD for the site that required institutional controls be added to the implemented remedy to restrict usage of on-site groundwater, prevent the installation of wells, and protect the existing site remedy infrastructure. The MDEQ issued a concurrence letter for the ESD in September 2010.

The Third FYR report was completed in September 2013. The site inspection for the FYR report was conducted in November 2012. The undetermined protectiveness statement and components of the remedy not meeting performance standards were addressed in the 2013 FYR. Additional information needs to be obtained by evaluating the impacts of the lack of an inward gradient at the site, re-evaluate the current list of chemicals of concern, and evaluating the risks associated with a potential upgradient source identified at the site.

The Declaration of Restrictive Covenant and Grant of Environmental Protection Easement was made on April 24, 2015, by Michigan Land Bank Authority.

SITE STATUS

The PRPs continue to collect quarterly groundwater samples with no measurable change in previously noted items. Operation and Maintenance reports indicate that benzene, toluene, and total xylenes are migrating onto the site from an upgradient area of past Liquid Disposal, Inc. contamination not included in the original slurry wall containment area. An investigation is needed to evaluate the extent of contamination and take the corrective actions necessary.

MDEQ staff completed reviewing the "Evaluation of Current Conditions Report" document submitted by the PRP consultant and provided written comments.

Currently, negotiations to determine corrective actions have temporarily stalled for unknown reasons but it is hoped that negotiations will restart and continue.

ENFORCEMENT STATUS

The EPA identified approximately 850 liable parties under the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, as amended. A liability determination has not been done under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. A group of settling parties, known as the Liquid Disposal, Inc., PRP steering group, was established and signed a Consent Decree with the EPA to implement the remedial design and remedial actions and to perform operation and maintenance activities at the site. The state signed a Consent Order with the steering group on September 18, 1994, for payment of natural resource damages, as well as past and future oversight costs.

The adjacent property owner has been using the access road to the site for storage of junk cars and scrap metal. A letter was sent to the owner requesting that he remove all debris from the road. The state referred the trespass issue to the Michigan Land Bank Authority and the property owner, to secure the site.

SPECIAL CONSIDERATIONS

None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/1987**

The cleanup remedy consisted of on-property land disposal of debris, on-property perimeter solidification/fixation of soil/waste, treatment of groundwater, and slurry wall and cap containment.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 08/28/1995**

The original remedy called for the extraction and treatment of off-site groundwater. This will not be implemented unless the EPA finds that off-site groundwater quality has deteriorated as a result of site-related contamination. The remedy called for the solidification of all on-site soils down to the water table. The EPA deemed that this degree of solidification is not necessary because the site contamination will be adequately contained by means of a cap, slurry wall, and on-site groundwater extraction. The target cleanup levels for barium and benzene were increased to meet the current MCLs in 1987.

Record of Decision *Amendment:* 0 *ESD:* 2 **Effective 09/10/2010**

The EPA issued an ESD to add institutional controls to the remedy to restrict the use of site groundwater, prevent installation of wells other than for the monitoring or enhancement of the implemented remedy, and protect the remediation system infrastructure.

Response Accomplishments: Completed

Interim Response

Removal of a PCB contaminated oil spill from the waste liquid lagoon. The spill traveled along a small creek which fed into the Clinton River. About 200 gallons of oil and 750 cubic yards of contaminated sediments were recovered.

Start Date: 05/01/1982 Primary Cost: $64,000 Source: Federal
End Date: 06/01/1982 Secondary Cost: $0 Source:

Interim Response

Site stabilization for safety and security. A leachate collection system was constructed to prevent lagoon leachate from migrating off-site.

Start Date: 07/26/1982 Primary Cost: $249,000 Source: Federal
End Date: 09/10/1982 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Interim Response An extensive surface cleanup was undertaken. The waste liquid lagoon was solidified and scrubber lagoons were drained, and both were capped and seeded, and all drums were removed for off-site disposal. Approximately 1.3 million gallons of liquid, 15,000 cubic yards of solids, and 1,800 drums were removed from the site.

Start Date: *04/21/1983*	Primary Cost:	$2,066,000	Source: Federal
End Date: *04/25/1984*	Secondary Cost:	$0	Source:

Remedial Investigation State lead.

Start Date: *04/22/1983*	Primary Cost:	$724,173	Source: Federal
End Date: *09/30/1987*	Secondary Cost:	$0	Source:

Interim Response Flammable liquids and sludges in 22 above ground and 8 below ground tanks were incinerated off-site, and the leachate collection system installed during July 1982 was repaired.

Start Date: *07/08/1985*	Primary Cost:	$1,675,000	Source: Federal
End Date: *04/18/1986*	Secondary Cost:	$0	Source:

Remedial Design

Start Date: *01/01/1988*	Primary Cost:	$0	Source: Private
End Date: *09/30/1992*	Secondary Cost:	$212,000	Source: Federal

Remedial Action Landfill cap, slurry wall, and on-site groundwater extraction.

Start Date: *01/01/1993*	Primary Cost:	$22,000,000	Source: Private
End Date: *01/01/1996*	Secondary Cost:	$435,000	Source: Federal

5 Year Review

Start Date: *05/01/2003*	Primary Cost:	$0	Source: Federal
End Date: *09/30/2003*	Secondary Cost:	$0	Source:

5 Year Review The Second FYR found that the EPA was not able to make the protectiveness statement at this time.

Start Date: *01/11/2008*	Primary Cost:	$0	Source:
End Date: *09/26/2008*	Secondary Cost:	$0	Source:

5 Year Review The Third FYR report was signed in September 2013. The site inspection for the FYR report was conducted in November 2012. The Review concluded that the remedy currently protects human health and the environment because there is no human exposure to site-related contamination. However, the Report recommended that steps need to be taken to achieve and then maintain the two-foot inward hydraulic gradient required by the ROD.

Start Date: *10/07/2012*	Primary Cost:	$0	Source:
End Date: *09/23/2013*	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Ongoing

Operation and Maintenance Groundwater and landfill cap monitoring.

Start Date: 01/01/1996 Primary Cost: $0 Source: Private

End Date: 01/01/2026 Secondary Cost: $0 Source:

Response Accomplishments: Future Need

5 Year Review There will be another FYR in 2018 as hazardous substances still remain on this site.

Start Date: 10/07/2017 Primary Cost: $0 Source:

End Date: 09/23/2018 Secondary Cost: $0 Source:

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005785-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Design	$27,298	$0	$0	$27,298	$0
Remedial Investigation	$724,173	$0	$0	$724,173	$0
Totals:	$751,471	$0	$0	$751,471	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$21,443	$0	$0	$21,443	$0

Cooperative Agreement Number V995258-03 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$437	$0	$0	$436	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$75,502	$0	$0	$67,117	$0
Totals:	$97,382	$0	$0	$88,996	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: South Macomb Disposal Auth (l
21290 24-Mile Road
Macomb Twp , MI

County: Macomb
MDEQ District Location: Southeast MI
Managed By: RRD-Superfund

Federal Site Code: S4
State Site ID#: 50000032
State Site Score: 27

LOCATION
The South Macomb Disposal (Landfills 9 & 9A) site is located near the intersection of 24-Mile and Card Road in Macomb Township, Macomb County, Michigan. The site occupies approximately 150 acres located on the south side of 24-Mile Road.

SITE HISTORY
The South Macomb Disposal (Landfills 9 and 9A) site is comprised of two adjacent municipal landfills, Landfill 9 and Landfill 9A, that were utilized for the disposal of municipal wastes from 1968 to 1975. The sites were not adequately covered, lined, or fenced. A water table aquifer and two confined aquifers are contaminated with landfill leachate. Historically, frequent leachate outbreaks occurred along the perimeters of the landfills.

Historically, residential wells were contaminated; and low levels of organic vapors were detected in the air in neighborhood homes. The state provided bottled water from 1983 to 1988 to the 12 residences where health advisories had been issued. The township and state extended a municipal water system to residences with contaminated wells in 1988. Some residents in the area still rely on groundwater for their drinking water. These private wells are threatened by the continuing discharge of leachate into the groundwater.

Contaminants in the groundwater include ammonia; volatile organic compounds, such as methylene chloride, vinyl chloride and benzene; and metals, such as iron and manganese. These contaminants have been found at concentrations greatly exceeding unrestricted residential cleanup levels beneath the landfill and have been found at concentrations slightly above the unrestricted residential cleanup levels in areas beyond the landfill property. If left unabated, these concentrations may cause health problems for a person who consumes this water over time.

In late 1988, the South Macomb Disposal Authority extended Landfill 9A's existing leachate collection system. Additionally, under court order, the South Macomb Disposal Authority constructed a shallow leachate collection drain and slurry wall along the north boundary of Landfill 9 to prevent contaminated groundwater from moving north toward 24-Mile Road.

On April 4, 1991, after extensive litigation, the Macomb County Circuit Court issued an opinion and order for comprehensive remedial action for the site. The court-ordered remedy included: construction of a slurry wall completely around Landfills 9 and 9A; construction of a cap on both sites; expansion of the leachate collection system; delineation of groundwater contamination; and extraction, treatment, and disposal of contaminated groundwater and leachate. The South Macomb Disposal Authority appealed the court order and the appeals court remanded the case back to the Macomb County Circuit Court for retrial.

The site was added to the National Priorities List in June 1986. The EPA conducted a Remedial Investigation/Feasibility Study (RI/FS) at the site. On August 13, 1991, the EPA signed a Record of Decision (ROD) for the site. The ROD describes the EPA-selected groundwater cleanup plan, which was essentially a subset of the court-ordered remedy. The

ROD made the landfill contents a separate phase of work and delayed a decision on the landfill cover until construction of the groundwater remedy was completed. The EPA's remedy included installation of groundwater extraction wells and leachate collection drains, installation of slurry walls, construction of an on-site water treatment system, connection of residents to a municipal water supply, and long-term monitoring. The EPA terminated negotiations in 1991 because the South Macomb Disposal Authority failed to provide a good-faith offer for implementation of the ROD cleanup plan. On December 9, 1991, in an effort to consolidate enforcement action, the EPA transferred the lead for site management to the state.

In December 1993, the Macomb County Circuit Court ordered the South Macomb Disposal Authority to perform a hydrogeological study and a bench scale study on recirculation of leachate, and prepare an array of remedial alternatives.

A final hydrogeological investigation report was submitted on February 28, 1995. A report on the evaluation of remedial alternatives was submitted on May 19, 1995. It was determined that recirculation of leachate would not be effective at this site. In the spring of 1996, the MDEQ performed sampling and other field activities to aid in the assessment of remedial alternatives. Per a directive of the court, the South Macomb Disposal Authority and the MDEQ held discussions in an attempt to develop an acceptable remedy for the site.

The South Macomb Disposal Authority and the state discussed options for a settlement with the EPA. However, in its January 1998 letter, the EPA declined a federal cost-share settlement at the South Macomb Disposal (Landfills 9 and 9A) site. In July 1998, the South Macomb Disposal Authority contracted with Conestoga-Rovers & Associates for development of a Remedial Action Plan (RAP), remedial design, and oversight of construction activities. In June 2000, Conestoga-Rovers & Associates submitted the supplemental plume delineation report, and in August 2000 they submitted the pre-design investigation report.

The state of Michigan and the South Macomb Disposal Authority entered into a preliminary agreement on July 9, 1999, regarding remediation of the South Macomb Disposal (Landfills 9 and 9A) site. This agreement was amended in August 2000 and again in October 2000. The amended agreement called for the state of Michigan and the South Macomb Disposal Authority to enter into a Consent Decree for implementation of a RAP.

The state of Michigan and the South Macomb Disposal Authority entered into a Consent Decree on June 26, 2002, which required implementation of an attached RAP, payment to the state of $1,000,000 for past state response activity costs and payment of future state costs. The RAP required improvements to the landfill cover; the collection, treatment, and disposal of contaminated leachate and groundwater; management of landfill gas, long-term monitoring and achievement of specific performance standards. The performance standards include achieving capture of the groundwater plume within four years of the start of the leachate collection system.

On-site construction activities began with clearing and grubbing activities in February 2001. Construction of the landfill cap improvements began in May 2001 and was substantially complete by the end of 2003. Construction of the leachate collection system began in August 2001, was completed on September 4, 2002, and the system started full operation on November 19, 2002.

Implementation of the long-term groundwater monitoring program began in November 2002. Several new groundwater monitoring wells were installed in 2002 and 2003 to better determine the progress of the cleanup. The leachate collector on the east side of the landfill

was determined to be too shallow to meet the objective of full capture in this area. Therefore, a deeper replacement leachate collection trench was installed on the east side of the landfill in October 2003 to improve leachate collection in this area. The intent of this portion of the trench is to remove the water from the waste and to stop contaminated groundwater from flowing beyond the eastern boundary of the site.

Landfill gas was also initially monitored on a quarterly basis via a series of gas monitoring probes. Gas was detected at close to half the lower explosive limit near the property boundary in one gas probe on the north side of Landfill 9 in February 2003. Six additional gas vents were installed in March 2003 and the levels of methane reaching this area rapidly decreased. In 2004, gas was again detected above the lower explosive limit in gas probes north of Landfills 9 and 9A. A gas venting trench was installed north of Landfill 9 and additional gas vents were installed north of Landfill 9A. Also, in 2004, additional subsurface gas probes were installed to define the extent of the subsurface gas that exceeds the lower explosive limit. No residences or other buildings are located in the immediate vicinity of the gas detections. In 2006, additional gas vents and gas probes were installed.

The RAP required a groundwater extraction well system be installed. Construction of an initial extraction well system was completed in May 2005. The extraction well system at that time consisted of two extraction wells northeast of the landfills. In 2006, significant modifications to the groundwater and leachate extraction system were completed. Seven leachate extraction wells were installed into the center of the two landfills. Two old pump test wells on the south side of Landfill 9A were converted to groundwater extraction wells. Also, water from the two groundwater extraction wells northeast of the site was rerouted to a new force main to allow for greater extraction rates. Overall extraction rates were greatly increased in 2006 in an attempt to increase capture of the contaminated leachate and groundwater.

Significant settlement of the landfill cap has occurred in several areas. Repairs were made in 2004, 2005, and 2006 which involved placing more soil and reseeding the areas that had settled to maintain grades and prevent ponding of water on the cap. Repairs to the cap have also been made to address cracks that have formed in the cap.

Per the Consent Decree, the South Macomb Disposal Authority had until November 19, 2006, to gain full capture of the contaminated groundwater plumes emanating from the site. In the areas east and northeast and south of the landfills, capture still has not been demonstrated for the full extent of the groundwater contaminant plume that exceeds health-based criteria. Petro submitted a Corrective Action Plan on November 29, 2006, to address the lack of capture. The Corrective Action Plan did not contain the necessary actions to achieve the performance standards and was disapproved. Petro submitted a revised Corrective Action Plan on November 29, 2007. The revised Corrective Action Plan again did not propose actions sufficient to achieve the site performance objectives and was disapproved by the MDEQ on May 28, 2008.

In 2011, the South Macomb Disposal Authority's new consultant, TRC Companies Inc., submitted a new draft Corrective Action Plan to address the issues at the site. The MDEQ approved the implementation of the actions in the plan in November 2011. The plan called for the installation of new leachate collection systems and new groundwater extraction wells.

Corrective action field work began in December 2011 and continued through 2014. New leachate collection trenches were installed in Landfill 9A and new leachate collection sumps and leachate and groundwater recovery wells were installed in both landfills. Many new piezometers were installed to gage the effectiveness of the new systems. Improvements were also made to the landfill cover system to reduce infiltration and increase vegetation.

Groundwater in-situ treatment pilot studies were completed in 2014 to determine if air sparging would effectively remediate off-site groundwater contamination. Final results of the pilot studies indicated that in-situ treatment was not successful.

SITE STATUS

The South Macomb Disposal Authority's consultant also continues to monitor and maintain the site. Leachate collection, using portions of the old leachate collection system and the newly installed system, continues to collect leachate for the purpose of demonstrating inward gradient of the groundwater surrounding the landfills. The operation of the collection systems will continue to be optimized based on ongoing data collection from the leachate within the landfills and the off-site groundwater. After the system optimization is complete, the operations and mainteannce (O & M) manual will be revised to demonstrate understanding of the system and operation to enduce the required leachate control. Groundwater samples continue to be collected on a semiannual basis to assess progress.

All site data continue to be evaluated to determine if an inward gradient at the landfill boundary has been initially achieved and is sustainable. The South Macomb Disposal Authority requested to implement an alternate remedial action to address contaminated groundwater away from the landfills. A determination of compliance and further evaluation of the request for an alternative remedial action will continue in 2018.

ENFORCEMENT STATUS

In April 1991, the Macomb County Circuit Court ordered the South Macomb Disposal Authority to perform the remedial action, which included construction of a slurry wall around the site, construction of a multi-media cap, leachate collection and treatment, and groundwater purging and treatment. The Court of Appeals remanded this case back to the circuit court. The state negotiated with the South Macomb Disposal Authority to reach agreement on a remedy to avoid a retrial. The parties signed a Consent Decree (File No. 85-3838-CZ) resolving this case on June 26, 2002. The MDEQ is currently monitoring the progress of the South Macomb Disposal Authority in cleaning up the site. The South Macomb Disposal Authority has been in violation of the Consent Decree since November 29, 2006, for failure to achieve the specified performance standards. Stipulated penalties continue to accrue for failure to meet the requirements of the Consent Decree.

A federal court case was dismissed without prejudice in March 1996.

SPECIAL CONSIDERATIONS

Under the Municipal Landfill Cost-Share Grant Program, the state has provided $5,716,956 to the South Macomb Disposal Authority for response activities from 1997 through 2001. The South Macomb Disposal Authority also received $8,900,000 in 2000 and $34,381,670 from several insurance companies for costs it incurred related to this site. On May 4, 2005, the Macomb County Circuit Court ruled that the South Macomb Disposal Authority must repay to the state the $5,716,956 of grant funds awarded as a result of recovering the funds from the insurance companies. The South Macomb Disposal Authority repaid the full grant amount plus interest (a total of $6,693,057.80) on November 3, 2008.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 08/13/1991**

The EPA-specified remedy included groundwater extraction, installation of a slurry wall, leachate collection, on-site treatment of extracted water, long-term monitoring, and connection of all residents in the immediate vicinity to municipal water. The South Macomb Disposal Authority is not implementing the ROD remedy but is implementing the remedy outlined in the RAP attached to the June 26, 2002, Consent Decree.

Response Accomplishments: Completed

Alternate Water

Michigan Environmental Response Act, 1982 PA 307, as amended, funds in the amount of $550,400 were authorized for an extension of the municipal water system.

Start Date:	*01/01/1983*	Primary Cost:	$552,893	Source: State
End Date:	*01/01/1988*	Secondary Cost:	$0	Source:

Interim Response

The potentially responsible party (PRP) installed a leachate collection system and partial slurry wall, which was funded in part by a $500,000 grant from the state.

Start Date:	*01/01/1987*	Primary Cost:	$93,722	Source: Private
End Date:	*01/01/1988*	Secondary Cost:	$500,000	Source: State

Remedial Investigation

The RI and FS were performed by the EPA.

Start Date:	*09/01/1987*	Primary Cost:	$1,242,000	Source: Federal
End Date:	*08/13/1991*	Secondary Cost:	$0	Source:

Remedial Design

Bond funds in the amount of $200,000 were authorized for oversight of the court-ordered hydrogeologic investigation. An additional $90,000 of bond funds were authorized for additional fieldwork necessary to design a remedy. The PRPs have conducted an additional investigation to support design and prepared remediation plans.

Start Date:	*04/01/1992*	Primary Cost:	$4,000,000	Source: Private
End Date:	*06/26/2002*	Secondary Cost:	$290,000	Source: State

OPERABLE UNIT 00: Entire Site

Response Accomplishments: In Progress

Remedial Action The remedial action includes improvements to the landfill cap, installation and operation of a leachate collection system, installation and operation of a groundwater collection system, treatment and disposal of all collected water, installation of a passive landfill gas venting system and long-term monitoring. In 2002, the cost of the remedial action was estimated at $16,000,000 over 30 years (including O & M).

Start Date: 02/01/2001 Primary Cost: $16,000,000 Source: Private

End Date: 01/31/2018 Secondary Cost: $0 Source:

Response Accomplishments: Ongoing

Operation and Maintenance This includes the operation of the leachate and groundwater collection, treatment, and disposal systems. It also includes maintenance of the landfill cap and gas venting system, and long-term monitoring. The South Macomb Disposal Authority spent approximately $1,013,000 for maintaining the leachate collection system and disposing of leachate from July 23, 1996, through September 30, 2001. The O & M costs from 2015 were approximately $1,340,000. These costs included repairs to the landfill cap and leachate collection systems as well as consultant time for analysis of monitoring data for attaining compliance and revision of the operation and maintenance documents. The 2015 O & M costs are not reflective of typical O & M costs, additional work was completed in 2015 and also 2016 to improve site conditions. Average O & M costs are likely near $250,000 per year.

Start Date: 10/01/1988 Primary Cost: $1,590,000 Source: Private

End Date: 02/01/2031 Secondary Cost: $0 Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$30,000	$0	$0	$30,000	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$640	$0	$0	$640	$0
Totals:	$30,640	$0	$0	$30,640	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Ten-Mile Drain
10 Mile & Jefferson
St. Clair Shores , MI

County: Macomb
MDEQ District Location: Southeast MI
Managed By: RRD-Superfund

Federal Site Code: 63
State Site ID#: 50000736
State Site Score: 37

LOCATION
The Ten-Mile Drain site is located near the intersection of Bon Brae Street and Harper Avenue in St. Clair Shores, Macomb County, Michigan, in an area of mixed commercial/residential development. It includes the Ten-Mile Drain storm sewer system, which consists of concrete sewer pipes and soil surrounding the pipes in a utility corridor 15 feet underground. The site covers several blocks where polychlorinated biphenyls (PCBs) have been found in the storm sewer in significant quantities. The PCBs are moving within the storm sewer, which empties into two canals connected to Lake St. Clair. The canals are private property and used by residents for recreational boating, swimming, and fishing.

SITE HISTORY
In 2001, elevated levels of PCBs were discovered in sediment samples collected as a part of a permit application process for a proposed dredging project in the Lange and Revere Streets canals. The canals had not been dredged in years and at the time Lake St. Clair water levels were three feet lower than normal and the sediment build-up was making it difficult for boating. In addition, the canals receive stormwater and sediment from the Ten-Mile Drain storm sewer system. The discovery of PCBs in the canal sediments prompted an emergency response from the EPA's removal program. At the time, responders assumed PCBs had been illegally dumped in Ten-Mile Drain, but the problem has proven to be persistent. Since then, the EPA and MDEQ have been involved in several removal actions and associated investigations attempting to trace the source of the PCBs.

Between 2002 and 2004, the EPA Removal Branch conducted extensive sampling in and near the drain, the drain was dewatered, cleaned with a high pressure jet, and sediments removed. In addition, the Lange and Revere canals were sampled and dredged. Macomb County conducted a limited number of soil borings and sampled the backfill around the drain in 2004.

During 2005, the EPA's removal program and the MDEQ completed 64 soil borings and identified the area around Harper Avenue and Bon Brae Street as the main area of contamination. One contaminated surface area was identified and this area was excavated in 2006.

In 2006, the EPA's removal program installed 1,500 feet of pipe liner in the drain near the corner of Bon Brae Street and Harper Avenue. A large sediment trap was installed in the drain at the outfall to the canals to serve to collect contaminated sediment. In 2007, using grant funding from the MDEQ, the city of St. Clair Shores started periodic sampling to monitor the conditions in and around the drain. This work continued until 2011. During 2009, PCB oil was discovered inside the lined portion of the sewer system.

During 2008, the MDEQ conducted a Site Investigation to support listing the site on the National Priorities List. The site was listed in 2010.

In 2010, another EPA emergency removal was conducted. The drain near Harper Avenue

and Bon Brae Street was dewatered and cleaned with a high pressure jet vacuum. A series of 15 weirs were installed inside the drain at manholes located along Bon Brae Street and Harper Avenue. The 15 joined 2 weirs previously mounted in the drain system. The weirs serve to trap oil and sediment and pinpoint what section of the drain the contamination is re-entering, and allow for removal of trapped sediments adjacent to the weir. A geophysical survey of the Harper-Bon Brae area was conducted, and soil borings were conducted in suspected source areas.

In 2010, fish were collected from the Lange and Revere Streets canals to be analyzed for PCBs. Analytical results from fish in the canals revealed very high levels of PCBs. A "Do Not Eat the Fish" advisory was issued for all fish in the Lange and Revere Streets canals and for carp and catfish in Lake St. Clair in 2011. The advisory was revised in 2012 after additional fish collection conducted five miles north and four miles south of the canals revealed fish in Lake St Clair, within two miles of the canals contained PCBs as well.

The EPA removed sediment build-up from the weir traps during 2011, and absorbent snares were installed to allow new incoming oil to collect on them.

During 2011, the EPA selected the first interim Record of Decision (ROD) to address the high concentrations of PCB oil that continued to accumulate behind the weirs inside the drain. This interim action consists of monthly source control activities to monitor, sample, and dispose of the accumulation of PCB oil and sediment behind the weirs. A Superfund State Contract (SSC) was executed in 2012 that included a 10 percent contribution of costs for this activity by the MDEQ. This activity is ongoing.

In 2011, the EPA began their site-wide Remedial Investigation (RI) and conducted sediment sampling in the canals. Approximately 140 samples were collected from the canals. The EPA found the highest concentrations at the outfall of the drain into the canals. The concentration decreased with distance from the outfall and depth. Also, in 2011-2012, the EPA concluded a targeted source investigation field sampling event in an effort to identify the source of PCBs within the Ten-Mile Drain system. The EPA's contractor collected samples from more than 90 soil boring locations within the underground utility corridors (sanitary sewer, water, and storm drain). The final summary report revealed PCB oil, which is heavier than water, had pooled beneath four manhole vaults within the storm sewer system. The vaults are the lowest points in the drain system. The investigation also identified PCBs at all depths adjacent to the storm sewer system at Bon Brae Street and Harper Avenue, and along Harper Avenue between Bon Brae and Lakeland Streets.

In 2013 and 2014, the EPA conducted additional RI work that included collecting soil samples from residential and commercial properties along the canals and near the intersection of Bon Brae Street and Harper Avenue. As a result of the investigation, a former machine shop, located at Harper Avenue and Lakeland, was identified as the original source of the PCBs. A potentially responsible party has not been identified. The high concentrations observed in the manhole vaults appear to be accumulations of dense oil in low spots within the drainage system. Based on the results, a time-critical removal action was conducted during 2014 to remove contaminated surface soil at ten properties, including eight public right-of-ways, one residential yard, and part of a commercial property.

In 2014, the EPA executed a second interim ROD that would remove high concentrations of PCBs from the drain system. Two manhole vaults, and the surrounding soil, were selected for removal and replacement.

Three years of post-vault removal monitoring inside the drain and sampling the monitoring and recovery wells, and removing PCB oil, if present, is also included in this interim remedial

action. The SSC was amended to provide for a 10 percent contribution of costs from the MDEQ. This work was conducted during 2015. During the course of the excavation, PCB oil was discovered dripping from the 48-inch storm sewer pipe that connected these two vaults. A decision was made to also remove this 120-foot long section pipe and the soil below it. This required temporarily shutting down a section of Harper Avenue, a major five-lane through-street. A second amendment to the SSC was executed, securing additional funding from the EPA, to complete this work. The MDEQ added its 10 percent cost share for remedial activities under the existing amended SSC. The EPA and MDEQ worked closely to expedite the review of the amendment to the SSC. This allowed this work to be completed concurrently with the replacement of the vaults. Harper Avenue was closed on November 2, and reopened to traffic on November 23, 2015.

As part of the site-wide RI, an investigation to evaluate PCB-contamination along the Old Martin Drain was conducted during the summer of 2015. Fifty soil borings were completed in three areas of the former drain to assess contamination.

SITE STATUS
EPA contractors continue to mobilize to the site on a monthly basis to monitor, and periodically remove PCB oil and contaminated sediment accumulating behind the weirs, as well as place absorbent snares in front of selected weirs to soak up new oil entering into the drain. The weir maintenance activities described in the interim action ROD are short-term measures to address risk while the EPA and the MDEQ continue through the remedial process and until a final long-term cleanup plan is selected.

In 2016, the EPA submitted a draft RI/Feasibility Study (FS) for the removal of shallow soils from residential and commercial properties along Lakeland and the Lange and Revere Canals. This soil removal is expected to take place in 2018. In 2017, the EPA submitted an FS for the sitewide remedy. This will address PCB contamination in the Ten Mile Drain system as well as in the Lange and Revere Canals. MDEQ is still in the process of reviewing and commenting on this document.

ENFORCEMENT STATUS
No Potentially Responsible Parties identified.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 09/27/2011**

Interim ROD executed to provide source control measures to mitigate the discharge of PCB contamination within the Ten-Mile Drain to the Lange and Revere Streets canals, including: monitoring and sampling; removal of sediment and oil; disposal of saturated snares, and PCB oil and contaminated sediment.

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 05/16/2014**

This second Interim ROD was executed to remove two vaults and excavate the soils around those vaults that contain the highest levels of PCBs at the intersection of Bon Brae Street and Harper Avenue. The remedy also provides for reconstruction of the vaults and post-vault monitoring inside the drain, with removal of any PCB oils that might collect after the contaminated soil removal work.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 09/20/2016**

This ESD discusses the following four modifications to the selected remedy: 1) the excavation and replacement of the 120-foot length of reinforced concrete pipe and impacted bedding materials beneath Harper Avenue between manhole vaults M7179 and J01; 2) the use of an alternate manhole vault lining method; 3) installation of two anti-seep collars; and 4) a reduction in the number of extraction and monitoring wells.

Response Accomplishments: Completed

5 Year Review

The First Five Year Review (FYR) was trigged by the on-site construction start day of April 10, 2012 for the first interim remedial action. The FYR stated that the 2011 and 2014 interim remedial actions at the site currently protect human health and the environment because there are no current exposure pathways to the PCB contamination inside the TMD system and the removal of the highly-impacted backfill and bedding materials at selected portions fo the system in conjuction with the ongoing monthly source control activities serve as protective interim measures. In order for the remedies to be protecting in the long term, the ICs required by the 2014 interim ROD must be implemented.

Start Date: 01/01/2017	Primary Cost:	$0	Source:
End Date: 04/06/2017	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: In Progress

Interim Response Interim source control measures to mitigate the discharge of PCB-contamination within the Ten-Mile Drain to the Lange and Revere Streets canals, including: monitoring and sampling, removal of sediment and oil, disposal of saturated snares and PCB oil and contaminated sediment. An SSC was signed February 1, 2012, between the EPA and the state for these interim actions.

Start Date:	*02/01/2012*	Primary Cost:	$1,132,000	Source:	Federal
End Date:	*02/28/2018*	Secondary Cost:	$125,000	Source:	State

Remedial Investigation Investigation to find the nature and extent of PCB contamination.

Start Date:	*01/14/2013*	Primary Cost:	$3,000,000	Source:	Federal
End Date:	*01/14/2019*	Secondary Cost:	$0	Source:	

Interim Response The Interim Action SSC was amended August 4, 2014, to allow for the excavation and replacement of two of the highest contaminated vaults within the storm drain along with three years of monitoring inside the drain and sampling the monitoring and recovery wells, and removing PCB oil, if present. This SSC was amended again September 23, 2015, to also include removal of 120 feet of 48-inch storm water pipe between these two vaults. The construction work was completed in 2015. Monitoring of the contamination within this reconstructed area will continue into 2018.

Start Date:	*05/16/2014*	Primary Cost:	$3,414,036	Source:	Federal
End Date:	*11/29/2018*	Secondary Cost:	$379,337	Source:	State

Response Accomplishments: Future Need

Remedial Design Engineering design related to addressing PCB contamination in the Ten-Mile Drain stormsewer system.

Start Date:	*12/31/2018*	Primary Cost:	$0	Source:	
End Date:	*12/31/2019*	Secondary Cost:	$0	Source:	

Remedial Action Implement RA to address PCB contamination in the Ten-Mile Drain stormsewer system.

Start Date:	*12/31/2019*	Primary Cost:	$0	Source:	
End Date:	*12/31/2020*	Secondary Cost:	$0	Source:	

5 Year Review The next FYR is due in April 2022.

Start Date:	*12/31/2021*	Primary Cost:	$0	Source:	
End Date:	*04/29/2022*	Secondary Cost:	$0	Source:	

Remedial Design Engineering design related to addressing PCB contamination in the Lange and Revere Street canals.

Start Date:	*12/31/2023*	Primary Cost:	$0	Source:	
End Date:	*12/30/2024*	Secondary Cost:	$0	Source:	

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Future Need

Remedial Action Implement RA to address PCB contaminated sediments in the Lange and Revere Street Canals.

Start Date: 12/31/2024	Primary Cost:	$0	Source:
End Date: 12/31/2025	Secondary Cost:	$0	Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$493	$0	$493	$493	$493

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$13,464	$0	$0	$13,464	$778

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$13,940	$0	$0	$13,940	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$18,986	$0	$0	$18,986	$0
Totals:	$46,883	$0	$493	$46,883	$1,271

STATE SUPERFUND CONTRACTS

For Operable Unit 00 : Entire Site **: Open**

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Interim Response	$4,924,711	$492,471	$455,579	$0
Totals:	$4,924,711	$492,471	$455,579	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Packaging Corp. of America (P
East Lake Road
Manistee , MI

County: Manistee
MDEQ District Location: Cadillac
Managed By: RRD-Superfund

Federal Site Code: 90
State Site ID#: 51000058
State Site Score: 33

LOCATION
The Packaging Corporation of America (PCA) site is located in Stronach Township, Manistee County, Michigan. The site consists of approximately 700 acres of land in and adjoining Section 17 of Stronach Township (T21N, R16W). The site is bordered by the village of Eastlake to the north, the village of Stronach to the south, Manistee Lake to the west, and Manistee National Forest to the east.

SITE HISTORY
PCA owns the pulp mill in Manistee, which over the years released contaminated wastewater that resulted in the PCA Superfund site. The pulp mill is still operating, producing primarily corrugated cardboard and boxboard. Prior to 1949 the pulp mill, then owned by American Boxboard Co., used the Kraft process. The Kraft process produced very little wastewater. In 1949, the company switched to the neutral sulfite semichemical cooking process, which produced much more contaminated wastewater. From 1949 to 1950, this wastewater was discharged directly to Manistee Lake. The neutral sulfite semichemical cooking process discharge during this period depleted oxygen in the lake and resulted in a massive fish kill. As a result, the discharge was diverted to on-land seepage lagoons with approval from the Michigan Water Resources Commission. From 1951 to 1976, the plant pumped seven billion gallons of wastewater into eight unlined seepage lagoons on 105 acres of land, resulting in an extensive plume of groundwater contamination.

The wastewater, which seeped into the groundwater, consisted of black liquor from the neutral sulfite semichemical cooking process, as well as primary clarifier sludge, evaporator condensate, and some biocides, fungicides, surfactants, and oils. The black liquor portion consists of lignins, tannins, other wood compounds, sodium, sulfate, and carbonate. Due to aggressive oxidative/reductive properties of the black liquor, it dissolves and entrains heavy metals from native soils as it migrates through, resulting in significant metal concentrations in the groundwater.

The plume initially flows under 1.5 square miles of industrially zoned land east of Manistee Lake. Pactiv Corporation is the current owner of this land, including the lagoons and land to the west up to the lake, excluding the Martin Marietta plant site. They are the current potentially responsible party (PRP) for the Superfund site. Hydrogeological investigations have indicated that the shallow, more diffuse portion of the contaminated groundwater from the lagoons discharges into Manistee Lake, but the transport and fate of the plume, especially the dense, deep plume, beyond the east shoreline wells remains uncertain. The high density of the contaminants drives the most contaminated portion of the plume to the base of the aquifer, at depths below the bottom of Manistee Lake, making the fate of the plume that much more uncertain. Monitoring wells along the eastern shoreline exhibit concentrations of heavy metals which exceed the EPA and Michigan drinking water standards. Residential wells have not been impacted, but the plume comes within 200 feet of several such wells.

The site was placed on the National Priorities List on September 8, 1983. PCA performed a

Remedial Investigation/Feasibility Study (RI/FS) under an April 1984 Administrative Order by Consent with the EPA. Due to questions about the environmental fate and toxicological impacts of the groundwater plume, another phase of the investigation, including well installation in Manistee Lake, took place in October to December 1988.

The RI Report and Baseline Risk Assessment were finalized on September 30, 1991. Since the EPA was considering accepting the risk assessment conclusion that the discharge of the plume into the lake has no detrimental effect, the Michigan Department of Natural Resources (MDNR) undertook its own studies. These studies confirmed a discharge of at least a portion of the plume to the lake. It also documented exceedances of groundwater/surface water interface criteria and a high level of aquatic toxicity in the venting groundwater and sediment pore water. The EPA completed the FS in July 1993, and the Record of Decision (ROD) was signed in September 1993, requiring no-action with monitoring. The state did not concur with the ROD, primarily due to deficiencies in the RI in the areas of plume characterization and fate determination and associated risks. Lagoon sediments were addressed under an agreement directly with the MDEQ, wherein the PRP consolidated them into a single, lined lagoon and capped them.

A groundwater and surface water monitoring work plan was approved by the EPA in 1995, and Pactiv has conducted annual rounds of groundwater and surface water monitoring since then. The results of these sampling events show a continued presence of concentrated black wastewater moving toward the lake at the bottom of the aquifer, and a release of contaminants in concentrations consistent with past monitoring results into Manistee Lake of lesser concentrated black water.

The MDEQ had previously set aside funds to conduct investigative work to evaluate the conclusions of the EPA's ROD. The MDEQ had planned an investigation at and around the PCA property to determine if the basis by which a no-action ROD was selected was accurate. The MDEQ's investigative work was designed to only determine whether further plume definition work is needed (by the PRP), rather than conduct complete definition work. The investigation project was bid out, and a contractor selected, but with the decision by the MDEQ not to pursue new long-term funding, this project was suspended in July 2008.

SITE STATUS

Oversight of the PRP is being conducted by the EPA as the lead agency for this site. The PRP (Pactiv) continues to conduct annual groundwater monitoring for the monitored natural attenuation remedy and submits an annual report summarizing the results.

ENFORCEMENT STATUS

In January 2002 and December 2003, the state sent notice/demand letters to Pactiv Corporation (formerly Packaging Corporation of America, and Tenneco) requesting recovery of state-incurred response activity costs as well as performance of additional response activities to adequately characterize the nature, extent, transport, and fate of all hazardous substances in the groundwater at the PCA Superfund site and assess the risk associated with those hazardous substances for all relevant groundwater exposure pathways.

Negotiations with Pactiv followed; however, Pactiv expressed an unwillingness to track the extent of the deep, toxic groundwater plume to determine its transport, fate, and impacts as it moves toward Manistee Lake and possibly Lake Michigan.

In April 2005, Pactiv's attorneys filed suit against the director of the MDEQ and the Attorney General in an attempt to bar the state from demanding additional response activities at the PCA site. Pactiv claimed the state's independent authority under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as

amended, was preempted by federal law (Comprehensive Environmental Response, Compensation, and Liability Act) and, therefore, the state could not require Pactiv to perform additional response activities at the PCA site because an EPA selected remedy was already in place through the 1993 ROD. Pactiv also claimed that the state's demands violated their due process rights. In addition, Pactiv sought reimbursement of their attorney's fees and any additional relief the court deemed appropriate.

In February 2007, a settlement was reached in which the state agreed to forever waive the past cost demand for those costs incurred to date and not to take further enforcement action against Pactiv until the MDEQ has collected additional data at the PCA site to support its position that the assumptions and conclusions in the ROD are not supported and the current remedy is not protective of human health and the environment. In return, Pactiv agreed to dismiss its claims without prejudice and forever waive their attorney's fees incurred to date.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/24/1993**
This is a "No-Action" ROD with monitoring.

Response Accomplishments: Cancelled

Remedial Investigation The MDEQ had set aside funds to conduct investigative work to evaluate the basis of the EPA's no-action ROD. However, the department was not able to secure new long-term funding and remaining funds were allocated to existing projects.

Start Date:	*05/01/2007*	Primary Cost:	$0	Source: <None>
End Date:	*09/15/2008*	Secondary Cost:	$0	Source: <None>

Response Accomplishments: Completed

Negotiations RI/FS negotiations.

Start Date:	*02/15/1984*	Primary Cost:	$0	Source:
End Date:	*02/15/1985*	Secondary Cost:	$0	Source:

Remedial Investigation Secondary costs include supplemental investigative work done by the MDEQ.

Start Date:	*05/02/1985*	Primary Cost:	$2,000,000	Source: Private
End Date:	*09/24/1993*	Secondary Cost:	$540,000	Source: State

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Interim Response The PRP paid for and conducted this interim response of construction of a landfill and placement of lagoon sediments therein. This work was done under a March 23, 1993, Consent Decree between Tenneco Packaging (now known as Pactiv Corporation) and the MDEQ.

Start Date: 03/23/1993 Primary Cost: $0 Source: Private
End Date: 12/31/1999 Secondary Cost: $0 Source: State

Negotiations Operation and Maintenance negotiations.

Start Date: 12/31/1993 Primary Cost: $0 Source:
End Date: 10/01/1994 Secondary Cost: $0 Source:

Response Accomplishments: Ongoing

Operation and Maintenance Monitoring.

Start Date: 06/30/1995 Primary Cost: $0 Source:
End Date: 12/31/2060 Secondary Cost: $0 Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$5,917	$0	$0	$5,917	$0

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$112,920	$0	$0	$95,706	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$369	$0	$0	$369	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$50,885	$0	$0	$50,885	$0
Totals:	$170,091	$0	$0	$152,877	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Mason County Landfill
Inman Road
Ludington , MI

County: Mason
MDEQ District Location: Cadillac
Managed By: RRD-Superfund

Federal Site Code: E3
State Site ID#: 53000013
State Site Score: 31

LOCATION
The Mason County Landfill is located three miles south of the city of Ludington and one mile east of Lake Michigan. It is in the northeast quadrant of the intersections of Bradshaw and Inman Roads in Pere Marquette Township, Mason County, Michigan. Iris Creek begins in a marsh about 400 feet to the north of the landfill and flows to the northeast towards the Pere Marquette River, about one mile away. The area is rural and agricultural, with scattered houses along both roads and a cluster of several houses less than a 1/4 mile to the north. All residences use private wells for their drinking water supply with the nearest municipal water supply being at least a few miles away. The Ludington pump storage facility is located 1/2 mile to the south.

SITE HISTORY
The Mason County Landfill began operation in late 1971 and was operated for the Mason County Department of Public Works by Acme Disposal Company of Ludington. Approximately 10 acres of the 18-acre site was landfilled. During its operation, the landfill received residential, commercial, and industrial refuse, liquids, and sludge. Acme Disposal Company closed the landfill in August 1978, but did not follow the closure plan.

Since closure, the site and adjacent properties were impacted by erosion and groundwater contamination with site-related contaminants. Groundwater and surface-water (Iris Creek) contamination was confirmed. Contaminants included ethylbenzene, trichloroethylene, 1,1-dichloroethylene, and toluene. Two residential wells were contaminated above state drinking water standards. They were replaced with deeper wells by the Michigan Department of Public Health through the Michigan Environmental Response Act, 1982 PA 307, as amended.

The site was placed on the National Priorities List (NPL) on September 8, 1983, the same year that the Mason County Department of Public Works received a $92,000 grant for improvements to the landfill. The clay cap was improved and a sedimentation basin was constructed downstream from an existing pond. Two adjacent properties were purchased by the county. Sixteen methane vents were placed in the top of the fill to vent off-gases.

Superfund dollars were authorized to conduct a remedial investigation/feasibility study (RI/FS) to determine the nature and extent of contamination and to evaluate cleanup alternatives. A Record of Decision (ROD) identifying the selected cleanup remedy was issued in September 1988. The site was split into two operable units (OUs): the landfill contents (OU1) and the site groundwater (OU2). These were acted upon separately in order to properly cap the landfill prior to completion of the groundwater portion of the RI.

Work on the landfill cap began in November 1990. It was constructed to comply with hazardous waste landfill closure requirements, was completed in October 1991, and included new fencing and monitoring well installation. Minor repairs to the cap and drainage swales were made in the spring of 1992. Mason County Department of Public Works, the potentially responsible party (PRP) responsible for implementing the remedy, submitted the

construction verification report for the landfill closure cap in July 1992. The EPA sent an acceptance letter to the county in September 1992. Mason County continues to monitor the groundwater, surface water, and residential well water on an annual basis.

The ROD for the groundwater operable unit was signed by the EPA in June 1993. The EPA determined that the levels and extent of groundwater contamination did not cause a significant health risk to the surrounding public or the environment. As a result, the EPA selected "No-Action with Monitoring" as the groundwater remedy.

In 1997, the EPA proposed that this site be deleted from the NPL as all remedial actions had been implemented. The MDEQ reviewed monitoring data from the last several years to determine whether it would concur with the EPA's deletion proposal. In the summer of 1999, the MDEQ concurred with the proposed deletion of the site from the NPL, and the site was officially deleted from the NPL on September 9, 1999.

County staff and MDEQ staff met in August 2005 to discuss various concerns. Mason County agreed to complete several actions at the site. These include: 1) evaluation of planned development near the site, 2) filling some data gaps with respect to residential water wells, 3) evaluate potential methane migration in the subsurface (done), 4) changing the groundwater sampling method to low-flow and non-filtering for metals (done), 5) add pH and hardness parameters to the surface water sampling analysis and determine whether sediment sampling needs to continue due to the lack of sediment criteria, 6) sending a recent aerial photograph to the MDEQ, and 7) change some formatting and content in the annual reports (done).

Mason County began monitoring the site for methane in 2006. Initial results for dissolved methane in groundwater ranged from less than 1.0 micrograms per liter (µg/l) to 41 µg/l. According to an August 14, 2008, e-mail from Mason County, landfill gas monitoring at the Pere Marquette facility began in "August of 2007 and took readings in August and October of fiscal year (FY) 2007 and January of FY 2008 and quarterly since then."

Five-Year Reviews (FYR) were conducted by the EPA in 1997 and 2001. The Third FYR by the EPA was signed on February 13, 2006, and concluded that the current remedy is protective. The review also stated "The primary concern for future monitoring is to ensure Michigan drinking water criteria at all groundwater wells are met for inorganic compounds and to ensure future residential development does not lead to elevated risks from Site groundwater. The MDEQ and Mason County are continuing to discuss the monitoring program and are working toward resolving these issues through modification of the Site monitoring program."

In FY 2007, state funds were approved to replace two residential water wells contaminated with manganese and iron at concentrations exceeding aesthetic residential drinking water standards and background levels. These wells consistently have concentrations above the aesthetic criteria but below the risk-based residential criteria for iron and/or manganese.

The Fourth FYR was signed by the EPA on January 24, 2011, and concluded that the current remedy is protective. The review also stated "Long term protectiveness requires continued operation & maintenance [O & M] of Site property, ICs [Institutional Controls], and monitoring systems." The MDEQ disagrees with the EPA's statement that there has not been migration of contaminated groundwater off-site and provided the EPA with a written response.

At the MDEQ, Water Resource Division's request, additional monitoring was performed on two residential wells impacted by contaminant(s) above aesthetic criteria but below health

based criteria. Upon review of the additional sample results, Water Resource Division staff agreed to install two deeper replacement residential wells and test them prior to abandoning the two existing residential wells. The first replacement residential well was installed in November 2012 approximately 90 feet deeper than the existing well. Sample results indicated that the concentrations were higher than the average original residential well concentrations. Based on this, the unlikelihood of having better water quality at a deeper interval at the second residential well replacement location, and the desire to make optimal use of state resources, it was decided to not replace either residential well and abandon the new, deeper residential well that had higher concentrations. This was completed in December 2012 with the invoice being paid in February 2013. Closeout letters were sent to the residents in February 2013.

On December 15, 2014, the MDEQ sent the EPA a FYR issues identification letter that stated: "Based on existing site data, it does not appear there are issues that need to be raised in the upcoming Mason County Landfill Five-Year Review. It should be noted that the existing monitoring well program (wells and parameters) is not sufficient to adequately monitor downgradient migration of site-related contaminants. Additionally, while the ROD may require compliance with Maximum Contaminant Levels, there are known exceedances of Michigan Part 201 generic residential criteria (aesthetic based) for iron and manganese in downgradient residential wells. It is unclear whether or not these are from naturally occurring environment or from site-related contamination."

The EPA issued the fifth FYR on January 15, 2016. The review concluded the remedy is protective of human health and the environment in the short-term. To address MDEQ concerns, the EPA agreed to the incorporate the following into the final report: 1) the MDEQ continues to have concerns regarding exceedances of MDEQ's groundwater aesthetic criteria, 2) MDEQ recommends development and implementation of a downgradient monitoring program (including new monitoring wells) to evaluate protection of downgradient residential wells (currently there are no monitoring wells between the landfill and residential drinking water wells), 3) MDEQ recommends Babbin Pond be dredged to minimize the release of iron sediment to Iris Creek.

SITE STATUS

Mason County still owns the site and monitors and maintains it on a regular basis.

MDEQ reiterated the following concerns to Mason County: 1) the site has not been adequately characterized for offsite migration (using residential drinking water wells instead of monitoring wells) and therefore, the remedy cannot be considered protective, 2) sentinel wells should be installed and monitored upgradient of the residential wells to provide protection, 3) there are known exceedances of aesthetic criteria in downgradient residential wells, 4) Babbin Pond needs to be dredged to minimize the release of iron sediment to Iris Creek. In December, MDEQ requested Mason County evaluate groundwater and residential wells for perfluoroalkyk substances (PFAS), an emerging contaminant. Discussions with EPA, Mason County and MDEQ are scheduled to occur in spring 2018.

ENFORCEMENT STATUS

In April 1989, the EPA unable to achieve a settlement with the PRPs to implement the selected 1988 ROD landfill remedy, issued a Unilateral Administrative Order. It was issued under Section 106 of the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, for completion of the landfill contents operable unit. As a result of the EPA order, Mason County agreed to implement the remedy to cap the landfill. After the landfill cap was completed and the ROD for the on-site groundwater was issued, the EPA again entered negotiations with the PRPs. A Consent Decree agreement was

reached obligating the PRPs to perform long-term groundwater and surface water monitoring, residential well monitoring, and maintenance of the site.

SPECIAL CONSIDERATIONS
As of May 20, 2004, Mason County has been awarded $122,643 in Municipal Landfill Cost-Share Grants.

OPERABLE UNITS

00	Entire Site
01	Landfill Contents
02	Groundwater

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The FYR was prepared by the EPA.

Start Date:	*06/15/1997*	Primary Cost:	$0	Source: Federal
End Date:	*11/13/1997*	Secondary Cost:	$0	Source:

5 Year Review The Second FYR was prepared by the EPA.

Start Date:	*01/15/2001*	Primary Cost:	$3,000	Source: Federal
End Date:	*02/27/2001*	Secondary Cost:	$0	Source:

5 Year Review The Third FYR by the EPA was signed on February 13, 2006, and concluded that the current remedy is protective. The primary concern for future monitoring is to ensure Michigan drinking water criteria at all groundwater wells are met for inorganic compounds and to ensure future residential development does not lead to elevated risks from Site groundwater.

Start Date:	*10/05/2005*	Primary Cost:	$0	Source: Federal
End Date:	*02/13/2006*	Secondary Cost:	$0	Source:

5 Year Review The Fourth FYR was prepared by the EPA and concluded that long-term protectiveness requires continued O & M of site property ICs and monitoring systems.

Start Date:	*11/08/2010*	Primary Cost:	$0	Source: Federal
End Date:	*01/24/2011*	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The review concluded the remedy is protective of human health and the environment in the short-term. To address MDEQ concerns, the EPA agreed to the incorporate the following into the final report: 1) the MDEQ continues to have concerns regarding exceedances of MDEQ's groundwater aesthetic criteria, 2) MDEQ recommends development and implementation of a downgradient monitoring program (including new monitoring wells) to evaluate protection of downgradient residential wells (currently there are no monitoring wells between the landfill and residential drinking water wells), 3) MDEQ recommends Babbin Pond be dredged to minimize the release of iron sediment to Iris Creek.

Start Date: *12/15/2014*	Primary Cost:	$0	Source:
End Date: *01/15/2016*	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

5 Year Review Estimated end date based on five years from the date of the last FYR.

Start Date: *01/15/2020*	Primary Cost:	$0	Source:
End Date: *01/15/2021*	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Landfill Contents

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/28/1988**

Selected remedy is a soil/clay Resource Conservation and Recovery Act, 1976 PL 94-580, as amended Subtitle C, compliant hazardous waste landfill cap, property use restrictions to prohibit use of the shallow aquifer, site fence, and groundwater monitoring (to evaluate cap effectiveness).

Response Accomplishments: Completed

Interim Response The Mason County Department of Public Works received a $92,000 grant for improvements to the landfill.

Start Date: *06/15/1983*	Primary Cost:	$92,000	Source: State
End Date: *12/15/1986*	Secondary Cost:	$0	Source:

Remedial Investigation

Start Date: *09/30/1985*	Primary Cost:	$882,000	Source: Federal
End Date: *09/28/1988*	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Landfill Contents

Response Accomplishments: Completed

Remedial Design Design of hazardous waste landfill cap. Private costs reflect Mason County costs per January 29, 2004, information from Mason County.

Start Date: 01/15/1989	Primary Cost:	$179,384	Source: Private
End Date: 06/29/1990	Secondary Cost:	$150,000	Source: Federal

Remedial Action An upgraded landfill cap was constructed using PRP and state grant funds.

Start Date: 01/15/1990	Primary Cost:	$0	Source: Private
End Date: 09/01/1992	Secondary Cost:	$600,000	Source: State

Response Accomplishments: Ongoing

Operation and Maintenance Monitoring and maintenance: The PRPs are responsible for monitoring groundwater, surface water/sediment, residential wells, and maintaining the landfill cap for 30 years, or until it has been demonstrated that site contamination is no longer a threat to the local drinking-water aquifer. The cost was estimated at $40,000 per year and includes other additional actual costs incurred by the county in the early/mid 2000's.

2017 costs: Mason County reported $13,300 for groundwater monitoring and $2,531 for landfill maintenance (mowing, removing downed trees along fence lines, gas monitoring).

Start Date: 12/16/1989	Primary Cost:	$1,541,872	Source: Private
End Date: 12/16/2019	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: Groundwater

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 06/15/1993**

The selected remedy is "No-Action" with monitoring of groundwater, surface water, and residential wells.

Response Accomplishments: Completed

Alternate Water Alternate Water: Residents were placed on bottled water until their wells were replaced.

Start Date: 01/15/1983	Primary Cost:	$0	Source: Private
End Date: 12/15/1984	Secondary Cost:	$0	Source:

Interim Response Two residential drinking-water wells were replaced.

Start Date: 01/15/1984	Primary Cost:	$16,000	Source: State
End Date: 12/15/1984	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: Groundwater

Response Accomplishments: Completed

Remedial Investigation

Start Date: 09/28/1988	Primary Cost:	$275,000	Source: Federal
End Date: 09/27/1993	Secondary Cost:	$0	Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$1,577	$0	$0	$1,577	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$228	$0	$0	$228	$0

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$35,000	$0	$0	$21,962	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$23,910	$0	$0	$23,910	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$313	$0	$0	$312	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$690	$0	$0	$690	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$11,828	$0	$0	$11,828	$0

Cooperative Agreement Number V995339-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$7,316	$0	$0	$7,316	$0
Totals:	$80,863	$0	$0	$67,824	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Bofors Nobel, Inc.
5025 Evanston Avenue
Muskegon , MI

County: Muskegon
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: 34
State Site ID#: 61000005
State Site Score: 45

LOCATION
The Bofors Nobel, Inc. site is located 6 miles east of downtown Muskegon on Evanston Avenue, 1/4 mile west of Wolf Lake Road in Egelston Township, Muskegon County, Michigan. The 85-acre site includes a former specialty chemical production facility, an unused landfill, an operating groundwater pumping and treatment system, and ten abandoned sludge lagoons. The southern portion of the site is bounded by Big Black Creek. There are wetlands on either side of Big Black Creek within the creek's floodplain. Approximately 1,800 people live within a 1.25-mile radius of this site.

SITE HISTORY
Lakeway Chemicals began producing industrial chemicals at the site in 1960. The facility changed ownership on several occasions throughout its history and eventually became Bofors Nobel, Inc. Throughout the 1960s and early 1970s, ten on-site lagoons were used for disposal of chemical sludge, wastewater, and various waste liquids. This practice resulted in contamination of the groundwater underneath the site and subsequently, Big Black Creek. Because of this contamination, the Michigan Department of Natural Resources placed various restrictions on wastewater disposal from the site. In 1976, wastewater from the plant was accepted at the Muskegon County wastewater treatment plant (WWTP) and purge wells were installed at the site to extract contaminated groundwater.

In December 1985, the owners of the Bofors Nobel, Inc. plant filed for protection under Chapter 11 of the bankruptcy laws for a variety of reasons, including purported expenditures for environmental measures in excess of $60 million. In consideration of the liabilities and claims filed by creditors, the owners petitioned the court to evaluate the possibility of selling the facility in order to maximize assets for distribution to creditors. In June 1986, the bankruptcy court granted permission to engage the services of a broker to pursue potential buyers for the existing manufacturing facility.

The sale of the Bofors Nobel, Inc. assets to Lomac, Incorporated (Lomac) was completed on March 25, 1987. As part of the sales agreement, an "Agreement and Covenant Not to Sue" was entered between Lomac, Incorporated, the state of Michigan, and the EPA that would allow the Lomac Plant to continue operations independent of previous site activities. As part of the bankruptcy agreement, an environmental escrow account was set up to help pay for response activities at the site. As part of the escrow agreement, the state received access to $10 million for performance of remedial activities. Additionally, a Water Services Treatment Agreement was entered between the state and Lomac to allow continued treatment of water purged from the contaminated aquifer at the operating plant's treatment facility.

The site was placed on the National Priorities List in March 1989 and all subsequent response activities have been carried out under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 1980 PL 96-510, as amended by the Superfund Amendments and Reauthorization Act (SARA), 1986 PL 99-499.

The site contaminants include pigment manufacturing intermediates benzidene and 3,3'-dichlorobenzene. Concentrations of benzidene and 3,3'-dichlorobenzene in soils and sludge range up to 2,300,000 micrograms per kilogram (µg/kg) and 4,400,000 µg/kg, respectively. These values are up to 500,000 times the allowable human direct contact criteria. Soil cleanup criteria for protection of the surface water is 0.11 µg/kg for benzidene and 1.26 µg/kg for 3,3'-dichlorobenzene. The relevant soils criteria are also exceeded for a number of other volatile and semi-volatile compounds. Concentrations of benzidene and 3,3'-dichlorobenzene in groundwater range up to 1,200 micrograms per liter (µg/l) and 900 µg/l, respectively. Groundwater cleanup criteria for protection of the surface water is 0.0054 µg/l for benzidene and 0.063 µg/l for 3,3'-dichlorobenzene. There are also a number of volatile organic compounds and semi-volatile organic compounds that exceed unrestricted residential groundwater cleanup criteria.

In the 1970s, contaminated groundwater discharging to Big Black Creek caused fish kills and severely impacted aquatic life in the creek. A groundwater extraction system began operating in the early 1980s, which stopped the discharge to the creek. The creek has recovered to a point where some native fish populations exist once again in the previously affected portion of the creek.

A chain link fence surrounds the covered lagoon area to prohibit entrance by trespassers and prevent the human direct contact health threat.

Construction of a Superfund financed groundwater treatment plant (plant) was completed in September 1994 and has been successfully operating since that time. The required state match for the remedial action was provided to EPA through a Superfund State Contract. The groundwater from the extraction wells installed in the 1980s, previously directed to Lomac's pre-treatment facility prior to discharge to the Muskegon County WWTP, was redirected to the plant when it was completed. Design for an on-site landfill to contain the lagoon area soils and sludge was completed in 1995; however, construction of the landfill was not implemented due to the initiation of settlement negotiations with a potentially responsible party (PRP) group.

The EPA, the United States Department of Justice, the MDEQ, and the Michigan Department of Attorney General began negotiations with the PRP group (Group) in 1996 in an attempt to have the Group assume the Remedial Action (RA). At the Group's request, the EPA conducted a re-evaluation of the Agency selected remedy of constructing an on-site landfill for contaminated soils and sludge and compared it to a Group proposed containment remedy using a slurry wall. The EPA determined that the original selected remedy was still the best remedy for remediation of soils and sludge, unless the Group made some modifications to their proposal. Discussions continued on the possibility of implementing the slurry wall remedy if the Group assumed responsibility for meeting the performance objectives of protecting Big Black Creek and eliminating the human direct contact health threat posed by the contaminated soil. Concurrently, the MDEQ was also negotiating with Lomac on the development of an interim RA plan, under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, for the operating plant portion of the site.

Verbal agreements on the Consent Decree and Statement of Work language were reached between the government Agencies, the Group, and Lomac late in fiscal year (FY) 1998. In July 1999, the EPA, with concurrence by the MDEQ, issued an amendment to the Record of Decision (ROD) changing the landfill remedy to the total in-situ containment remedy. Under this agreement, the Group would implement the remedy for the contaminated soils and sludge in the former lagoon area and assume operation of the groundwater extraction and treatment system. Lomac would implement an interim response at the plant site, which

would isolate contaminated soils from human direct contact. The funding source for the RA comes in part from the Group's internal allotments and in part from an EPA escrow account set up from bankruptcy funds when the Bofors Nobel, Inc.'s plant closed in 1986. The total initial settlement value is $16 million. Parties to the settlement spent most of FY 1999 working out the final settlement documents language. The settlement includes payment of $500,000 to the MDEQ for natural resource damages.

In September 1998, the First Five-Year Review Report was completed by the EPA with input from the MDEQ staff. The report concluded that the completed portion of the remedy for the groundwater/lagoon, soil, and sludge Operable Unit (OU)1 is protective of human health and the environment by removing a significant amount of contaminated groundwater and restricting access to contaminated areas.

A Consent Decree for implementation of the containment remedy was signed by the Group, Lomac, and the EPA in December 1999. A separate Consent Decree for implementation of the interim response at the plant site was signed by Lomac and the state on December 13, 1999. The Group and Lomac have assumed the responsibility for the site cleanup and control of the plant as of February 2000.

In September 2000, MDEQ staff reviewed the "Remedial Design Work Plan" and the "Pre-Design Data Acquisition and Treatability Study Work Plan" and provided written comments to the EPA. The remedial design (RD) Work Plan was subsequently approved by the EPA. The review of the "Groundwater Model and Preliminary Design Simulation Report" was completed in July 2003. The PRP Group evaluated alternate treatment methods for long-term ammonia treatment and submitted a recommended approach to the MDEQ. In January 2003, the PRPs completed conducting vertical aquifer sampling activities to define the screen depth and constructed 11 new monitoring wells for purposes of plume delineation.

In August 2003, a Second Five-Year Review Report was completed by the EPA with input from the MDEQ staff. The report concluded that the remedy currently protects human health and the environment but, in order for the remedy to be protective in the long term, the following actions need to be taken: confirmation of the effectiveness of extraction wells currently on site, better maintenance of those wells to improve pumping efficiency, completion of the total in-situ containment remedy design, construction of the designed total in-situ containment remedy, issuance of an OU2 Plant site ROD, continued short and long-term monitoring of the total in-situ containment remedy, and operation and maintenance (O & M) of the total in-situ containment remedy to achieve and maintain remedy cleanup goals.

Implementation of the containment remedy was broken down into two phases. Phase I primarily involves construction of the barrier wall and Phase II includes covering the lagoon area and construction of the treatment wetland. Construction of the barrier wall started in October 2004 and was completed in December 2005. The treatment wetland construction started in the spring of 2006 and was completed in the fall of 2007.

The final inspection for the barrier wall was completed by the Agencies and the parties involved on December 8, 2005. The contractor prepared and submitted a "Barrier Wall Construction Documentation Report" in March 2006. Implementation of the Phase II design for covering the lagoon area began in the spring of 2006. Placement of the top soil cover within the lagoon areas and seeding and planting of the lagoon areas was completed in the spring of 2007. The old buildings housing the pumps were replaced with new durable steel structures with new electrical wiring. The removal and off-site disposal of phorate sludge in the above ground storage tanks was carried out in December 2006.

The Phase II (wetland construction) final inspection was conducted by the EPA, the MDEQ, and the PRPs in November 2007. The final inspection consisted of: the final completed cap over the lagoon areas, the wetland restoration area outside the fence, and the weir structure. The "Phase II Construction Documentation Report" was completed by Parsons, the PRPs contractor, and submitted to the Agencies in April 2008.

The Third Five-Year Review (FYR) was signed on August 7, 2008. The site inspection was carried out on November 14, 2007, and February 27, 2008. This FYR concluded that the current groundwater containment and extraction system may be capturing contaminated groundwater before reaching Big Black Creek. The FYR recommended to: implement the Restrictive Covenant (RC) drafted in 2006, complete near-term monitoring to confirm the Site's hydraulic characteristics, develop the Performance Standard Verification Plan and Contingent Remedial Action Plan, and implement Contingent Actions if extraction well's capture was ineffective.

In early 2009, the PRPs submitted a request to the EPA for the Agencies to consider a possible shut-off of the Ultraviolet/Oxidation stage of the treatment train at the Bofors Nobel Groundwater Treatment Plant. This request was evaluated and approved by the Agencies.

In May 2011, MDEQ staff installed 17 multi-level wells using state funds to help determine if the slurry wall is effectively preventing or stopping contaminants from entering Big Black Creek. This effort became necessary after the PRPs refused to fill in the data gap necessary to make such determination. Evaluation of the analytical data we received from the lab indicates that the remedy is not capturing all contaminated groundwater south of the barrier wall; the constructed wetlands component of the remedy is not working as intended and as a result could constitute an exposure pathway to environmental receptors; groundwater contamination exists outside the western edge of the barrier wall and is not being captured and contained; and groundwater contamination exists in the southwest area of the barrier wall suggesting potential barrier breach in that area.

In late 2011, SulTRAC, the EPA RA contractor, completed the Supplemental Remedial Investigation/Focused Feasibility Study (RI/FFS) workplan for the Lomac Plant OU area. MDEQ staff completed reviewing the document and provided written feedback to the EPA. In July 2012, SulTRAC implemented the RI workplan.

The RC for this site was completed and signed on May 4, 2012.

In 2013/2014, the MDEQ staff, the EPA, and the PRPs conducted a series of meetings and conference calls regarding Amendments to Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Public Act 190 of 2012) in general and groundwater surface water interface, Conceptual Site Model, Deminimis Determinations in particular as they relate to the Bofors site.

In 2013/2014 the MDEQ staff developed a Work Plan and a Scope of Work in connection with deep monitoring wells anticipated to be installed in the Meander Bend Area in Spring/Summer of 2016. These wells are needed to help us understand the extent of groundwater contamination at depth. The PRPs have refused to install such wells.

The OU2 Phase II Investigation of the Supplemental RI was completed in the Summer of 2014. This investigation consisted of abandoning old wells and replacing them with new groundwater monitoring wells where previous investigation indicated the presence of impacted groundwater. In addition, the EPA contractor conducted a geoprobe/soil sampling program including the tank farm area and outside process buildings where chemicals of concern were used/stored. There is a plan to advance a second set of borings within the footprint of the buildings since the buildings have been demolished.

SITE STATUS
There are ongoing discussions between the Agencies and the PRPs about the Site Conceptual Model, effectiveness of the barrier wall in containing the contaminants, areas of contamination outside the barrier wall, the Meander Bend/shallow groundwater issues, and deep groundwater migration investigation across the Big Black Creek area.

The annual inspection and maintenance of the asphalt cover as well as the hygienic groundwater monitoring in the former Lomac Propety area was conducted in June 2017. Demolition of dilapidated buildings at the Lomac Property occured in 2015 and 2016. Currently, further investigative work in the footprint of the former structures is being discussed to determine potential contamination source areas that have yet to be characterized post buildings demolition.

In response to EPA's request in July 2016, the MDEQ staff in consultation with the Attorney General's Office, identified Michigan statutes and their promulgated regulations that may represent Applicable or Relevant and Appropriate Requirements (ARARs) for the proposed EPA preliminary response actions at the Lomac site. MDEQ staff in consultation with the Attorney General's office, revised the ARARs table based on comments received from the EPA staff.

The PRPs continue to operate and maintain the treatment wetland, lagoon area cover, groundwater extraction wells, and treatment system. Major issues such as the location of the compliance monitoring wells in the vicinity of Big Black Creek are being discussed and negotiated. These details will be included in a Performance Standards Verification Plan to be submitted some time in 2018.

The MDEQ staff completed a Work Plan and Scope of Work for performing a deep aquifer investigation in 2016 to properly evaluate the effectiveness of the barrier wall in preventing contamination from migrating below the wall and towards the creek. A contractor was retained to install the deep wells at five locations. This task was completed in November 2016. The final "Remedial Investigation Technical Memorandum" documenting the findings of vertical aquifer sampling and groundwater monitoring was submitted to MDEQ in October, 2017.

In March 2017, the MDEQ staff completed evaluating the Mixing Zone Determination Request submitted by the PRPs and provided a written response to the request. The MDEQ is awaitng response from the PRP consultant.

In October 2017, the MDEQ staff sent a letter to EPA identifying issues recommended for inclusion in the upcoming FYR Report for this Site.

ENFORCEMENT STATUS
Enforcement action was performed under the CERCLA/SARA with the EPA as the lead Agency for enforcement. A Consent Decree for implementation of the containment remedy was signed by the Group, Lomac, and the EPA in December 1999. A separate Consent Decree for implementation of the interim response at the plant site was signed by Lomac and the state on December 13, 1999.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site
01	Groundwater/Lagoon Soil and Sludge
02	Contaminated Soil on the LOMAC Operating Plant Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The First FYR was completed by the EPA on September 30, 1998. The report concluded that the completed portion of the groundwater/lagoon, soil and sludge OU remedy is protective of human health and the environment by removing a significant amount of contaminated groundwater and restricting access to the contaminated areas.

Start Date: 05/05/1998 Primary Cost: $0 Source: Federal
End Date: 09/30/1998 Secondary Cost: $0 Source:

5 Year Review The assessment of the Second FYR report found that the completed Plant Phase OU remedy has been constructed in accordance with the requirements of the ROD, and that O & M of the groundwater treatment plant and extraction wells is controlling groundwater that discharges to Big Black Creek.

Start Date: 04/07/2003 Primary Cost: $0 Source: Federal
End Date: 08/07/2003 Secondary Cost: $0 Source:

5 Year Review The Third FYR was signed on August 7, 2008. The site inspection was carried out on November 14, 2007, and February 27, 2008. This FYR concluded that the current groundwater containment and extraction system may be capturing contaminated groundwater before reaching Big Black Creek. The FYR recommended to: implement the Restrictive Covenant drafted in 2006, complete near-term monitoring to confirm the site's hydraulic characteristics, develop the Performance Standard Verification Plan and Contingent Remedial Action Plan, and implement Contingent Actions if extraction well's capture is ineffective.

Start Date: 01/02/2008 Primary Cost: $0 Source: Federal
End Date: 08/07/2008 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The Fourth FYR was signed on August 2, 2013. The Review concluded that "the remedy for this site is protective of human health and the environment in the short term. To ensure long-term protectiveness, the following actions need to be taken: continued monitoring of groundwater at and around the Barrier Wall and Big Black Creek; implementation of Contingent Remedial Actions to address lack of complete groundwater capture; provide a site-specific determination on Act 190 as to its requirements; and, effectively implement Contingent Remedial Actions to satisfy Performance Standards and Remedial Action Objectives."

Start Date: 01/02/2013	Primary Cost:	$0	Source:
End Date: 07/31/2013	Secondary Cost:	$0	Source:

Response Accomplishments: In Progress

5 Year Review Since hazardous substances remain on site, there will be another FYR completed in 2018. In October 2017, the MDEQ staff sent a letter to EPA identifying issues recommended for inclusion in the upcoming FYR Report for this Site.

Start Date: 08/02/2017	Primary Cost:	$0	Source:
End Date: 08/02/2018	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Groundwater/Lagoon Soil and Sludge

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/17/1990**

The original ROD selected on-site incineration of contaminated soil and sludge and construction of a new groundwater treatment plant. Estimated annual O & M for the selected remedy is $313,000 for five years. The present worth is estimated at $70,874,000.

Record of Decision *Amendment:* 01 *ESD:* 0 **Effective 07/22/1992**

Due to increases in costs and the volume of soil needing treatment, the incineration option proved to be cost prohibitive. The ROD was amended to select on-site landfilling for soil and sludge.

Record of Decision *Amendment:* 02 *ESD:* 0 **Effective 07/16/1999**

The ROD was amended for a second time in 1999 to change the remedy to the PRP proposed total in-situ containment remedy.

OPERABLE UNIT 01: Groundwater/Lagoon Soil and Sludge

Response Accomplishments: Completed

Interim Response

Interim Response included fencing the site, installation of monitoring and purge wells, complete upgrade of the purge well electrical system, road construction, construction of a decontamination facility, an office trailer, an equipment storage area, and a treatability study on the groundwater.

Start Date:	*09/30/1987*	Primary Cost:	$7,000,000	Source: Private
End Date:	*09/30/1988*	Secondary Cost:	$1,620,000	Source: State

Remedial Design

The RD consisted of the Plant and Landfill. Both designs were completed in 1993. No state funds were used.

Start Date:	*09/30/1991*	Primary Cost:	$1,000,000	Source: Federal
End Date:	*09/30/1993*	Secondary Cost:	$0	Source:

Remedial Action

The Plant has been operational since 1994. The system continues to prevent contaminated groundwater from discharging to the creek. This RA was performed under a Superfund State Contract between the state and the EPA.

Start Date:	*07/30/1993*	Primary Cost:	$14,672,700	Source: Federal
End Date:	*09/30/1997*	Secondary Cost:	$1,630,300	Source: State

Long Term Remedial Action

The state oversaw the Plant operation until the PRPs took over in February 2000. This is the Long-Term Remedial Action of the Plant performed by the MDEQ.

Start Date:	*09/30/1997*	Primary Cost:	$1,547,501	Source: Federal
End Date:	*02/28/2000*	Secondary Cost:	$174,943	Source: State

Remedial Action

The 1999 amended ROD changed the landfill remedy to the total in-situ containment remedy. The Group has implemented this remedy for the contaminated soils and sludge in the former lagoon area and the groundwater. The barrier wall construction was completed in December 2005. The wetland construction (Phase ll) was completed in December 2007. The O & M of the plant and groundwater pumping and treatment system still continues. The funding source for the RA comes in part from the Group's internal allotments and in part from an escrow account set up from bankruptcy funds when the Bofors Nobel, Inc.'s plant closed in 1986. The total initial settlement value is $16 million.

Start Date:	*10/01/2004*	Primary Cost:	$14,784,530	Source: Private
End Date:	*12/15/2007*	Secondary Cost:	$348,000	Source: Federal

OPERABLE UNIT 01: Groundwater/Lagoon Soil and Sludge

Response Accomplishments: Ongoing

Operation and Maintenance

The PRPs will maintain this total in-situ containment remedy under the federal Decree. The barrier wall construction was completed in December 2005 and construction of the wetland was completed in December 2007. Also the groundwater extraction and treatment system continues to operate.

Start Date:	*03/01/2000*	Primary Cost:	$15,639,990	Source: Private
End Date:	*09/30/2051*	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: Contaminated Soil on the LOMAC Operating Plant Site

Response Accomplishments: Completed

Remedial Investigation

Note: the Primary Estimated Cost indicated consists of state and escrow funding sources.

To facilitate investigation, the site was divided into the Lagoon Area OU and the Plant Site OU.

Start Date:	*09/30/1988*	Primary Cost:	$5,100,000	Source: Private
End Date:	*09/30/1990*	Secondary Cost:	$0	Source:

Interim Response

Lomac took several steps to reduce existing contamination on the plant property and covered contaminated soils to reduce direct contact threats.

Start Date:	*01/30/1999*	Primary Cost:	$500,000	Source: Private
End Date:	*10/30/1999*	Secondary Cost:	$0	Source:

Response Accomplishments: In Progress

Interim Response

Lomac is implementing the interim RA Plant soil remedy which includes covering of some soils and implementation of deed restrictions. The "Hygienic Groundwater Wells" and "Hot Spot 1 Asphalt Cover Maintenance" Reports are being submitted to the MDEQ annually. The ROD for the final RA is yet to be developed.

Start Date:	*12/31/1999*	Primary Cost:	$0	Source:
End Date:	*09/30/2018*	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: Contaminated Soil on the LOMAC Operating Plant Site

Response Accomplishments: In Progress

Remedial Investigation SulTRAC, the EPA RA contractor for the Plant Site OU, completed the work plan for the Supplemental RI/FFS. We reviewed the document and provided written feedback to the EPA and its contractor. The first and second phases of the RI have been completed. However, the RA contractor is still working on the report detailing the supplemental remedial investigation work along with the remedial alternatives screening memo. Dilapidated buildings on site were demolished in the Summer of 2015. Further investigative work in the footprint of the former structures may be necessary to determine possible contamination source areas. Costs for this future need are unknown until a remedy is selected.

Start Date: 06/10/2012	Primary Cost:	$0	Source: Federal
End Date: 12/15/2018	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

Remedial Action The ROD selecting the remedy for the plant site OU has not yet been developed. The first and second phases of the RI have been completed.

Start Date: 01/01/2018	Primary Cost:	$0	Source:
End Date: 12/31/2019	Secondary Cost:	$0	Source:

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V985232-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Long Term Remedial Action	$1,749,444	$174,945	$0	$1,749,444	$0
Management Assistance	$99,982	$9,998	$0	$99,982	$0
Totals:	$1,849,426	$184,943	$0	$1,849,426	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$11,848	$0	$11,848	$11,848	$11,848

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$48,722	$0	$0	$48,722	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$68,975	$0	$0	$68,975	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$121,987	$0	$0	$121,987	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$59,060	$0	$0	$59,060	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$44,480	$0	$0	$44,480	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$58,373	$0	$0	$58,373	$4,358

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$73,066	$0	$0	$67,159	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$65,000	$0	$0	$64,947	$0

Cooperative Agreement Number V995261-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$66,667	$6,667	$0	$66,626	$0

Cooperative Agreement Number V995259-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Design	$48,696	$0	$0	$48,696	$0
Totals:	$666,875	$6,667	$11,848	$660,875	$16,206

STATE SUPERFUND CONTRACTS

For Operable Unit 01 : Groundwater/Lagoon Soil and Sludge : Closed

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Action	$15,020,875	$1,502,087	$1,502,087	$0
Totals:	$15,020,875	$1,502,087	$1,502,087	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Duell & Gardner Landfill
1285 East Bard Road
Muskegon , MI

County: Muskegon
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: C3
State Site ID#: 61000016
State Site Score: 33

LOCATION
The Duell & Gardner Landfill site is located at 1285 E. Bard Road in Dalton Township, approximately five miles north of the city of Muskegon. The site is comprised of an 80-acre parcel; however, the landfill itself covers an area of about four acres. Land use in the area is primarily residential and agricultural. Approximately 140 people live within a one-mile radius and 1,200 people live within a two-mile radius of the site. The landfill is located on the southern half of the property. Two residences and an agricultural field are located on the northern half of the property. Regional surface water drainage is to the south and east of the site toward Bear Creek approximately 1/2 mile from the site. Some drainage may flow to an agricultural drainage ditch located 400 feet south of the property.

SITE HISTORY
The Duell & Gardner Landfill is a closed landfill that was operated from the 1940s through 1973. It is believed that local chemical companies dumped waste at the landfill until the late 1960s. Materials on-site included approximately 500 drums in various stages of deterioration scattered in the woods adjacent to the landfill, as well as hundreds of lab bottles, areas of refuse/debris, and piles of unidentified sludge-like material. The landfill ceased operating in December 1973 and is no longer used. There is no fence, but warning signs have been placed on the periphery of the site.

The site was placed on the National Priorities List on September 8, 1983. In September 1985, as part of an EPA removal action, about 500 drums, some associated soil and debris, and sludge-like material were collected from various locations on-site, placed in a staging area, and sampled. All staged materials were disposed of at appropriate off-site facilities in early 1986.

A Remedial Investigation (RI) and Feasibility Study (FS) began in late 1986 to determine the nature and extent of contamination, and to evaluate cleanup alternatives. The RI was completed in April 1992 and determined that both groundwater and soil contamination were present at the site. Soil contaminants include gentian violet, aniline, dimethylaniline, and pesticides. Groundwater contaminants include carbon tetrachloride, chloroform, and dimethylaniline. These contaminants were found at concentrations above unrestricted residential cleanup standards. If left unabated, these contaminants could pose health risks to potential future on-site residents that consume the water over a lifetime or regularly come into contact with the soil. Groundwater flows to the south/southeast. There are several residential wells in use about 3/4 of a mile south of the site.

A treatability study was performed to determine which cleanup technologies may be effective in treating the unusual contaminants found at the Duell & Gardner Landfill site. The FS used the information from the RI and the treatability study to evaluate a variety of cleanup alternatives.

The FS was completed in March 1993. The state sampled residential wells near the site in February 1993. The data from this sampling indicated that the residential wells had not

been impacted by the contaminated groundwater.

The state and the EPA signed a Record of Decision (ROD) for the site on September 7, 1993. The ROD called for the treatment of contaminated soil on-site using low temperature thermal desorption, installation of a landfill cover, and extraction and carbon adsorption treatment of contaminated groundwater.

The EPA sent a Unilateral Administrative Order to CPC International, Inc. in June 1994, requiring them to conduct the design and cleanup. The work plan for the design and implementation of the selected remedy was approved by the EPA on October 19, 1995. The company began fieldwork on the pre-design investigation on November 20, 1995. This fieldwork involved the collection of soil and groundwater samples and the installation of new groundwater monitoring wells. The final pre-design investigation report was submitted on November 15, 1996. The data in this report provided full definition of the groundwater contaminant plume and indicated that there was no immediate threat to residential wells in the area. Based upon the pre-design investigation report, the EPA and the MDEQ have made changes to the previously selected cleanup plan.

The EPA took over the remedial action (RA) lead for this project beginning in September 2000. A State Superfund Contract for Remedial Action at the Duell & Gardner site was signed by both the state and the EPA in September 2000. The cost of the RA was $2,500,000. The state's cost for the RA under this Superfund State Contract was $250,000.

The final design of the remedy was completed in 2000 using federal funds. Construction of the final remedy at the site was completed in August 2001. The RA consisted of construction of a landfill cap and a groundwater treatment system. The landfill cap was constructed between October 2000 and April 2001. During completion of these activities, the eight-acre kidney shaped waste area was consolidated into a four-acre rectangular landfill area. Hot spot soil areas identified during the RI were excavated and consolidated onto the four-acre rectangular landfill. Approximately 2,000 cubic yards of gentian violet impacted soils that were identified inside the northern and southern boundary of the four-acre landfill were excavated, sampled, analyzed, and consolidated on-site within an approved special waste cell under the cap. The groundwater treatment system construction consisting of four recovery wells, an infiltration gallery, and a treatment building was completed in August 2001. The Landfill Monitoring Plan and the Operation and Maintenance (O & M) Manual were completed by the United States Army Corps of Engineers (USACE) contractors in 2002.

The ROD was amended on June 29, 2001. The amended ROD calls for excavation and appropriate disposal of contaminated soils and eliminates low temperature thermal desorption from the remedy; requires construction of a landfill cap; retains the requirement of construction of a groundwater pump and treat (P & T) system; and requires long-term groundwater monitoring to ensure that contaminated groundwater does not pose a threat to any potential receptors.

The First Five-Year Review (FYR) for this site was signed by the EPA in September 2005. The FYR Report concluded that the site remedy is protective of human health and the environment because impacted soils have been removed, wastes have been consolidated into a four-acre landfill and covered with an impermeable cover, and impacted groundwater is currently being recovered and treated on-site. However, in order for the remedy to be protective in the long term, institutional controls need to be put in place to prevent exposure to contaminated groundwater and soils. In comments on the FYR, the MDEQ expressed a concern that there has been no monitoring of landfill gas around the perimeter of the landfill.

The Final Draft Long-Term Monitoring Plan for the site was approved by the EPA in 2006. The MDEQ did not approve of the plan as it did not include metals as part of the monitoring plan. Consequently, the MDEQ proceeded to split samples for groundwater during the annual groundwater monitoring event in September 2006.

In 2006, MDEQ staff identified 21 private wells for sampling in the vicinity of the landfill that have the potential of being impacted by the landfill plume. The actual sampling of the private wells was conducted by the Muskegon County Health Department under contract with the MDEQ Water Bureau. The samples thus collected were submitted to the MDEQ Drinking Water Laboratory in Lansing for analysis. Lead, arsenic, chloroform, dichloromethane, and total trihalomethanes were detected in two private wells at levels below the Federal Maximum Contaminant Level.

In September 2006, the MDEQ installed multi-level temporary wells in suspect areas for contaminant screening purposes. These wells were sampled in December 2007. The sampling results from one of the temporary multi-level wells indicated the presence of vinyl chloride and 1,2-dichloroethane at depths of 20 feet and 50 feet. These two chemicals are not listed as contaminants of concern in the ROD. In 2008, the MDEQ took confirmatory samples from the previously installed temporary wells and installed three additional multi-level wells downgradient of the well where the two new contaminants were found. The MDEQ made recommendations to the EPA to install permanent monitoring well(s) in the area based on data obtained from the temporary wells. Consequently, the EPA installed three monitoring wells at the recommended locations.

The site was surveyed and restrictive covenants put in place as of 2007.

The Second FYR was signed on March 8, 2010. The FYR concluded that the remedy in place is protective of human health and the environment because impacted soils have been removed; wastes have been consolidated into a four-acre landfill and covered with an impermeable cover; impacted groundwater is currently being recovered and treated on-site; and institutional controls to restrict current and future use of the site have been implemented. The remedy will continue to ensure protectiveness at the site until cleanup goals are met.

In May 2010, the EPA temporarily shut down the groundwater extraction and treatment system because the cleanup standards were achieved in the affected monitoring wells. The March 2012 groundwater analytical results indicate that chemical constituents in the groundwater have remained below Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, cleanup criteria since the system shutdown in May 2010. As per agreement between the agencies, the March 2012 annual monitoring event represents the last monitoring event before system decommissioning.

The MDEQ took over O & M at the site in August 2012. The system has been decommissioned and the treatment building demolished and disposed of off-site per the Work Plan. The Final RA Report and Operation, Maintenance and Monitoring Plan were prepared by Shaw Environmental, Inc. on behalf of the USACE and submitted to the MDEQ in October and November 2012. The Final Close-Out Report was completed by the EPA and received in February 2013.

Groundwater analytical results from the April 2013 round of sampling indicate that chemical constituents in the groundwater have remained below the Part 201 cleanup criteria since the system shutdown in May 2010. This was the first monitoring event since the MDEQ took over O & M at the site in August 2012.

The state has continued to maintain the landfill cap since taking over O & M and the permanent marker was placed on-site in October 2013. Groundwater sampling was completed in April 2014. This was the second monitoring event since the MDEQ took over O & M at the site in August 2012.

Groundwater analytical results from the April 2015 round of sampling indicate that chemical constituents in the groundwater have remained below the Part 201 cleanup criteria since the system shutdown in May 2010. This was the third monitoring event since the MDEQ took over O & M at the site in August 2012.

The FYR was executed by the EPA on March 8, 2015. The results of the FYR show that the remedy at the site is protective of human health and the environment because impacted soils have been removed; wastes have been consolidated into a four-acre landfill and covered with an impermeable cover; groundwater is currently meeting Michigan Part 201 and Part 22 water standards and no longer needs treatment; and institutional controls (IC) to restrict current and future use of the site and to ensure long-term stewardship have been implemented. ICs in the form of an environmental covenant are in place for the site. The IC Plan ensures long-term stewardship because it establishes a process to ensure that ICs are in place, maintained, and effective. The state continues to maintain the landfill cap (mowing and site inspections) as part of continuing O & M requirements. There were no new issues or follow-up actions cited in this review.

After reviewing data from groundwater sampling events in 2010-2015, the MDEQ determined that there was not a need for groundwater sampling in 2016. Sampling over this time period showed that chemical constituents in the groundwater have remained below the Part 201 cleanup criteria since the P & T system shutdown in May 2010. The EPA was in agreement in the decision to not sample in 2016. The MDEQ is currently pursuing the appropriate steps to close the site with the cooperation of the EPA.

SITE STATUS

The MDEQ is continuing to pursue steps to close the site with the cooperation of the EPA. The MDEQ did not sample during 2017 due to chemical constituents in the groundwater samples (2010-2015) being below the Part 201 cleanup criteria. Site activities for 2017 included road maintenance and vegetation control to prepare for the future abandonment of the remaining monitoring wells.

ENFORCEMENT STATUS

The EPA issued a Unilateral Administrative Order (Order) for the design and construction of the remedy to CPC International, Inc., in June 1994. CPC International, Inc., performed the pre-design investigation. In September 1997, CPC International, Inc., notified the EPA and the state that they would not be completing any other work under the Order because of a favorable federal court ruling at a related site.

In September 1999, a Consent Decree was entered that required Best Foods (formerly known as CPC International, Inc.) to pay the state $10,000 in reimbursement of past response activity costs. The settlement was influenced by the United States Supreme Court decision on derivative liability in the United States vs. Best Foods case regarding the Ott/Story/Cordova facility. This settlement absolved Best Foods of any and all liabilities they may have on both Duell & Gardner and Ott/Story/Cordova sites (some of the waste disposed of at the Duell & Gardner Landfill originated at the Ott/Story/Cordova site).

SPECIAL CONSIDERATIONS

None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 09/07/1993**

The original ROD called for on-site treatment of soils, construction of a landfill cap, and extraction and carbon treatment of groundwater.

Total present worth cost was estimated at $5,902,000 for 30 years.

Record of Decision *Amendment:* 01 *ESD:* 0 **Effective 06/29/2001**

The amended ROD calls for excavation and appropriate disposal of contaminated soils and eliminates low temperature thermal desorption from the remedy; requires construction of a landfill cap; retains the requirement of construction of a groundwater pump and treat system; and requires long-term groundwater monitoring to ensure that contaminated groundwater does not pose a threat to any potential receptors.

The total estimated cost indicated above consists of total capital cost and annual capital cost for off-site soil disposal and groundwater monitoring. The total present worth cost for 30 years is estimated at $2,436,698.

Response Accomplishments: Completed

Interim Response Removal of drums, laboratory bottles, and soil by the EPA.

Start Date: 09/30/1985	Primary Cost:	$129,000	Source: Federal
End Date: 03/30/1986	Secondary Cost:	$0	Source:

Remedial Investigation The state performed the RI/FS using a mix of state and federal funding through a cooperative agreement (V005922-01) with the EPA. The state funding was designated as Advance Match, and intended to be used to meet RA and long-term remedial action (LTRA) match requirements.

Start Date: 04/01/1987	Primary Cost:	$874,120	Source: Federal
End Date: 03/30/1993	Secondary Cost:	$465,461	Source: State

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Design The bulk of the remedial design (RD) expenditures were incurred by private parties and are not included, as they only report to the state on a voluntary basis.

Start Date: 07/01/1994 Primary Cost: $0 Source: Private
End Date: 07/30/1996 Secondary Cost: $0 Source:

Remedial Design The RD was completed by the USACE Rapid Response Team. The design consisted of the landfill cap and extraction and treatment system for the contaminated groundwater.

Start Date: 09/01/2000 Primary Cost: $291,000 Source: Federal
End Date: 10/12/2000 Secondary Cost: $0 Source:

Long Term Remedial Action Consists of operation of the groundwater extraction and treatment system and associated monitoring of the groundwater. Costs are a rough estimate. State advance match from RI covered any state funding match necessary for this activity being conducted under a Superfund State Contract.

On April 18, 2012, the EPA, USACE, MDEQ, and Shaw Environmental, Inc. conducted a site visit to ensure that all agencies were in agreement with the decommissioning process as well as the items that would be addressed and the procedures that would be followed.

The ten-year LTRA time period ended in August 2012 and the site officially transitioned to the state at that time.

Start Date: 07/21/2001 Primary Cost: $558,000 Source: Federal
End Date: 08/10/2012 Secondary Cost: $0 Source:

5 Year Review The EPA signed the FYR Report on September 2, 2005. The FYR Report concluded that the site remedy is protective of human health and the environment because impacted soils have been removed, wastes have been consolidated into a four-acre landfill and covered with an impermeable cover, and impacted groundwater is currently being covered and treated on-site. In order for the remedy to be protective in the long term, ICs have been put in place since 2007 to prevent exposure to contaminated groundwater and soils.

Start Date: 06/23/2005 Primary Cost: $0 Source:
End Date: 09/02/2005 Secondary Cost: $0 Source:

Operation and Maintenance The state conducted analysis of split samples for metals during the annual groundwater monitoring event in 2006. The state installed additional monitoring wells where data gaps exist in 2011. A restrictive covenant was put in place in 2007. A permanent marker was installed at the site in October 2013.

Start Date: 07/21/2006 Primary Cost: $200,000 Source: State
End Date: 08/10/2012 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review This FYR was signed on March 8, 2010. The Five-Year Review concluded that the remedy in place is protective of human health and the environment because impacted soils have been removed; wastes have been consolidated into a four-acre landfill and covered with an impermeable cover; impacted groundwater is currently being recovered and treated on-site; and ICs to restrict current and future use of the site have been implemented. The remedy will continue to ensure protectiveness at the site until cleanup goals are met.

Start Date: 11/02/2009	Primary Cost:	$0	Source: Federal
End Date: 03/08/2010	Secondary Cost:	$0	Source:

5 Year Review This FYR was executed on March 8, 2015. The remedy at the site is protective of human health and the environment because impacted soils have been removed; wastes have been consolidated into a four-acre landfill and covered with an impermeable cover; groundwater is currently meeting Michigan Part 201 and Part 22 water standards and no longer needs treatment; and ICs to restrict current and future use of the site and to ensure long-term stewardship have been implemented. ICs in the form of an environmental covenant are in place for the site. The IC Plan ensures Long-Term Stewardship because it establishes a process to ensure that ICs are in place, maintained, and effective.

Start Date: 03/08/2014	Primary Cost:	$0	Source:
End Date: 03/08/2015	Secondary Cost:	$0	Source:

Response Accomplishments: Construction Complete

Remedial Action The RA at this site has two components: the landfill capping and installation of the groundwater extraction and treatment system. The landfill capping construction started in October 2000 and was completed on July 20, 2001. The groundwater treatment and extraction system construction started in April 2001 and was completed on July 20, 2001. The state's ten percent match of $250,000 is covered by the advance match the state paid during the RI.

Start Date: 10/12/2000	Primary Cost:	$2,500,000	Source: Federal
End Date: 07/20/2001	Secondary Cost:	$0	Source: State

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Ongoing

Operation and Maintenance As of August 2012, the site had transitioned to the state. The state has assumed responsibility for landfill cap maintenance and groundwater monitoring since the ten-year LTRA has officially ended. The state will maintain the site at an estimated cost of $58,000 per year for 30 years. This initial cost estimate of $58,000 per year for O & M has been changed to $10,000 per year due to the reduced activities on-site. The $10,000 per year is adequate for cap maintenance and the reduced frequency of groundwater sampling.

Start Date: 08/10/2012 Primary Cost: $58,000 Source: State

End Date: 08/11/2042 Secondary Cost: $0 Source:

Response Accomplishments: Future Need

5 Year Review A new FYR will need to be completed by March 8, 2020.

Start Date: 03/08/2019 Primary Cost: $0 Source:

End Date: 03/08/2020 Secondary Cost: $0 Source:

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V985568-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$56,359	$0	$0	$56,072	$0

Cooperative Agreement Number V005922-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$1,402,857	$528,450	$0	$1,283,509	$0
Totals:	$1,459,216	$528,450	$0	$1,339,582	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$23,101	$0	$0	$23,101	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$953	$0	$0	$953	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$36,846	$0	$0	$36,846	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$40,535	$0	$0	$40,535	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$29,843	$0	$0	$29,843	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$10,919	$0	$0	$10,919	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$28,758	$0	$0	$28,758	$0

Cooperative Agreement Number V995261-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$38,889	$3,889	$0	$38,803	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995261-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$44,444	$4,444	$0	$44,432	$0
Totals:	$254,289	$8,333	$0	$254,191	$0

STATE SUPERFUND CONTRACTS

For Operable Unit 00 : Entire Site : Open

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Action	$2,500,000	$250,000	$0	$0
Totals:	$2,500,000	$250,000	$0	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Kaydon Corporation
2860 McCracken Street
Norton Shores , MI

County: Muskegon
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: AD
State Site ID#: 61000023
State Site Score: 30

LOCATION
The Kaydon Corporation (Kaydon) facility is located on 26.2-acres at 2860 McCracken Street in the city of Norton Shores, Muskegon County, Michigan. Land use around the facility is a mixture of industrial and residential. The property is bounded to the north by a Grand Trunk Railroad right-of-way and residential homes, to the east by Estes Street and small industrial facilities, and to the south and west by residential properties. The property is approximately 600 feet from Ruddiman Creek, which discharges into Muskegon Lake, which in turn discharges into Lake Michigan.

SITE HISTORY
White Motors Company originally owned the property and manufactured engine blocks. Kaydon purchased the property in 1941 and began manufacturing roller bearings, ball bearings, and various bearing assemblies, and continues to manufacture products on the site. Kaydon discharged process wastewater into unlined lagoons and directly into Ruddiman Creek until 1968. The wastewater contained volatile organic compounds, metals, cyanide, and polynuclear aromatic hydrocarbons. These contaminants impacted the on-property soils, the groundwater on and off the property, and the surface water and sediments of Ruddiman Creek at concentrations exceeding both the generic residential and the industrial criteria of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA).

Investigation at Kaydon began in October 1982, with a request by the Michigan Department of Natural Resources for a hydrological investigation of the area. The investigation results released in 1985 identified the presence of chlorinated organic solvents (1,1-dichloroethane and 1,2-dichloroethylene) in groundwater migrating from the Kaydon facility.

In 1986, Kaydon excavated the lagoon area, removing 1,500 cubic yards of contaminated soil and sludges, which were taken off-property for disposal in an approved landfill. In 1987, Kaydon installed and began operation of two groundwater purge wells to capture contaminants leaving the property. Kaydon was added to the National Priorities List (NPL) in February 1990.

In November 1992, the EPA published a Site Analysis Report to assess and document past activities that may have contributed to the groundwater, surface water, and soil contamination associated with the property. The report identified potential areas of concern based on aerial photographs and known past hazardous waste storage and disposal practices. In 1993, Kaydon began conducting an investigation of these identified areas of concern. The analytical results from soil samples taken in the former lagoon area (excavated in 1986) confirmed that the remaining contaminant concentrations in the soils of this area were below the NREPA criteria for limited industrial use.

In 1997, Kaydon submitted a Remedial Action Plan (RAP) for the remaining on-property soil and groundwater contamination to the MDEQ for review. However, after the submittal and partial review of this RAP, an additional area of significant contamination was identified.

This area, identified as the Dumpster and Sludge area, was investigated and both the soils and the groundwater were contaminated at concentrations above the NREPA cleanup criteria. The RAP for the remaining on-property contamination was withdrawn pending response actions for the Dumpster and Sludge area.

An interim response was conducted in the Dumpster and Sludge area in July 1998. The interim response consisted of removal and disposal of contaminated soils, as well as extraction of visually impacted, due to oil sheen, groundwater. Kaydon submitted an interim response activities report to the MDEQ on January 21, 1999, and identified another area of known contamination, the Used Oil Vault area.

The Used Oil Vault area, located east of the Kaydon manufacturing plant building, included a 20,000-gallon concrete vault originally used as a settling basin for process waters. In July 1998, the vault housed a 10,000-gallon steel oil tank used to store machine coolant oils. Kaydon conducted an investigation and removal action without notification to the MDEQ prior to reporting their findings in January 21, 1999.

Kaydon performed further investigatory work in both the Dumpster and Sludge and Used Oil Vault areas on-property. Based on the results of this work, Kaydon submitted a work plan in December 2000. The work plan proposed a change in the design of the on-property groundwater extraction system to install an additional groundwater purge well near the location of the former dumpster area.

All on-property investigation work was believed to be completed, and a draft revised RAP for the on-property soil and groundwater contamination was submitted in November 2001 and was commented on by the MDEQ. Based upon the MDEQ comments, the revised RAP, now denoted as an Interim RAP, was submitted in October 2002 and was reviewed in early 2003 under the new Administrative Rules of Part 201. Based upon this review, the MDEQ requested that Kaydon conduct an indoor air investigation to complete requirements included in the new Administrative Rules of Part 201. Kaydon submitted a work plan for this investigation which was reviewed and approved by the MDEQ. The indoor air investigation was conducted in July 2003. The report of this investigation was submitted and approved by the MDEQ in 2004.

Kaydon submitted a work plan in December 2000 for investigation of the off-property operable unit (OU) groundwater contamination. The MDEQ provided comments on the work plan, and the off-property investigation was conducted from 2001 through 2003. A report on this groundwater investigation, which included both the on-property and the off-property groundwater contamination plume, was submitted to the MDEQ in 2004.

Discussions between Kaydon and the MDEQ in 2005 determined that an additional extraction well was not needed as part of the on-property groundwater extraction system. The MDEQ proposed installation of one additional monitoring well and several piezometers on-property to complete the on-property monitoring network which was accomplished in late 2006.

The EPA developed and finaled a Preliminary Close-Out Report, which stated that all of the on-property construction for the remedy had been completed. The Preliminary Close-Out Report, a requirement in the Superfund process, was signed in June 2006.

In June 2008, both the MDEQ and Kaydon agreed to perform a Two-Year Pilot Test Shutdown of the on-property groundwater extraction system. If during the Pilot Test, groundwater monitoring determined that contamination in the on-property OU remained at or below Part 201 criteria, the on-property groundwater extraction system could be shut down

permanently and the Operation and Maintenance (O & M) of both the on-property and off-property OU groundwater contamination would continue under a Monitored Natural Attenuation remedy with on-going quarterly groundwater sampling.

The Two-Year Pilot Test Shutdown ended in June 2010. Based on the groundwater data collected during the Pilot Test, only one on-property monitoring well detected contamination exceeding criteria. It was agreed by the MDEQ and Kaydon, to continue the Pilot Test for one additional year (to June 2011) with continued quarterly groundwater monitoring of this well. During this extended Pilot Test period, groundwater monitoring determined that groundwater contamination in the on-property OU monitoring wells remained at or below Part 201 criteria. O & M of the off-property groundwater contamination plume continued under a Monitored Natural Attenuation remedy with on-going semi-annual groundwater sampling.

Based upon discussions held between the MDEQ and Kaydon throughout 2010, a list of documents to be submitted for the off-property groundwater OU was developed. In 2011, Kaydon was expected to submit the following documents: a Remedial Investigation/Feasibility Study; document groundwater uses within the area of the groundwater plume and determine receptors; document migration and exposure pathways; and, identify any Groundwater to Surface Water Interface (GSI) issues for Ruddiman Creek. When these plans were finaled, Kaydon was to submit a RAP encompassing all the remedial work that was completed for both the on and off-property OUs. The final RAP would also include a groundwater ordinance, Financial Assurance Mechanism, and a Consent Decree.

With the implementation of the Part 201 Amendments in December 2010, Kaydon was no longer required to submit a RAP. Instead, Kaydon opted to develop an off-property groundwater OU Monitoring Plan and implement an area-wide Groundwater Ordinance. To accomplish this, Kaydon would develop and submit a Response Activity Work Plan for the off-property groundwater OU2 to the MDEQ for review. The Response Activity Work Plan was approved by the MDEQ on May 21, 2013. The tasks included in the Response Activity Work Plan included the following: complete groundwater plume definition, specifically north of Sherman Boulevard; groundwater program monitoring development; assessment of risk for vapor intrusion (VI) into residences and commercial/industrial properties; assessment of risk for infiltration of groundwater into storm sewers; assessment of risk associated with non-potable groundwater uses; and final remedy evaluation and implementation including development of a groundwater ordinance and a monitoring plan.

In March 2015, Kaydon submited a No Further Action Report documenting completion of all of the remedial actions undertaken for on-property soils and groundwater OU. All of the on-property soils and groundwater OU monitoring wells and extraction wells were properly plugged and abandoned in late December 2015. The MDEQ accepted the NFA Report in a letter dated February 17, 2016.

By the end of 2014, Kaydon had completed all of the additional field investigation tasks in the off-property groundwater OU2 Response Activity Work Plan except for the vapor investigation, the assessment of any risk associated with non-potable groundwater use of the private wells located within the groundwater plume area, and the development of a groundwater ordinance and monitoring plan.

SITE STATUS

Semi-annual groundwater sampling for the off-property groundwater OU continued through 2017.

Kaydon conducted the vapor assessment in October 2017 and developed a draft Human

Human Health Risk Assessment report related to any risks that may be associated with the non-potable use of the groundwater. The Human Health Risk Assessment was submitted to the MDEQ for review in April of 2017. The report on the VI Investigation will be submitted in 2018.

When completed, a report detailing these Response Activity Work Plan activities is expected in 2018 as well as a Monitoring Plan for OU2 and development of a groundwater ordinance.

ENFORCEMENT STATUS
Kaydon is the only party identified as liable under the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site
1	On-Property Soils and Groundwater
2	Off-Property Groundwater

OPERABLE UNIT 1 : On-Property Soils and Groundwater

Response Accomplishments: Completed

Remedial Investigation Investigations of lagoon areas.

Start Date: 04/01/1986 Primary Cost: $0 Source: Private
End Date: 12/01/1986 Secondary Cost: $0 Source:

Interim Response 1,500 cubic yards of contaminated soil from the lagoon areas were excavated and disposed of off the property.

Start Date: 07/01/1986 Primary Cost: $0 Source: Private
End Date: 12/01/1986 Secondary Cost: $0 Source:

OPERABLE UNIT 1 : On-Property Soils and Groundwater

Response Accomplishments: Completed

Operation and Maintenance

Operation of on-property groundwater extraction system, sending effluent to the city sanitary sewer for treatment and quarterly groundwater sampling was required under the 2008 O & M plan. In June 2008, both the MDEQ and Kaydon agreed to perform a Two-Year Pilot Test Shutdown of the Pump and Treat System. The Two-Year Pilot Test ended in June 2010, and was extended for one year to June 2011. Based on the groundwater data collected during the Pilot Test, only one on-property monitoring well detected contamination exceeding criteria. Since contamination in the on-property groundwater OU remained at or below Part 201 criteria, in 2013 the MDEQ gave approval for Kaydon to permanently shut down the inactive Pump and Treat System.

Start Date: *08/17/1987*	Primary Cost:	$0	Source: Private
End Date: *12/31/2012*	Secondary Cost:	$0	Source:

Interim Response

Install and begin operation of on-property groundwater capture system. Completed the on-property monitoring network by the end of 2006.

Start Date: *08/17/1987*	Primary Cost:	$0	Source: Private
End Date: *12/30/2006*	Secondary Cost:	$0	Source:

Remedial Investigation

Investigation of Dumpster disposal area and Used Oil Vault area.

Start Date: *05/30/1997*	Primary Cost:	$0	Source: Private
End Date: *04/01/1998*	Secondary Cost:	$0	Source:

Interim Response

Soil excavation and disposal from Dumpster and Used Oil Vault areas.

Start Date: *07/01/1997*	Primary Cost:	$0	Source: Private
End Date: *09/30/1997*	Secondary Cost:	$0	Source:

Interim Response

Indoor air investigation. The sampling was completed in 2003 and the report was submitted in 2004.

Start Date: *07/01/2003*	Primary Cost:	$0	Source: Private
End Date: *12/30/2003*	Secondary Cost:	$0	Source:

OPERABLE UNIT 1 : On-Property Soils and Groundwater

Response Accomplishments: Completed

Project Closeout Both the MDEQ and Kaydon have agreed that all identified source areas in the on-property OU have been successfully remediated and no longer contributes contamination to the off-property groundwater contamination plume. Under the Part 201 Amendments of 2010, Kaydon developed and submitted a No Further Action Report for the on-property OU to document the completion of the remedial actions. The No Further Action Report was completed and the MDEQ provided the No Further Action acceptance letter, dated February 17, 2016. The EPA has agreed to consider deletion from the NPL for the Kaydon on-site property OU.

Start Date: 12/01/2014	Primary Cost:	$0	Source: Private
End Date: 02/17/2016	Secondary Cost:	$0	Source:

OPERABLE UNIT 2 : Off-Property Groundwater

Response Accomplishments: Completed

Remedial Investigation Investigate off-property groundwater contamination. Report of the three years of monitoring was submitted in 2004.

Start Date: 01/01/2001	Primary Cost:	$0	Source: Private
End Date: 12/30/2003	Secondary Cost:	$0	Source:

Response Accomplishments: In Progress

Negotiations In December 2012, Kaydon submitted a Response Activity Work Plan for the off-property groundwater OU for MDEQ review. The Response Activity Work Plan included the following: determine the Kaydon facility boundary; establish the off-property groundwater plume boundary; determine groundwater uses within the plume boundary; determine if a vapor intrusion migration exposure pathway exists; determine if there are GSI issues for Ruddiman Creek; investigate the storm water lines to determine if this is a pathway for the contaminated groundwater plume; conduct a non-potable use survey for all of the private wells located within the off-site groundwater plume; and development of a groundwater ordinance and monitoring plan. The Response Activity Work Plan was approved by the MDEQ on May 21, 2014. Kaydon completed all of the Response Activity Work Plan task field activities in 2014, with the exception of the air vapor investigation, the non-potable use of the private wells, development of a groundwater ordinance and monitoring plan. The air vapor investigation was conducted in October 2017 and a draft HHRA was submited to the MDEQ in April 2017. The two remaining tasks to be addressed are development of a groundwater ordinance and monitoring plan and are expected to be completed in 2018.

Start Date: 03/17/2008	Primary Cost:	$0	Source: Private
End Date: 12/30/2018	Secondary Cost:	$0	Source:

OPERABLE UNIT 2 : Off-Property Groundwater

Response Accomplishments: In Progress

Remedial Investigation

Kaydon conducted several of the Response Activity Work Plan tasks field investigations in 2014. The collected information was submitted to the MDEQ for preliminary review in late 2014. Review and discussion of the information between the MDEQ and Kaydon determined all of the tasks had been completed with the exception of the air vapor investigtion, the survey of the non-potable use of the private wells, development of the groundwater ordinance and the monitoring plan. The air vapor investigation was conducted in October 2017 and a draft HHRA was submited to the MDEQ in April 2017. The two remaining tasks to be addressed are development of a groundwater ordinance and monitoring plan and are expected to be completed in 2018.

Start Date: 06/01/2014	Primary Cost:	$0	Source: Private
End Date: 12/01/2018	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance

The off-property groundwater OU monitoring plan has yet to be developed but it was included as a task in the Response Activity Work Plan for the off-property OU. On-going semi-annual sampling of the off-property groundwater OU monitoring wells will continue until the off-property monitoring plan is developted.

Start Date: 06/07/2009	Primary Cost:	$0	Source: Private
End Date: 12/01/2020	Secondary Cost:	$0	Source:

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Muskegon Chemical
1725 Warner Street
Whitehall , MI

County: Muskegon
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: DL
State Site ID#: 61000029
State Site Score: 37

LOCATION
The Muskegon Chemical Company site (the site) includes the 19.6 acres of the Koch Chemical Company production facility located at 1725 Warner Street and associated groundwater contamination. The area of groundwater contamination originated from the facility and has moved off-site. The contamination associated with the site is known to have migrated 1/2 mile southwest of the facility to Mill Pond Creek. Part of the off-site contamination exists under properties not owned by Koch Chemical Company.

SITE HISTORY
The Muskegon Chemical Company began production of specialty chemicals at the Whitehall facility in 1975. Groundwater contamination was initially discovered in 1977 during testing for installation of an industrial water supply well at the facility.

A hydrogeologic investigation conducted in 1980 identified three primary organic contaminants of concern in the groundwater: 1,2-dichloroethane, bis(2-chlorophyll)ether (Chlorex), and triglycol dichloride. The contaminant plume was estimated to be 1,150 feet in length, flowing in a southwest direction from the facility. Muskegon Chemical Company installed one purge well centrally in the path of the plume. The probable source of contamination was identified as a leak in the drainage system inside the Muskegon Chemical Company manufacturing facility, which was subsequently repaired.

In 1981, it was discovered that the groundwater contamination plume from the Whitehall facility was discharging to Mill Pond Creek. As a result of this discharge, the MDEQ and the Muskegon Chemical Company entered into a consent agreement and a plea agreement in 1981 and 1983, respectively. These agreements required the Muskegon Chemical Company to conduct two hydrogeologic investigations and to install several groundwater purge wells and a groundwater treatment system.

On December 31, 1985, Koch Chemical Company (Koch) purchased the Whitehall facility from Muskegon Chemical Company. On January 7, 1986, Muskegon Chemical Company, Koch, and the MDEQ entered a consent agreement, which approved the existing purge well system and established a seven-year period of operation. A March 1989 report by the MDEQ documented continued impact on Mill Pond Creek by the Whitehall facility groundwater contamination plume. On February 21, 1990, the site was placed on the National Priorities List.

On February 25, 1991, Koch and the MDEQ signed an Administrative Order by Consent, that required Koch to conduct an interim response action and a remedial investigation/feasibility study (RI/FS) under direction of the MDEQ. As a result of this order, Koch retained the firm of CH2M Hill to perform the interim response action and the RI/FS. During the summer of 1991, Koch conducted field activities, which included groundwater, surface water, soil, and sediment sampling, as part of the interim response action and RI at the site. On March 10, 1993, the MDEQ signed a Record of Decision (ROD) for the interim response action, which consisted of: 1) removal or extraction of contaminated groundwater

in the vicinity of Mill Pond Creek; and 2) treatment of the contaminated groundwater prior to disposal or discharge.

The interim response action was implemented by Koch in early 1993. The RI/FS was conducted in late 1993. The draft reports were submitted in February 1996. Both documents were finaled in February 1996. A draft Remedial Action Plan (RAP) was submitted for review in October 1995 and was approved in June 1996. The RAP was revised in 2000 to incorporate the Muskegon County ordinance in place of the deed restrictions not able to be attained from Howmet Corporation (the neighboring property).

In 2002, Koch Chemical Company requested a mixing zone determination from the MDEQ's Water Bureau. Subsequent to the request, the MDEQ's Water Bureau calculated site-specific discharge criteria for groundwater discharging to Mill Pond Creek. It was determined that current groundwater contamination is far below that which would pose a threat to Mill Pond Creek. After the mixing zone determination was conducted, Koch requested that the MDEQ allow Koch to shut down the groundwater extraction system while Koch and the MDEQ negotiated an amendment to the RAP. The amended RAP incorporated the mixing zone based groundwater discharge criteria as the cleanup criteria for groundwater at the site. The MDEQ approved an interim shutdown of the groundwater extraction system in April 2002.

Koch proposed a conceptual RAP revision to the MDEQ in 2003. Internal review of the document resulted in the identification of certain items that required resolution before the MDEQ could approve a RAP modification. Chief among those items was the discovery that the site was within the city of Whitehall's wellhead protection area. As a resolution to this issue, Koch agreed to partially fund the abandonment of the city of Whitehall's well number four and install a new, higher capacity municipal well located further away from the site. This gave the city a greater capacity to pump municipal water, removed the possibility of drawing site-related contaminated groundwater to a city well, and changed the city's wellhead protection area such that the site is no longer within it. In 2005, the city completed the abandonment of well number four and the installation of the new municipal well.

Active soil remediation was concluded in 1999. There was a small area of groundwater that remained contaminated with elevated levels of tetrachloroethylene (PCE) that, while still protective of Mill Pond Creek, needed to be addressed. Koch decided to remediate this contamination through air sparging (AS). The AS system was installed on the plant property in the summer of 2003 and was operated until 2006.

In 2006, Koch petitioned the MDEQ to cease, on an interim basis, operation of the AS system. The purpose of the shutdown was to evaluate whether or not the PCE contamination might rebound after shutting down the treatment system. Subsequent rounds of quarterly groundwater monitoring have been conducted since system shutdown, and no appreciable rebound of PCE has been observed.

While Koch worked on submitting modifications to its RAP, one of the existing objectives required Koch to either cap the soils beneath the former processing plant, or utilize the existing structure as a barrier to infiltration and exposure to the contaminated soils. Because the building had fallen into disrepair, Koch decided to demolish the plant and construct a new cap over the contaminated soils beneath the building. In 2006, Koch conducted this work. Components of the cap include the concrete floor from the former processing plant, a layer of soil to create the appropriate slope, a flexible membrane liner, a drainage layer, and topsoil.

In May 2005, Koch submitted a draft RAP to the MDEQ. Agency comments were returned to

Koch in October 2005. Subsequently, Koch decided to abandon the idea of a totally new RAP, and instead focused on administrative modifications to the existing RAP. A formal submittal was made to the MDEQ in October 2006. This submittal, and the subsequent discussions with Koch, resolved nearly all of the issues raised earlier by the MDEQ. One outstanding issue was determining and establishing appropriate permanent shutdown criteria for the AS system. Through discussion, this issue was resolved to the satisfaction of each party involved. Revised draft RAP amendments were submitted to the MDEQ in December 2008 and May 2009 for agency review.

On April 4, 2008, the EPA signed the Third Five-Year Review (FYR) for the site. The Third FYR concluded that the remedy is protective of human health and the environment in the short term since there is no present exposure pathway to site-related contaminants under existing conditions. Long-term protectiveness requires compliance with effective Institutional Controls (ICs). Effective ICs must be monitored and maintained. Some additional follow-up actions were recommended to help ensure that long-term protectiveness is maintained. These actions are to evaluate the vapor intrusion pathway, review and potentially modify use restrictions, along with long-term stewardship procedures, potential modification of cleanup criteria, and define shutdown criteria for the AS system. Each of these items were brought to resolution in the months following release of the Five-Year Review document.

The RAP Amendment was approved by the MDEQ in January 2010.

The Fourth FYR was completed in April 2013. The Muskegon Chemical Company remedy has significantly reduced site-related contaminants. The remedy is protective of human health and the environment in the short term since there is no present exposure pathway to Muskegon Chemical Company-related contaminants under existing conditions. The remedy is expected to be protective in the long term since ICs are in place.

SITE STATUS

The consultant for the responsible party completed their evaluation of the vapor intrusion pathway in the spring of 2017 and is awaiting comments from the EPA and MDEQ. Groundwater sampling was completed in October of 2017 per the biennial sampling plan. The MDEQ and EPA are working on the Fifth FYR that is due in April of 2018. The EPA and MDEQ met with site consultants and a representative from Flint Hills Resources in November of 2017 to complete the FYR site walk and discuss site issues.

ENFORCEMENT STATUS

In 1997, Koch signed a Decree with the MDEQ to implement the remedy and reimburse state costs. The Decree required Koch to have restrictive covenants (RCs) placed on off-site properties that are affected by the groundwater plume to prevent groundwater usage. An RC has been placed on all affected parcels except one. Since this RC could not be negotiated, the MDEQ and Koch negotiated changes to the RAP that allow the Muskegon County well permitting ordinance to serve as an IC for this parcel of property.

A RAP Amendment was approved by the MDEQ in January 2010. Among other things, the RAP Amendment incorporates mixing zone-based groundwater surface water interface criteria as the groundwater cleanup standards for the site.

SPECIAL CONSIDERATIONS

None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 03/10/1993**

This was an interim action remedy that included the extraction of contaminated groundwater in the vicinity of Mill Pond Creek and the treatment of the contaminated groundwater prior to disposal or discharge.

Remedial Action Plan Identifier: Muskegon Chemical **Effective 07/02/1995**

Final Determination: Technically Approved

Response Accomplishments: Completed

Remedial Investigation

Under several different orders, Koch completed several studies on the condition of the area surrounding the Muskegon Chemical Company facility. These studies included both soil and groundwater investigations. Costs shown are estimated.

Start Date: *06/15/1981* Primary Cost: $750,000 Source: Private

End Date: *06/15/1996* Secondary Cost: $0 Source:

Interim Response

Koch, under a Consent Agreement with the MDEQ, installed purge wells at the bluff of Mill Pond Creek to prevent the contaminated plume from entering the creek. As part of an approved interim shutdown, purge wells were turned off in April 2002 in response to a mixing zone determination for groundwater discharging to Mill Pond Creek. Costs shown are estimated.

Start Date: *06/15/1983* Primary Cost: $750,000 Source: Private

End Date: *06/01/1996* Secondary Cost: $0 Source:

Remedial Action

The remedial action was conducted under a RAP, which was approved in June 1996. Contaminated soil was treated by way of hot-air soil vapor extraction. The groundwater treatment system included an air stripper and carbon treatment prior to the strategic reinjection of the treated effluent. Costs for these activities shown are estimated.

Start Date: *06/01/1996* Primary Cost: $2,000,000 Source: Private

End Date: *06/01/1999* Secondary Cost: $0 Source:

5 Year Review

The First FYR reaffirmed the cleanup goals from the RAP and identified no new issues that required resolution.

Start Date: *01/01/1998* Primary Cost: $0 Source:

End Date: *03/13/1998* Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The Second FYR identified a number of follow-up actions, including the resolution of drinking water issues with the city of Whitehall, resolution of IC issues, and resolution of a proposed modification to the RAP to allow for new groundwater cleanup criteria.

Start Date: *01/01/2003*	Primary Cost:	$0	Source:	
End Date: *04/04/2003*	Secondary Cost:	$0	Source:	

5 Year Review The Third FYR was signed on April 4, 2008. The document concluded that the remedy is protective of human
health and the environment in the short term since there is no present exposure pathway to site-related contaminants under existing conditions. Long-term protectiveness requires compliance with effective ICs.

Start Date: *10/01/2007*	Primary Cost:	$10,000	Source:	Private
End Date: *04/04/2008*	Secondary Cost:	$0	Source:	

5 Year Review The MDEQ and EPA completed the Fourth FYR of the site on April 4, 2013. The Muskegon Chemical Company remedy has significantly reduced site-related contaminants. The remedy is protective of human health and the environment in the short term since there is no present exposure pathway to Muskegon Chemical Company-related contaminants under existing conditions. The remedy is expected to be protective in the long term since ICs are in place.

Start Date: *10/01/2012*	Primary Cost:	$0	Source:	
End Date: *04/04/2013*	Secondary Cost:	$0	Source:	

Response Accomplishments: In Progress

5 Year Review The MDEQ and EPA should complete the Fifth FYR of the site on April 4, 2018.

Start Date: *04/04/2017*	Primary Cost:	$0	Source:	
End Date: *04/04/2018*	Secondary Cost:	$0	Source:	

Response Accomplishments: Ongoing

Operation and Maintenance Operation and maintenance activities at this site are conducted by Koch, and consist of groundwater monitoring and landfill cap maintenance. Costs shown are estimated.

Start Date: *06/15/1983*	Primary Cost:	$1,500,000	Source:	Private
End Date: *01/01/2020*	Secondary Cost:	$0	Source:	

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Ott/Story/Cordova Chemical Co
500 Agard Road
North Muskegon , MI

County: Muskegon
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: 02
State Site ID#: 61000051
State Site Score: 43

LOCATION
The Ott/Story/Cordova Superfund site is located on Agard Road in Dalton Township, Muskegon County, approximately three miles north of the city of Muskegon. The surrounding area is rural/residential with a small trailer park located just northwest of the property. A small stream, known as Little Bear Creek, and an unnamed tributary are located about 1/2 mile southeast of the former chemical plant.

SITE HISTORY
Several chemical companies, producing pharmaceutical and veterinary medicine precursors and pesticide and herbicide chemical constituents, operated at the site between 1957 and 1985. Chemical waste was stored on-site in deteriorating 55-gallon drums and production wastewater and sludge were discharged into on-site seepage lagoons. The site was abandoned by the Story Chemical Company in 1977. In 1978 the MDEQ, in conjunction with an agreement with the new owner, the Cordova Chemical Company of Michigan, performed a drum removal and excavated the waste lagoons. Several remedial investigations (RIs) revealed that poor waste handling practices between 1957 and 1977 resulted in extensive groundwater and soils contamination.

The groundwater, contaminated with over 90 organic chemicals, including priority pollutants such as benzene, toluene, vinyl chloride, 1,2-dichloroethane, and tetrachloroethene, flows to the southeast and began discharging into Little Bear Creek and the unnamed tributary in the early 1970s. Contamination levels in the groundwater exceeded over 10,000 times the residential drinking water criteria for several chemicals and initially caused a drinking water health threat. Many residents were provided with bottled drinking water in the 1970s, and in 1982 a municipal water supply line was installed. This construction alleviated the acute drinking water threat.

The groundwater discharge to Little Bear Creek caused serious degradation of approximately 3/4 of a mile of the stream and created an environmental and human health direct contact hazard. Control of this discharge was one of the main objectives of site remediation. The discharge of contaminated groundwater to the creek area is being controlled by a groundwater extraction system that began operation in 1996. The southern extent and final fate of the deepest portion of the groundwater contaminant plume is still unknown.

The decision to construct the groundwater capture system and the water treatment plant were stipulated in two Records of Decision (ROD) known as Operable Units (OUs)1, Groundwater Containment, and 2, Groundwater Contain/Restore. Operation of the plant began in February 1996, with plant effluent discharged to the North Branch of the Muskegon River under the provisions of a National Pollutant Discharge Elimination System permit. The extraction and treatment system was designated operational and functional on August 9, 2000. The state has been responsible for 100 percent of the operation and maintenance (O & M) costs since 2011. The treatment plant is designed for 30 years of operation. Groundwater modeling estimates the time to clean up the groundwater at up to 80 years.

Muskegon County acquired the former Ott/Story/Cordova land through a land transfer in September 2002 from the Cordova Chemical Company of Michigan, which purchased the site in 1977, after Story Chemical Company went bankrupt. The Cordova Chemical Company entered into a stipulation and consent agreement with the MDEQ when it purchased the site. The Cordova Chemical Company of Michigan ceased chemical production operations in 1985 and has since salvaged most of the production equipment.

Five-Year Reviews (FYR) were completed in 1997 as a streamlined review for response actions still ongoing and in 2002 as a statutory review. There were not any issues for follow-up actions identified in the 1997 or the 2002 FYRs. The Third FYR was written in 2007 and identified several issues remaining to be addressed: conduct an "extent-of-contamination" investigation of the semi-confined (confined) aquifer; conduct a capture zone analysis that includes hydraulic and chemical evaluations; and conduct a deep (bedrock) well evaluation in the former production area. Once the semi-confined aquifer and capture analysis work is completed, a determination can be made regarding what, if any, institutional controls (ICs) need to be implemented to prevent exposure to site contaminants.

Two phases of vertical aquifer sampling were completed during 2009 and 2010; however, the horizontal and vertical extent of contamination in the semi-confined aquifer has yet to be defined. Other tasks yet to be performed include installation of permanent monitoring wells in key locations to monitor the contaminant plume in the semi-confined aquifer and evaluation of the extent of impact from a deep (bedrock) well that remains at the former plant.

The EPA completed the Fourth FYR on September 12, 2012. The recommendations for follow-up action include investigation and remediation of the semi-confined and bedrock aquifers, additional groundwater source area remediation, and implementation of off-site ICs.

Investigation field work to address the semi-confined and bedrock aquifers contamination as well as identify and remediate additional sources of groundwater contamination in the former chemical production plant area began in summer 2014, continued throughout the summer of 2015, and the spring of 2016. This remedial design work includes pre-design investigations to complete delineation of the horizontal and vertical extent of the contamination in both aquifers and the former plant area and installation of permanent monitoring wells. Remedial Action (RA) work is anticipated to follow the completion of the remedial design (RD), likely in 2018.

The EPA has continued work to determine the effectiveness of the extraction wells and conveyance piping to determine if any of the components need to be rehabilitated or replaced. Assessment work (field work and reporting) begun in 2014 continued throughout 2015, and concluded in 2016.

SITE STATUS

The groundwater extraction and treatment system at Ott Story continues to control the spread of contaminated groundwater to the Little Bear Creek and its unnamed tributary and also progresses the restoration of the contaminated aquifers that may be a future drinking water source. The site continues to operate in O & M under contract by the state to Fishbeck, Thompson, Carr, & Huber, Inc. to operate the unconfined aquifer contaminated groundwater extraction and treatment systems.

Investigation data collected from 2014 through 2016 will be evaluated in 2017 and 2018 to determine a path foward to address the numerous high concentration source areas identified in the former chemical manufacturing areas. Additional work is planned in 2018 to delineate the semi-confined aquifer and bed rock aquifer contamination.

Recommendations for the repair or replacement of the high volume extraction well network and conveyance piping were finalized in 2017 leading to the development of an RD. Additional modeling of the capture network to determine replacement extraction well locations has been completed. RD work is anticipated in 2018 for construction (RA) in 2019.

A FYR Report was completed in September 2017. The remedy was determined to currently be protective of human health and the environment. Recommendations for follow up actions included continued evaluation and future replacement of extraction components of the extraction system to ensure long term capture of contaminated groundwater, additional investigation of the semi-confined and bedrock aquifers, and the identification of 1,4-dioxane as a new contaminant.

ENFORCEMENT STATUS

In 1989, litigation was initiated in federal district court against Bestfoods, Inc., formerly known as CPC International, Inc., and three related entities: Aerojet General Corporation, Cordova Chemical Company (a California Corporation), and Cordova Chemical Company of Michigan (a Michigan Corporation) (collectively "the Aerojet Defendants") for liability under the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, as amended (CERCLA), at the Ott/Story/Cordova site. The trial court determined that all four parties were liable under the CERCLA. That liability determination was appealed to the Court of Appeals for the Sixth Circuit and the United States Supreme Court. In 1998, the United States Supreme Court issued an opinion in the case that set a new standard for determining when a parent corporation could be held liable for a facility owned by its subsidiary. The United States Supreme Court reversed the district court's liability determination as to Bestfoods, Aerojet, and Cordova Chemical Company and the case was remanded to the district court for further consideration based upon the standard articulated by the United States Supreme Court. In addition, Cordova Chemical Company of Michigan, who is liable as the current owner of the site, may continue to raise defenses to liability. The case was decided in 2001 by Judge Hillman in the district court with a ruling that the parent company, CPC International, Inc., was not liable.

In 1999, a settlement agreement was reached with the federal and state governments and the Aerojet Defendants. The settlement agreement was set forth in a proposed Consent Decree (Decree) that was subject to public comment. The proposed Decree resolves the liability of the Aerojet Defendants under CERCLA. The Decree was entered in district court on December 18, 1989.

A separate state court action was initiated by the Aerojet Defendants in the Michigan Court of Claims. In the Court of Claims action, the Aerojet Defendants alleged that the state had agreed to indemnify them for all environmental liability pursuant to the Stipulation and Consent Order that was entered with the state of Michigan in 1977 when Cordova Chemical Company purchased the property. The Court of Claims determined that the agreement was in fact an indemnification agreement, and that it required the state to indemnify the Aerojet Defendants for any environmental liability it has at the site. This includes the claims asserted against the Aerojet Defendants by both the federal government and Bestfoods, Inc., under CERCLA. The Michigan Court of Appeals affirmed this decision and the Michigan Supreme Court denied the state's Application for Leave to Appeal.

A settlement agreement was entered in federal court on August 24, 2000, with the Aerojet Defendants concerning the state's liability for indemnification. The settlement required the MDEQ to perform or fund the remedy for the OU, Soils/Sediment. The state paid the Aerojet Defendants $1.5 million to resolve all claims for indemnification.

The groundwater capture and treatment RA continues to move forward utilizing federal and state funding. Enforcement action pursuant to Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, has not been taken due to the above liability determination and because an enforcement action was already pending under CERCLA. The MDEQ implemented the soils remedy and additional work to facilitate redevelopment. The remedy and additional work to facilitate redevelopment was completed by June 2002.

SPECIAL CONSIDERATIONS

Muskegon County initiated redevelopment efforts at the former chemical plant site in 2007 with the installation of utilities and roads to facilitate use as an industrial park. As of September 2011, one tenant has acquired property in the industrial park and constructed a dry sand, truck to railroad loading facility (The Nugent Sand Company). The facility operated for 5 years and now is no longer in operation. The County of Muskegon, in partnership with Dalton Township, has designed a non-motorized recreational trail to connect two large trail systems to the north and south of the site. A portion of the connector trail will be routed through the site. Construction of the trail (through the site) is anticipated in 2018.

OPERABLE UNITS

00	Entire Site
01	Groundwater Containment
02	Groundwater Contain/Restore
03	Soils/Sediment

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Bottled Water Residents whose private water wells were contaminated by the migrating plume were placed on bottled water.

Start Date: 01/15/1975 Primary Cost: $0 Source: Federal
End Date: 12/15/1982 Secondary Cost: $0 Source:

Interim Response Removal of 8,700 fifty-five gallon drums of chemical waste and excavation of lagoon sludge was performed as a joint action between the MDEQ and the Cordova Chemical Company as part of the agreement for the Cordova Chemical Company to assume ownership of the site.

Start Date: 01/15/1977 Primary Cost: $670,000 Source: State
End Date: 12/15/1978 Secondary Cost: $600,000 Source: Private

Interim Response The EPA conducted a preliminary site investigation to assess the nature of the pollutants and extent of contamination at the site.

Start Date: 01/15/1977 Primary Cost: $500,000 Source: Federal
End Date: 12/15/1978 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Alternate Water A lawsuit filed by affected residents resulted in an out-of-court settlement leading to replacement of private water wells with municipal water for approximately 90 homes. The potentially responsible parties group also contributed $100,000.

Start Date: *01/15/1981*	Primary Cost:	$1,000,000	Source:	Federal
End Date: *12/15/1982*	Secondary Cost:	$130,000	Source:	State

5 Year Review Type 1a streamlined review since the response is ongoing. No follow up issues reported. The site was determined to be protective.

Start Date: *01/13/1997*	Primary Cost:	$0	Source:	
End Date: *08/13/1997*	Secondary Cost:	$0	Source:	

5 Year Review No issues for follow-up action were reported. The site was determined to be protective.

Start Date: *07/15/2002*	Primary Cost:	$0	Source:	Federal
End Date: *09/19/2002*	Secondary Cost:	$0	Source:	

5 Year Review Several issues were identified including delineation of the extent of contamination in the semi-confined and bed rock aquifers and the need to evaluate system capture. The site was determined to be protective.

Start Date: *05/01/2007*	Primary Cost:	$25,000	Source:	Federal
End Date: *09/19/2007*	Secondary Cost:	$0	Source:	

5 Year Review Several issues were identified including delineation of the semi-confined and bed rock aquifers, investigation of the source area, and implementation of off-site ICs. The site was determined to be protective.

Start Date: *01/03/2012*	Primary Cost:	$25,000	Source:	Federal
End Date: *09/12/2012*	Secondary Cost:	$0	Source:	

5 Year Review A FYR Report was completed in September 2017. The site was determined to be protective. Recommendations for follow up actions included continued evaluation and future replacement of extraction components of the extraction system to ensure long term capture of contaminated groundwater, additional investigation of the semi-confined and bedrock aquifers, and the identification of 1,4-dioxane as a new contaminant.

Start Date: *05/08/2017*	Primary Cost:	$0	Source:	
End Date: *09/08/2017*	Secondary Cost:	$0	Source:	

Response Accomplishments: Future Need

5 Year Review

Start Date: *01/01/2022*	Primary Cost:	$0	Source:	
End Date: *09/12/2022*	Secondary Cost:	$0	Source:	

OPERABLE UNIT 01: Groundwater Containment

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/29/1989**

Groundwater extraction and treatment. The RI/feasibility study (FS), Design, and RA for this OU were combined with the OU, Groundwater Contain/Restore.

Response Accomplishments: Completed

Remedial Design This RD was combined with OU, Groundwater Contain/Restore, after determining that it was more cost-effective to address the entire site groundwater remediation with one overall action.

Start Date: 06/05/1990	Primary Cost:	$500,000	Source: Federal
End Date: 09/25/1991	Secondary Cost:	$0	Source:

Remedial Action This RA was later combined with the OU, Groundwater Contain/Restore, RA.

Start Date: 09/25/1991	Primary Cost:	$471,600	Source: Federal
End Date: 09/28/1992	Secondary Cost:	$52,400	Source: State

Response Accomplishments: In Progress

Remedial Action Evaluation of the extraction well collection system and conveyance piping to determine if wells and piping need to be repaired and or replaced as a condition of the transfer of the site from Long-Term Response Action (LTRA) to O & M. State match for this work is provided in an amendment dated December 24, 2013, to the LTRA SSC.

Start Date: 01/01/2011	Primary Cost:	$3,597,860	Source: Federal
End Date: 12/31/2018	Secondary Cost:	$397,762	Source: State

OPERABLE UNIT 02: Groundwater Contain/Restore

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/29/1990**

Groundwater extraction and treatment.

Response Accomplishments: Completed

Remedial Investigation The EPA conducted the RI/FS.

Start Date: 08/19/1983	Primary Cost:	$1,136,000	Source: Federal
End Date: 09/29/1990	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: Groundwater Contain/Restore

Response Accomplishments: Completed

Remedial Design The United States Army Corps of Engineers, through an interagency agreement with the EPA, contracted out the groundwater-system design work to a private design firm (OU, Groundwater Containment, objectives were incorporated into this design.).

Start Date: 01/31/1990 Primary Cost: $1,526,000 Source: Federal
End Date: 09/27/1993 Secondary Cost: $0 Source:

Long Term Remedial Action The EPA operated the groundwater extraction and treatment system for 10 years. The state entered into an SSC with the EPA, signed July 2, 1999, and amended June 6, 2007, which committed the state's 10 percent match funding of $2.5 million for the 10 years and $25 million project cost of the LTRA.

Start Date: 08/09/2000 Primary Cost: $22,500,000 Source: Federal
End Date: 01/31/2011 Secondary Cost: $2,500,000 Source: State

Operation and Maintenance Engineering review of the existing Ott/Story/Cordova wastewater treatment plant (WWTP) prior to state assumption of 100 percent O & M. The evaluation of the existing Ott/Story/Cordova WWTP has been completed and the EPA is addressing the recommendations from that study by making repairs to the Ott/Story/Cordova WWTP.

Start Date: 10/02/2008 Primary Cost: $188,888 Source: State
End Date: 03/30/2011 Secondary Cost: $0 Source:

Response Accomplishments: Construction Complete

Remedial Action Construction of the groundwater extraction and treatment system has been completed and the plant began operating on February 12, 1996. The purpose of the system is to stop the venting of contaminated groundwater into Little Bear Creek and to remediate the aquifer. The state provided its 10 percent match to the EPA through an SSC.

Start Date: 09/28/1992 Primary Cost: $33,055,200 Source: Federal
End Date: 08/09/2000 Secondary Cost: $3,672,800 Source: State

Response Accomplishments: In Progress

Remedial Investigation Investigate the semi-confined aquifer as stipulated in the second ROD for the site. Two phases of vertical aquifer profiling have been completed. Additional investigation work has been completed in 2014, 2015, and 2016, under EPA oversight, to define the horizontal and vertical extent of contamination in the semi-confined aquifer and also remaining source areas contributing to the groundwater contamination. Work is ongoing to complete delineation of the source areas and the semi-confined aquifer.

Start Date: 02/09/2009 Primary Cost: $2,600,000 Source: Federal
End Date: 12/31/2018 Secondary Cost: $0 Source:

OPERABLE UNIT 02: Groundwater Contain/Restore

Response Accomplishments: In Progress

Remedial Investigation Investigation is necessary to understand the nature and extent of contamination in the bedrock aquifer. After the investigation is completed, it will be necessary to complete an FS to determine the appropriate RA for the bedrock aquifer.

Start Date: 09/24/2012	Primary Cost:	$400,000	Source: Federal
End Date: 12/31/2018	Secondary Cost:	$0	Source:

Remedial Design RD for the treatment system for the semi-confined aquifer and groundwater source area removal.

Start Date: 06/02/2014	Primary Cost:	$100,000	Source: Federal
End Date: 12/31/2019	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance Estimated O & M cost of $2,000,000 per year in 2007 dollars, over 70 years, for an aggregate cost of $140,000,000. The MDEQ has completed five years of O & M and currently has an executed contract with Fishbeck, Thompson, Carr, & Huber Inc. for three years of O & M. The existing contract year will expire on September 30, 2019.

Start Date: 02/01/2011	Primary Cost:	$10,000,000	Source: State
End Date: 01/31/2071	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

Remedial Action RA to construct the semi-confined aquifer and groundwater source area removal remedy. Ten percent state match is required.

Start Date: 01/01/2018	Primary Cost:	$20,000,000	Source: Federal
End Date: 12/31/2018	Secondary Cost:	$2,000,000	Source: State

Remedial Design RD will be necessary to design the remediation system for the bedrock aquifer.

Start Date: 06/01/2018	Primary Cost:	$750,000	Source: Federal
End Date: 12/31/2019	Secondary Cost:	$0	Source:

Remedial Action RA to construct the remedy for the bedrock aquifer. Ten percent state match is required.

Start Date: 01/01/2019	Primary Cost:	$10,000,000	Source: Federal
End Date: 12/31/2020	Secondary Cost:	$1,000,000	Source: State

OPERABLE UNIT 03: Soils/Sediment

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/27/1993**

Excavation and treatment on-site with low-temperature thermal desorption.

OPERABLE UNIT 03: Soils/Sediment

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 02/26/1998**

Excavation of site soils with off-site disposal.

Response Accomplishments: Completed

Remedial Investigation OU, Soils/Sediment, includes plant site soils and Little Bear Creek sediments. A supplemental RI/FS was conducted by the EPA for site soils and sediments to further define areas requiring RA due to unacceptable human and environmental risks.

Start Date: 09/19/1990 Primary Cost: $269,000 Source: Federal
End Date: 09/27/1993 Secondary Cost: $0 Source:

Remedial Design The original remedy called for low-temperature thermal desorption treatment of contaminated soils. The state completed the design for the soils remedy and building demolition.

Start Date: 01/12/1994 Primary Cost: $699,000 Source: Federal
End Date: 03/06/1995 Secondary Cost: $0 Source:

Remedial Action

Start Date: 04/04/1995 Primary Cost: $3,195,000 Source: Federal
End Date: 12/30/2002 Secondary Cost: $355,000 Source: State

Remedial Action Implementation of the OU, Soils/Sediment, design of building demolition, and soil excavation with off-site disposal.

Start Date: 10/01/2001 Primary Cost: $2,843,852 Source: State
End Date: 06/15/2002 Secondary Cost: $0 Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$37,683	$0	$0	$37,683	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$55,131	$0	$0	$55,131	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$13,789	$0	$0	$13,789	$0

Cooperative Agreement Number V005851-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$165,000	$0	$0	$163,889	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$26,381	$0	$0	$26,381	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$32,907	$0	$0	$32,472	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$33,337	$0	$0	$33,337	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$20,000	$0	$0	$49	$0

Cooperative Agreement Number V995261-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$55,555	$5,555	$0	$55,555	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995261-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$200,333	$20,033	$0	$200,296	$0

Cooperative Agreement Number V995259-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Design	$79,046	$0	$0	$53,539	$0

Cooperative Agreement Number V995339-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$11,060	$0	$0	$11,060	$0
Totals:	$730,223	$25,588	$0	$683,181	$0

STATE SUPERFUND CONTRACTS

For Operable Unit 01 : Groundwater Containment : Closed

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Action	$524,000	$52,400	$52,400	$0

For Operable Unit 02 : Groundwater Contain/Restore : Open

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Long Term Remedial Action	$31,631,964	$3,163,196	$2,818,311	$2,654,342
Remedial Action	$36,728,000	$3,672,800	$3,671,360	$0

For Operable Unit 03 : Soils/Sediment : Closed

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Action	$3,301,113	$330,111	$330,111	$0
Totals:	$72,185,077	$7,218,507	$6,872,183	$2,654,342

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Peerless Plating
2554 Getty Avenue
Muskegon , MI

County: Muskegon
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: G2
State Site ID#: 61000039
State Site Score: 39

LOCATION
The Peerless Plating Company site is located on the east side of the city of Muskegon at 2554 Getty Avenue, Muskegon County, Michigan. The property is approximately one acre in size and located within a mix of light industrial and residential land uses. The property is bounded by Getty Avenue to the west and industrial and commercial properties to the north and south. Little Black Creek, which forms the southeast property boundry of the site, empties into Mona Lake to the south. The area is supplied with municipal drinking water and the buildings around the site are still using septic systems.

SITE HISTORY
The plant was constructed in 1937, and was operated by three separate owners before its closure in 1983. Electroplating operations and processes conducted at the facility included copper, nickel, chromium, cadmium, and zinc plating, as well as associated activities. These processes required the use of toxic, reactive, corrosive, and flammable chemicals. From 1937 to 1978, electroplating wastes including high levels of heavy metals were discharged into three unlined seepage lagoons at the rear of the facility. In 1979, a hydrogeological study was conducted to define the extent of groundwater and surface water contamination. Cadmium and cyanide were detected in the groundwater. In 1980, the seepage lagoon sludges were removed and disposed of and the excavated lagoon area was backfilled and capped.

Beginning in 1972, numerous regulatory attempts were made to bring the facility into compliance with water quality discharge limitations and to require construction of proper treatment facilities. These repeated regulatory efforts culminated in 1983 when the Michigan Department of Natural Resources (MDNR) conducted an investigation into operating failures at the Peerless Plating Company. This investigation found the firm had yet to adequately upgrade the treatment facilities and was still exceeding discharge limitations for chromium, cyanide, cadmium, and zinc. Further, the investigation found that portions of the plant's treatment system discharged directly to the groundwater rather than to the sanitary sewer. The investigation also revealed that drummed wastes had not been removed from the plant since 1980. In June 1983, Peerless Plating Company closed as a result of regulatory actions, labor problems, financial difficulties, and declared bankruptcy. The company abandoned the plant in its former operational condition with plating solutions, raw materials, and drummed wastes stored throughout the facility. The building was not well maintained and access was generally unrestricted.

Subsequently, personnel from Muskegon County Civil Defense and the Michigan Department of Public Health detected hydrocyanic acid gas in the facility atmosphere. The MDNR requested the EPA Region V Spill Response Section to perform an emergency removal action. The EPA determined the facility to be an immediate threat to human health and the environment and implemented the emergency removal action in September 1983. This action resulted in the removal of 37,000 gallons of hazardous liquids including many acids, plating solutions, and trichloroethylene. Lagoons were drained; soil was removed from lagoon areas; soils and sludges were removed from the building interior; vats, lines,

tanks, sumps, debris, floorboards, and walls were decontaminated; sewer lines were sealed; virgin and proprietary chemicals were removed; and on-site neutralization of cyanides and nitric acid occurred.

In March 1991, the EPA again conducted an emergency response action to remove and dispose of liquids and sludges contained in an enclosed aboveground tank. A portion of this response action, consisting of encapsulating an asbestos oven and installing a new security fence, was performed by Peerless Plating Company. The site was placed on the National Priorities List in August 1990 to address long-term remediation. The EPA began the remedial investigation/feasibility study (RI/FS) using federal funds in 1989 after negotiations with one of the potentially responsible parties (PRPs) failed. The final RI report was completed in September 1991, the FS completed in June 1992, and the Record of Decision (ROD) was signed by the EPA on September 21, 1992.

The major components of the selected remedy include: 1) demolition and disposal of the Peerless Plating Company building with additional soil sampling beneath the building during the remedial design, 2) groundwater extraction and treatment of volatile organic compounds (VOCs) by air stripping, followed by chemical precipitation of inorganic compounds (heavy metals), the discharge of which was regulated by a 1991 Substantive Requirements Document (SRD), and 3) treatment of organic compounds in the soils with in-situ vapor extraction, and excavation and stabilization of the inorganic compounds prior to disposal at a licensed hazardous waste disposal facility. The MDEQ concurred with the ROD.

The building was demolished in April 1993. The sampling of the soils beneath the building was completed in August 1993. The preliminary remedial design (RD) report was submitted to the EPA in August 1994. Although the RD was approved in early 1996, work was delayed until the EPA funding for the soil phase of the remedial actions became available late in 1996.

An Explanation of Significant Difference (ESD) was signed by the EPA on July 24, 1997. The ESD changed the soil cleanup criteria to current Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 201) criteria; identified two conditions to allow contaminated soils to remain on site above the cleanup criteria (1 - soils immediately adjacent to and underneath Hardware Distributors Incorporated, a hardware building to the south and 2 - contaminated soils below the water table to be addressed by the groundwater remedy) and required deed restrictions to protect on-site workers against exposure to contaminated groundwater until it was remediated. The MDEQ concurred with this ESD.

The soil removal began under a State Superfund Contract (SSC) in 1997 and was completed in late fall 1998. An 8,000-gallon underground storage tank, which contained less than 500 gallons of residual liquid plating waste was discovered during the removal of the contaminated soils. It was emptied, excavated, cleaned, and disposed of by mid-January 1999.

The start of the groundwater phase of the remedy was first delayed due to specification changes to the design. Work began in late fall 1999 but was again delayed when a significant amount of highly contaminated soils were discovered while excavating the foundation area for the treatment building. Further soil investigation, excavation, and disposal was conducted from 1999 to the summer of 2000.

A second ESD was developed for the site in April 2001. This second ESD amended the ROD as follows. Saturated soil at the site contained cadmium at concentrations exceeding the cleanup standard. Because of the difficulties and expense of excavating soil below the

water table, contaminated soils which contain constituent concentrations greater than the cleanup levels specified in the 1997 ESD would be excavated approximately to the depth of the water table. Soils southeast of the site and immediately adjacent to Little Black Creek contained cadmium and lead concentrations exceeding the cleanup standards. Excavation of the contaminated soils was completed in this area to within two feet of the stream channel in order to maintain the integrity of the stream bank. The remaining soils were covered with a geotextile membrane and six-inch diameter rock.

All soil remediation activities and construction of the groundwater treatment system were completed in March 2001. The groundwater extraction and treatment system went into operation during the summer of 2001 but was unable to meet its discharge limits for cadmium. The system was shut down in October 2001 and an application for a new SRD was submitted. The system became operational and functional in September 2002 and was projected to operate for ten years under the Long-Term Remedial Action (LTRA). The SSC was amended to cover the state's 10 percent match funding for the LTRA ten-year period.

The First Five-Year Review (FYR) was written and completed by the EPA in July 2002. The report concluded that the remedy was protective of human health and the environment in the short term. Long-term protectiveness, however, could not be determined until the groundwater cleanup goals were achieved.

The city of Muskegon contacted the MDEQ to request that the site waste water be discharged into their newly constructed Publicly Owned Treatment Works (POTW). The EPA and the state reviewed the requirements and determined that the maintenance of the Peerless Plating Company treatment facility would be greatly reduced by the change in discharge destination. The EPA's contractor designed a lift station and piping for the discharge. The lift was constructed approximately one block from the groundwater treatment facility. The EPA was responsible for the hook-up cost which was estimated at $1.5 million. The state was responsible for a 10 percent cost share, which was provided through the SSC. In January 2005, after reviewing the construction plans, the city of Muskegon requested that the lift station be upgraded so that all of the residences in the area could hook up to the system. A draft amendment to the SSC was received from the EPA for the connection to the county POTW, and the remaining years of the LTRA (operation of the groundwater treatment system). The SSC Amendment was signed by both Agencies and the connection to the POTW was completed in September 2005. The National Pollution Discharge Elimination System permit was discontinued. An amended ESD was received to reflect the changes in the discharge.

A report from Grand Valley State University concluded that the cadmium within Mona Lake was directly attributable to the Peerless Plating Company site. As a follow-up to that report, the MDEQ, in June 2005, performed additional studies of Little Black Creek to determine the source and extent of any cadmium in the Creek. The MDEQ collected sediment samples all along the Little Black Creek from the headwaters downstream to Mona Lake. Sediment toxicity studies were performed on selected Little Black Creek sediments. Based on these studies, sediments immediately downstream of the Peerless Plating Company site were demonstrated to be harmful to aquatic life. A recommendation for removal of sediments from the facility to Sherman Road was made to the EPA. This area included approximately 20 feet upstream of the abandoned discharge pipe to Sherman Boulevard, which is approximately 150 feet downstream.

After connection to the POTW in 2005, six months of effluent testing was performed to make sure that the existing treatment system could be shut down and dismantled. The process of demobilization began, which mandated a modification to the current extraction system and the enhancement of the monitoring point, now located in the existing building. Work orders and construction plans were reviewed in February 2007, construction began in

late March 2007, and was completed in early April 2007.

A third ESD was developed for the site in March 2006. This ESD was developed to change the need for the use of some or all of the treatment requirements established in the SRD and to switch the discharge point of the treated groundwater from Little Black Creek to the Muskegon Waste Water Treatment Plant.

A Second FYR was initiated by the EPA on October 25, 2006, and was completed on July 12, 2007. The Review concluded that the remedy remained protective of human health and the environment in the short term. Long-term protectiveness would not be fully achieved until effective Institutional Controls (ICs) have been implemented and maintained.

In 2008, the analytical data for the sediment samples collected from Little Black Creek were provided to the EPA for review. After the data review was completed, both Agencies decided in late 2008 that the EPA would develop a Risk Assessment to determine if a sediment remedial action (RA) would be required for Little Black Creek. The Ecological Risk Assessment was completed in March 2010 and accepted as final by the EPA in June 2011. The two Agencies agreed that a remedial action to address any sediment contamination will be conducted if there is a notable increase of cadmium contamination or as part of an area-wide Little Black Creek remediation and that the EPA would be responsible for addressing the Peerless Plating Company site portion of the creek.

The Third FYR was initiated by the EPA on October 25, 2011, and was completed on July 12, 2012. The Review concluded that the remedy remained protective of human health and the environment in the short term. Long-term protectiveness would not be fully achieved until effective ICs have been implemented and maintained.

Throughout 2012, the EPA and the MDEQ conducted monthly discussions on how to address the remaining cadmium contamination on both the Peerless Plating Company and Hardware Distributors Incorporated properties. The EPA agreed to undertake, with MDEQ approval, a separate RA to include in-situ soil treatment and installation of a permeable reactive barrier along Little Black Creek to address the remaining cadmium source area contaminated soils.

The ten-year LTRA process under EPA supervision ended on September 30, 2013. On October 1, 2013, Operation and Maintenance (O & M) of the site Pump and Treat remedy became the responsibility of the MDEQ.

Throughout 2013, both Agencies cooperated in development of Restrictive Covenants (RCs) for the site to meet the ICs required in the 2012 FYR. RCs were completed and filed with the Muskegon County Register of Deeds for the Peerless property on February 28, 2013, and the Hardware Distributors Incorporated property on October 18, 2013. Development of RCs for the remaining three properties containing the monitoring well network and the pump house which overlies the groundwater contamination plume continued into 2014.

The ROD Amendment to undertake a focused in-situ soil injection remedy and installation of a permeable reactive barrier along Little Black Creek for the remaining cadmium source soil contamination on both the Peerless and Hardware Distributors Incorporated properties, was signed on August 30, 2013. The MDEQ concurred with the ROD Amendment.

Both Agencies reviewed and approved the Pilot Test Work Plan for the In-Situ Chemical Reduction and Permeable Reaction Barrier for the Peerless Plating site on March 7, 2014. The Basis of Design Report for the In-Situ Chemical Reduction and Permeable Reaction Barrier was completed on March 24, 2014. The Pilot Test was conducted on the Peerless

Plating site from July through September 2014. The test results were very positive and included in the Final In-Situ Chemical Reduction and Permeable Reaction Barrier Pilot Study Report, dated December 12, 2014. Both Agencies agreed to implement the full scale In-Situ Chemical Reduction remedy in July 2015.

Development of additional site RCs continued in 2015. The RC for the Bill's Used Cars property was filed with the Muskegon County Register of Deeds on June 25, 2014. The RC for the Asphalt Paving property was filed on February 12, 2015. Development of the final RC, for the CAPCO property, continues.

RAs at this site are intended to address risks associated with contaminated groundwater discharges to Little Black Creek and to return the aquifer to its beneficial use (i.e., suitable for drinking water use).

The final Basis of Design Report for the In-Situ Chemical Reduction and Permeable Reaction Barrier was approved by both the EPA and the MDEQ on March 31, 2015. The Basis of Design report included shutting down the Pump and Treat (P & T) system, perfoming the actual injections, and collecting at least four years of quarterly groundwater sampling to evaluate the effectiveness of the remedy. Site preparations for the in-situ remedy began in July 2015. The P & T system was shut down on August 4, 2015, and the injections occurred from mid-August to early October. The initial quarterly groundwater sampling event occurred in late October 2015. The MDEQ will continue maintenance of the P & T system during this time since the contingency plan for possible failure of the in-situ remedy will be to re-activate the P & T system.

The fourth FYR report was written by MDEQ with EPA support and began in August 2016. The final report was approved and signed by the EPA on July 12, 2017.

SITE STATUS
The In- Situ Chemicial Reduction and Permeable Reactive Barrier remedy operated throughout 2017. Quarterly groundwater sampling results indicated the new remedy may be working as planned as heavy metal contamination concentrations are gradually reducing, even disappearing in some locations. However, while overall contaminant concentrations are lowering, criteria exceedances were also noted. The quarterly groundwater sampling will continue through 2018.

Based upon review of the nearly two years of quarterly sampling data, the EPA and the MDEQ have tenrtatively agreed to conduct a focused second round of injections underneath the HDI building where the highest concentrations of cadmium contamination is located. This second injection is scheduled for June 2018.

ENFORCEMENT STATUS
The responsible party declared bankruptcy in 1983 and there are no other PRPs. Therefore, no enforcement action is planned.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/21/1992**

The ROD required demolition of the building, removal and off-site disposal of contaminated soils, construction and operation of a groundwater P & T System. The system was designated as operational and functional on September 10, 2003, and will be operated by the EPA until September 10, 2013, at which time the MDEQ will acquire responsibility for the system O & M.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 07/24/1997**

An ESD to allow contaminated soils above cleanup criteria to remain on-site underneath a hardware building to the south and to require deed restrictions to protect on-site workers against exposure to contaminated groundwater until it is remediated.

Record of Decision *Amendment:* 0 *ESD:* 2 **Effective 04/05/2001**

A second ESD was developed for the site in April 2001. This second ESD amended the ROD as follows. Saturated soil at the site contained cadmium at concentrations exceeding the cleanup standard. Because of the difficulties and expense of excavating soil below the water table, contaminated soils which contain constituent concentrations greater than the cleanup levels specified in the 1997 ESD will be excavated approximately to the depth of the water table. Soils southeast of the site and immediately adjacent to Little Black Creek contain cadmium and lead concentrations exceeding the cleanup standards.

Record of Decision *Amendment:* 0 *ESD:* 3 **Effective 03/15/2006**

This ESD was developed to denote a partial change in the method being used to clean up the groundwater contaminants associated with the site. The 1992 ROD called for the use of a groundwater P & T System to address contaminated groundwater. An air stripper was selected to reduce the VOCs detected in the groundwater, followed by the precipitation of organic compounds. The treated groundwater was then discharged into Little Black Creek in compliance with the substantive National Pollution Discharge Elimination System requirements. These limits are contained in an SRD. This ESD changes the potential need for the use of some or all of the treatment requirements and also changes the discharge point from Little Black Creek to the Muskegon Waste Water Treatment Plant.

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 08/30/2013**

The ROD Amendment includes a focused in-situ injection remedy for the remaining cadmium source soils contamination located on both the Peerless and Hardware Distributors Incorporated properties along with installation of a permeable reactive barrier along Little Black Creek.

Response Accomplishments: Completed

Emergency Removal of cyanide and plating wastes in building.

Start Date: 09/01/1983	Primary Cost:	$131,000	Source: Federal
End Date: 10/31/1983	Secondary Cost:	$0	Source:

Remedial Investigation The RI/FS was conducted to determine the extent of heavy metals contamination on the site.

Start Date: 06/01/1989	Primary Cost:	$514,000	Source: Federal
End Date: 09/21/1992	Secondary Cost:	$0	Source:

Interim Response The EPA removal and disposal of liquids and sludges contained in an enclosed aboveground tank.

Start Date: 01/15/1991	Primary Cost:	$49,000	Source: Federal
End Date: 03/13/1991	Secondary Cost:	$0	Source:

Remedial Design The EPA-conducted design activities included the demolition and disposal of the Peerless Plating Company building with additional soil sampling beneath the building.

Start Date: 07/01/1992	Primary Cost:	$893,000	Source: Federal
End Date: 09/30/1996	Secondary Cost:	$0	Source:

Remedial Action Soil excavation in lagoons and the Peerless Plating Company building areas. Construction of groundwater Pump and Treat System. Initial start-up and operation of groundwater treatment system. System determined to be operational and functional on September 10, 2002. Initial SSC between the EPA and the state to provide match was signed July 31, 1996. It was amended September 17, 1996, and again September 28, 2000 to cover cost increases.

Start Date: 07/31/1996	Primary Cost:	$5,864,400	Source: Federal
End Date: 09/10/2002	Secondary Cost:	$651,600	Source: State

5 Year Review The First FYR determined the remedy was protective of human health and the environment in the short term. Long-term protectiveness, however, could not be determined until the groundwater cleanup goals were achieved.

Start Date: 10/01/2001	Primary Cost:	$20,000	Source: Federal
End Date: 09/25/2002	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Long Term Remedial Action

O & M of treatment system for ten years. The SSC was amended September 15, 2005, to provide funding for all ten years of LTRA, and again September 6, 2012, to cover increases in costs. Quarterly groundwater sampling was on-going during the ten-year LTRA.

Start Date:	*09/11/2002*	Primary Cost:	$7,596,624	Source: Federal
End Date:	*09/30/2013*	Secondary Cost:	$844,069	Source: State

Remedial Investigation

Funding was provided by the state to perform investigation of contaminated sediments in Little Black Creek. The MDEQ gathered all of the sediment analytical data and forwarded it to the EPA for review and inclusion in a Risk Assessment report.

Start Date:	*02/02/2005*	Primary Cost:	$100,000	Source: State
End Date:	*10/01/2005*	Secondary Cost:	$0	Source:

5 Year Review

The second FYR concluded the current remedy was protective of human health and the environment in the short term; however, long-term protectiveness could not be determined at that time.

Start Date:	*10/25/2006*	Primary Cost:	$20,000	Source: Federal
End Date:	*07/12/2007*	Secondary Cost:	$0	Source:

5 Year Review

The third FYR was initiated by the EPA on October 25, 2011, and was completed on July 12, 2012. The review concluded that the remedy remained protective of human health and the environment in the short term. Long-term protectiveness would not be fully achieved until effective ICs have been implemented and maintained and the groundwater criteria goals are achieved.

Start Date:	*10/25/2011*	Primary Cost:	$20,000	Source: Federal
End Date:	*07/12/2012*	Secondary Cost:	$0	Source:

Remedial Investigation

Investigate and delineate the remaining cadmium source area contaminated soils on both the Peerless Plating Company and Hardware Distributors Incorporated properties. In March 2012, the EPA conducted a soil RI on the Peerless Plating property to identify residual cadmium and cyanide contamination. Additional soil investigation along the Hardware Distributors Incorporated building north facing and east facing walls was also conducted. Anaytiacal results indicated that high concentrations of cadmium exist up to the building foundation and continues under the building.

Start Date:	*01/01/2012*	Primary Cost:	$0	Source: Federal
End Date:	*06/01/2012*	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review Development of the Fourth FYR report, was written by the MDEQ with EPA support and began development in August 2016. The report was completed, approved by the EPA and was signed on July 12, 2017. The fourth FYR concluded the current remedy was protective of human health and the environment in the short term; however, long-term protectiveness could not be determined at this time.

Start Date: 07/12/2016	Primary Cost:	$20,000	Source:	Federal
End Date: 07/12/2017	Secondary Cost:	$0	Source:	

Response Accomplishments: In Progress

Remedial Action A new cadmium source area remedy consisting of in-situ injection into the contaminated soil with installation of permeable reactive barrier along Little Black Creek began in July 2015 and will operate for up to five years. The Pilot Test of this remedy was conducted on the site from July through September 2014. The State is providing ten percent match for the remedy via the fifth amendment to the SSC signed March 19, 2015. In 2017, both the EPA and the MDEQ agreed that a second focused injection is needed to address the localized high cadmium concentrations under the HDI building. This focused second injection is scheduled for June 2018.

Start Date: 12/15/2014	Primary Cost:	$1,400,000	Source:	Federal
End Date: 01/01/2019	Secondary Cost:	$140,000	Source:	State

Response Accomplishments: Ongoing

Operation and Maintenance The MDEQ took over the O & M of the site P & T System remedy from the EPA on October 1, 2013. It is estimated that at least $15 million will be needed by the State to perform the O & M for 20 years (approximately $750,000 per year). The P & T system was shut down on August 4, 2015, prior to the in-situ injections. The MDEQ will continue maintenance of the P & T system during this time since the contingency plan for possible failure of the in-situ remedy will be to re-activate the P & T system.

Start Date: 10/01/2013	Primary Cost:	$750,000	Source:	State
End Date: 09/30/2033	Secondary Cost:	$0	Source:	

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E01982 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$20,000	$0	$0	$18,743	$17,416

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$18,282	$0	$0	$18,282	$0

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$30,000	$0	$0	$30,000	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$6,795	$0	$0	$6,795	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$433	$0	$0	$433	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$19,810	$0	$0	$19,810	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$12,621	$0	$0	$12,621	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$7,471	$0	$0	$7,471	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995261-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$133,333	$13,333	$0	$133,198	$0

Cooperative Agreement Number V995261-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Action	$11,111	$1,111	$0	$11,089	$0

Cooperative Agreement Number V995259-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Design	$25,000	$0	$0	$25,000	$0

Cooperative Agreement Number V995339-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$6,457	$0	$0	$4,275	$0
Totals:	$291,313	$14,444	$0	$287,716	$17,416

STATE SUPERFUND CONTRACTS

For Operable Unit 00 : Entire Site : Open

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Remedial Action	$16,356,693	$1,635,669	$1,608,568	$0
Totals:	$16,356,693	$1,635,669	$1,608,568	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: SCA Independent Landfill
4010 East Broadway
Muskegon , MI

County: Muskegon
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: 4A
State Site ID#: 61000047
State Site Score: 34

LOCATION
The SCA Independent Landfill (the site) is located in Section 6, Township 9 North, Range 15 West, Sullivan Township, Muskegon County, Michigan. The landfill is located east of Brooks Road between Summit Road and Black Creek. Landfilling was done at the edge of and in the wetlands on the south side of Black Creek. Private homes border the site to the south and west, and wetlands border the landfill to the east and north.

SITE HISTORY
The SCA Independent Landfill was first licensed in 1968 as a sanitary landfill under the Garbage and Refuse Disposal Act, 1965 PA 87, as amended. The landfill accepted municipal solid waste, comprised of residential, commercial, and industrial refuse from Muskegon and Ottawa Counties, as well as foundry sand and fly ash. Waste deposition at the site occurred in three distinct disposal areas, one of which is lined with three feet of clay, and another with a sealant material. The landfill was officially closed in June 1987. The entire waste disposal area has been closed and capped and is being maintained and monitored in accordance with the closure plan.

Groundwater at the site flows northward and discharges to the wetland and to Black Creek. Groundwater contamination was discovered during a 1976 hydrogeologic study. A biological study of the wetlands, conducted by the Michigan Department of Natural Resources (MDNR) in May 1980, documented elevated levels of anaerobic organisms in the immediate area of leachate outbreaks.

The site was placed on the National Priorities List on September 8, 1983, and designated a state-lead site. Waste Management, Inc., the current owner and potentially responsible party (PRP) for the site, executed an Administrative Order by Consent (AOC) with the MDNR in September 1993. In this AOC the PRP agreed to conduct the Remedial Investigation/Feasibility Study (RI/FS) and reimburse the MDNR for past costs associated with this site and for future costs associated with overseeing the RI/FS.

The PRP discovered three underground storage tanks on the site in September 1993, one of which had leaked waste oil. The tanks were removed and disposed of in November 1993, along with 725 cubic yards of contaminated soil. Groundwater was sampled downgradient from the tanks and found to be uncontaminated.

The RI was conducted from November 1993 to December 1995. The RI groundwater monitoring results indicated the presence of ammonia, aluminum, arsenic, iron, manganese, nickel, and benzene in concentrations up to 100 times greater than industrial drinking water criteria on the landfill property. Off-property, no residential wells are impacted; but manganese concentrations exceed the residential criterion by 25 times in monitoring wells just upgradient from residential property.

Groundwater/surface water interface (GSI) criteria for cadmium, unionized ammonia, and manganese have been exceeded in the adjacent wetlands, but not in the downgradient

Black Creek. Site concentrations of manganese exceeded the GSI criterion, but accompanying toxicological testing indicated that the metal was not having a significant adverse effect on surface water endpoints. Very high concentrations of total ammonia were found originating from the landfill. The regulated chemical form of ammonia, unionized ammonia, exceeded the GSI criterion at downgradient monitoring points.

It is unclear which properties to the northwest of the landfill have manganese, ammonia, or total nitrogen (from the landfill) in the groundwater at concentrations which exceed aesthetic and/or health based drinking water criteria. In the fall of 2001, the PRPs implemented a work plan to determine which downgradient parcels have manganese exceedances. Manganese and arsenic impacts were identified from the investigation. Additional work is needed farther downgradient to determine the extent of the manganese and arsenic impact and determine if institutional controls and/or deed restrictions could be put in place to control exposures.

The PRP has pursued interim source control measures to address leachate which has accumulated inside the landfill. These measures were constructed in the summer of 2000 and included improved leachate extraction, landfill cap repairs, and improved stormwater drainage. These improvements are consistent with any foreseeable final remedy for the site. The EPA designated the site as achieving completion of Remedial Action Construction on September 26, 2001.

The MDEQ completed the First Five-Year Review (FYR) in May 2005. The Review concluded that the remedy is expected to be protective of human health and the environment upon completion of all remedial components.

In October 2009, the PRPs voluntarily completed a portion of a proposed supplemental investigation to determine the extent of volatile organic compound (VOC) and metals contamination in the groundwater migrating toward private properties northwest of the landfill. The investigation included five direct push borings to sample the shallow, intermediate, and deep groundwater. Preliminary investigation results indicated that manganese and arsenic were present at concentrations greater than residential drinking water criteria at two of the boring locations. One permanent monitoring well was installed to continue monitoring groundwater contamination toward the adjacent private properties.

At the request of SC Holdings Inc., an agreement to terminate the 1993 AOC was entered between the state and SC Holdings Inc., in August 2013.

In June 2014, MDEQ staff along with wetland experts from Central Michigan University conducted wetland assessment at the SCA Site and issued a preliminary assessment that nutrient concentrations are not abnormally high in the wetlands and that the wetlands are a strongly groundwater fed sysytem.

SITE STATUS

The PRPs have continued voluntary operation and maintenance (O & M) of the site. O & M activities include collection, storage, and disposal of leachate from the landfill, annual landfill cap and storm water conveyance structure inspection, and long-term groundwater and surface water monitoring with state oversight.

At the request of SC Holdings Inc., an agreement to terminate the 1993 AOC was entered between the state and SC Holdings Inc., in August 2013. SCA Holdings has since been providing to the MDEQ written Annual Progress Reports including description of the O & M work performed at the Site during the previous twelve months. MDEQ has received and reviewed four such Reports since the termination of the 1993 AOC.

ENFORCEMENT STATUS
The site is a state-lead enforcement site. The PRPs will continue O & M activities at this site. O & M activities include collection, storage, and disposal of leachate from the landfill, annual landfill cap and storm water conveyance structure inspection, and long-term groundwater and surface water monitoring with state oversight.

At the request of SC Holdings Inc., an agreement to terminate the 1993 AOC was entered between the state and SC Holdings Inc., in August 2013.

The EPA is kept apprised of site activities and schedule.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Negotiations RI/FS negotiations.

Start Date: *03/25/1993*	Primary Cost:	$0	Source:
End Date: *10/20/1993*	Secondary Cost:	$0	Source:

Remedial Investigation

Start Date: *10/20/1993*	Primary Cost:	$3,000,000	Source: Private
End Date: *12/31/2001*	Secondary Cost:	$0	Source:

Interim Response The interim response consisted of landfill cap repairs, leachate extraction, and runoff water control.

Start Date: *05/01/2000*	Primary Cost:	$2,000,000	Source: Private
End Date: *06/01/2001*	Secondary Cost:	$0	Source:

5 Year Review The MDEQ conducted the First FYR, concluding that the remedy is expected to be protective of human health and the environment upon completion of all remedial components. No more FYRs are expected for this Site.

Start Date: *10/01/2004*	Primary Cost:	$0	Source: State
End Date: *05/13/2005*	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Investigation

In October 2009, the PRPs voluntarily completed a portion of a proposed supplemental investigation to determine the extent of VOC and metals contamination in the groundwater migrating toward private properties northwest of the landfill. The investigation included five direct push borings to sample the shallow, intermediate, and deep groundwater. Preliminary investigation results indicated that manganese and arsenic were present at concentrations greater than residential drinking water criteria at up to two of the boring locations.

Start Date: 10/19/2009	Primary Cost:	$0	Source:
End Date: 05/26/2010	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance

O & M activities include collection, storage, and disposal of leachate from the landfill, annual landfill cap and storm water conveyance structure inspection, and long-term groundwater and surface water monitoring with state oversight.

Start Date: 12/01/2001	Primary Cost:	$1,500,000	Source: Private
End Date: 12/01/2031	Secondary Cost:	$100,000	Source: State

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995340-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$33,244	$0	$0	$33,150	$0
Totals:	$33,244	$0	$0	$33,150	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Thermo-Chem, Inc
4331 Evanston Road
Muskegon , MI

County: Muskegon
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: W1
State Site ID#: 61000056
State Site Score: 34

LOCATION
The Thermo-Chem, Inc. property covers approximately 8 acres in Egelston Township on the south side of Evanston Road. The area surrounding the site is semi-rural and includes residential areas, light manufacturing and commercial buildings, and undeveloped woodlands. Black Creek, which flows into Mona Lake, is located about 1,200 feet south of the site. There are two other Superfund sites within two miles of Thermo-Chem, Inc. (Bofors Nobel, Inc. to the east, and SCA Independent Landfill to the south). The Sun Chemical Company is located approximately 3/4 of a mile east of the site. A portion of the site has reverted to state ownership due to non-payment of taxes.

SITE HISTORY
Thermo-Chem, Inc. was involved in solvent reprocessing and liquid waste disposal. The Thomas Solvent Company was located adjacent to Thermo-Chem, Inc. and is the parent company of Thermo-Chem, Inc. The Thermo-Chem, Inc. solvent reclaiming operation was closed in 1980. The facility had received paint wastes, antifreeze liquids, and solvents such as trichloroethylene (TCE) and methylene chloride for reclaiming. Waste sludges and residues were incinerated on-site, and wastewater was discharged to a clay-lined lagoon and two seepage lagoons. The Thomas Solvent Company sold both reprocessed and virgin solvents. The site includes both the Thermo-Chem, Inc. and the Thomas Solvent Company properties and the area of the groundwater contaminant plume, which flows south to Black Creek.

Groundwater and soil contamination has resulted from discharges of process wastes to the seepage lagoons and from poor waste and solvent handling practices. Groundwater and on-property soil are contaminated with volatile organic compounds including TCE, tetrachloroethylene, toluene, and benzene. Contaminated groundwater flows south from the property toward Black Creek. No residential wells have been impacted by the site. There is a potential that contamination could reach Black Creek and Mona Lake. Contaminants in the groundwater have been detected at levels up to 30,000 times the unrestricted residential criteria. The contaminated groundwater poses unacceptable risks to potential future residents if used for drinking water. Also, the contaminated groundwater poses a potentially severe environmental threat to Black Creek.

The site was placed on the National Priorities List in June 1986. The EPA removed chemicals in the laboratory building and sampled surface soils as an emergency response in August 1988.

The Remedial Investigation/Feasibility Study (RI/FS) was privately financed by a group of 72 private parties. The EPA issued a Record of Decision (ROD) on September 30, 1991. The ROD specifies extraction and treatment of contaminated groundwater with discharge of treated groundwater to Black Creek; excavation and off-site incineration of "hotspot" soil; and in-place treatment of the rest of the soil by soil vapor extraction (SVE). The remedy specified in the ROD only deals with on-property soil and contaminated groundwater up to its discharge point to Black Creek. The EPA delayed selecting a remedy for Black Creek,

and groundwater south of Black Creek until more information was collected.

A settlement was not initially reached between the EPA and the private parties for implementation of the Remedial Design (RD). The EPA then proceeded with a federally-funded RD. The Phase I soil removal design was completed by the EPA. Subsequently, the potentially responsible parties (PRPs) agreed to comply with a Unilateral Administrative Order (Order) and the PRPs finished the design for Phase II, groundwater extraction and treatment, and Phase III, soil treatment by SVE.

The PRPs began work on the Phase I Remedial Action (RA) in September 1995. Building demolition was completed in the spring of 1996. The soil removal portion of the remedy was completed in 1998. Construction of the groundwater treatment system and the soil treatment system began in September 1997 and was completed in 1998. The soil treatment system became operational in 1998. The groundwater treatment system has been operational since March 1999.

In September 2002, the EPA issued an Explanation of Significant Differences (ESD) to modify the original ROD which identified two Operable Units (OUs). This ESD combines the requirements for Black Creek and areas south of Black Creek with the requirements for areas north of Black Creek into one. It was deemed unnecessary by the EPA to maintain two OU designations at the Thermo-Chem Site. The ESD essentially concluded that the specified actions in the original ROD should be protective of the creek; however, it specified that an expanded monitoring program was necessary and upgrades to the groundwater pump and treat system may be necessary if complete capture of the contaminant plume is not demonstrated.

Pursuant to the 2002 ESD, a modeling evaluation was conducted by the EPA and MDEQ staff in 2003 to determine whether the existing extraction well system at the site is sufficient to hydraulically capture the contaminant plume going towards the Black Creek. The evaluation concluded that plume capture is not being attained at the extraction well-line. The pumping rate was subsequently increased to better achieve capture. An extraction well maintenance program has been put in place to maintain higher pumping rates.

A natural attenuation enhancement pilot study was conducted at the Thermo-Chem site. The pilot was initiated in August 2003 and began operating in September 2003. Biweekly sulfate and nitrate injections began in early September and were completed by mid-December 2004. The pilot study achieved increases in the decay rates for toluene, ethylbenzene, and Xylene, but not benzene. The relatively short treatment time for benzene, as a function of groundwater travel time within the pilot study, was likely a factor. Consequently, the pilot was concluded.

The First Five-Year Review (FYR) for the Thermo-Chem site was completed and signed on May 10, 2005. The review concluded that the remedy currently in place is protective of human health and the environment, and in order for the remedy to be protective in the long-term, groundwater must be restored to cleanup standards.

In August 2010, the PRPs submitted to the Agencies an "Enhanced Dechlorination Work Plan" for review and approval. The hope is to implement actions to enhance the natural degradation of contamination to expedite the cleanup of contaminated groundwater. The Work Plan was reviewed by the MDEQ internal review team and approved in September 2010 with certain conditions.

The PRP contractors finalized the combined Phase lll enhanced reductive dechlorination activities at the Thermo-Chem site in 2012. Testing of air sparge lines and all underground

service and piping is completed. The building slab, expansion joints, building structure and system control panels are in place. The tank was installed by February 2012. The first injection of 2% molasses to the system occurred in 2012. Four injection events (including Phases I and II of the Second Injection Event) were completed at the Site between August 2012 and December 2013. The fifth and sixth injection events were completed in 2014. The seventh injection event started in December 2014. Reports of the enhanced reductive chlorination process are being provided to the Agencies on an on-going basis. Decreasing concentrations of TCE and dichloroethylene (DCE) along with increasing concentrations of Vinyl Chloride and ethene at the performance monitoring wells indicate that enhanced reductive dechlorination is occurring.

The Third FYR Report was signed on May 8, 2015. The report concluded that the remedy currently in place is protective of human health and the environment but in order for the remedy to be protective in the long term, groundwater must be restored to cleanup levels.

On September 3, 2016, MDEQ Office of Waste Management and Radiological Protection performed an inspection and found the Site to be in compliance with the requirements of Part 111, Hazardous Wste Management, and Part 121, Liquid Industrial Waste, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA) and Subtitle D of Resource Conservation and Recovery Act, 1976 PL 94-580, as amended (RCRA).

SITE STATUS
The groundwater extraction and treatment system continues to operate. Site-wide groundwater monitoring is conducted annually.

In November 2017, the PRP consultants conducted annual air sampling, enhanced reductive dechlorination sampling, annual groundwater sampling and granular activated carbon change out. The tenth enhanced reductive dechlorination injection took place from February 1 to February 6, 2017.

The 2016 Annual Summary, Deep Well and Residential Well Sampling Reports were submitted by the PRPs and MDEQ staff provided written comments.

The Site participated in the 2017 Discharge Monitoring Report Quality Assurance Study 37 (DMR-QA-Study 37). Thermo Chem was selected because of its National Pollution Discharge Elimination System (NPDES) equivalent permit.

Currently, MDEQ staff is reviewing the DRAFT Declaration of Restrictive Covenant for this Site prepared by the EPA and the PRP.

ENFORCEMENT STATUS
The Thermo-Chem, Inc. PRP group is conducting the RA under an Order issued by the EPA.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNITS

01	Soil and Groundwater North of Black Creek
02	Groundwater South of Black Creek

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The EPA signed the First FYR report in May 2005. The report concluded that the remedy currently in place is protective of human health and the environment but in order for the remedy to be protective in the long term, groundwater must be restored to cleanup standards.

Start Date: 11/17/2004 Primary Cost: $0 Source:
End Date: 05/10/2005 Secondary Cost: $0 Source:

5 Year Review The Second FYR was completed and signed on May 5, 2010. The report concluded that the remedy currently in place is protective of human health and the environment but in order for the remedy to be protective in the long term, groundwater must be restored to cleanup levels.

Start Date: 10/01/2009 Primary Cost: $0 Source:
End Date: 05/05/2010 Secondary Cost: $0 Source:

5 Year Review The third FYR was completed in April, 2015. MDEQ staff identified several issues that needed to be included in the FYR in a letter written to EPA in June 2014. The FYR Report was signed on May 8, 2015.

Start Date: 10/28/2014 Primary Cost: $0 Source:
End Date: 05/08/2015 Secondary Cost: $0 Source:

Response Accomplishments: Future Need

5 Year Review The next FYR is projected to be completed in May 2020.

Start Date: 10/01/2019 Primary Cost: $0 Source:
End Date: 05/05/2020 Secondary Cost: $0 Source:

OPERABLE UNIT 01: Soil and Groundwater North of Black Creek

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 09/30/1991**

The 1991 ROD called for extraction and treatment of groundwater and off-site incineration of "hot spot" soils and in-place treatment of remaining contaminated soils. This ROD does not prescribe a remedy for the OU area south of the Black Creek and the floodplain.

OPERABLE UNIT 01: Soil and Groundwater North of Black Creek

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 1 **Effective 09/17/2002**

On September 17, 2002, the EPA issued an ESD to modify the original 1991 ROD which identified two OUs. This ESD combines the requirements of soil and groundwater north of Black Creek and groundwater south of Black Creek into one. It was deemed unnecessary by the EPA to maintain two OU designations at the site. The ESD specified that an expanded monitoring program was necessary and upgrades to the groundwater pump and treat system may be necessary if complete capture of the contaminant plume is not demonstrated.

Response Accomplishments: Completed

Remedial Investigation The RI/FS was conducted by a group of PRPs.

Start Date: 09/30/1987	Primary Cost:	$1,200,000	Source:	Private
End Date: 09/30/1991	Secondary Cost:	$0	Source:	

Interim Response The EPA removed laboratory chemicals.

Start Date: 09/30/1988	Primary Cost:	$50,000	Source:	Federal
End Date: 12/30/1988	Secondary Cost:	$0	Source:	

Interim Response The EPA removed buried tanks at the Thomas Solvent property.

Start Date: 04/30/1991	Primary Cost:	$150,000	Source:	Federal
End Date: 09/30/1991	Secondary Cost:	$0	Source:	

Remedial Design The RD was initiated by the EPA after the PRP group refused to comply with the Order. The EPA finished the Phase I design and started the Phase ll design. The PRP group then agreed to comply with the Order and subsequently finished the Phase II design and completed the Phase lll design.

Start Date: 10/30/1994	Primary Cost:	$2,517,000	Source:	Federal
End Date: 07/30/1997	Secondary Cost:	$0	Source:	Private

Remedial Action The primary estimated cost indicated is for implementation of Phases II and III of the design (groundwater extraction and treatment and SVE system installation, respectively) per the ROD.

Start Date: 09/30/1995	Primary Cost:	$8,020,000	Source:	Private
End Date: 12/30/1999	Secondary Cost:	$435,000	Source:	Federal

OPERABLE UNIT 01: Soil and Groundwater North of Black Creek

Response Accomplishments: Ongoing

Operation and Maintenance

Treatment and extraction of the groundwater at this site will perhaps continue for 30 years from the start of the pump and treat system (June1999). The cost estimate is based on the ROD annual Operation and Maintenance of $1,091,000 with a total expected cost of $32,730,000. This cost estimate does not include the SVE/Air Sparge operations.

Start Date: 06/30/1999	Primary Cost:	$1,091,000	Source:	Private
End Date: 06/30/2029	Secondary Cost:	$0	Source:	

OPERABLE UNIT 02: Groundwater South of Black Creek

Response Accomplishments: Completed

Remedial Investigation

The western extent of the plume has been delineated. An ESD to modify the original ROD was signed in September 2002. This ESD combined the soil and groundwater north of Black Creek with the groundwater south of Black Creek into one OU.

Start Date: 06/30/1999	Primary Cost:	$700,000	Source:	Private
End Date: 12/30/2002	Secondary Cost:	$0	Source:	

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$3,177	$0	$3,177	$3,177	$3,177

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$19,211	$0	$0	$19,211	$4,151

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$17,773	$0	$0	$17,773	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$58,628	$0	$0	$58,343	$0

Cooperative Agreement Number V995258-03 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$17,662	$0	$0	$17,662	$0

Cooperative Agreement Number V995259-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$1,984	$0	$0	$1,983	$0

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$35,000	$0	$0	$22,338	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$31,094	$0	$0	$31,094	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$30,818	$0	$0	$30,818	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$30,484	$0	$0	$30,484	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$30,000	$0	$0	$11,110	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$175,000	$0	$0	$174,761	$0

Cooperative Agreement Number V995259-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Design	$80,108	$0	$0	$80,108	$0
Totals:	$530,940	$0	$3,177	$498,862	$7,328

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Hi-Mill Manufacturing Co.
1704 Highland Road
Highland , MI

County: Oakland
MDEQ District Location: Southeast MI
Managed By: RRD-Superfund

Federal Site Code: 9Q
State Site ID#: 63000025
State Site Score: 41

LOCATION
The Hi-Mill Manufacturing Company occupies approximately 4.5 acres and is located on the south side of M-59 in Oakland County, 15 miles west of the city of Pontiac, and 1.5 miles east of the town of Highland. The Highland State Recreation Area, except for the M-59 boundary, surrounds the facility. The recreation area immediately adjacent to the Hi-Mill Manufacturing Company contains a 10-acre wetland. No municipal water supply is available in the area.

SITE HISTORY
Beginning in 1945, the Hi-Mill Manufacturing Company fabricated copper, aluminum, and brass tubing parts and fittings. Operations included cutting, machining, forming, shaping, and soldering raw tubing and fabricated tubing components. Former activities also included associated activities of nitric and sulfuric acid cleaning and pickling, chromic acid washing, and degreasing. Trichloroethylene (TCE) was used in the degreasing process for many years.

Until 1981, the process wastewater from these operations was discharged to two, unlined lagoons. In 1981, a wastewater recycling system became operational and the company discontinued discharging to the lagoons. For a brief period of time afterwards, in an effort to dewater the lagoons, the Hi-Mill Manufacturing Company spray evaporated the water remaining in the lagoons into the air via roof-mounted sprayers. The lagoons were excavated, the sludge was disposed of, and the lagoons backfilled in November and December 1983. During the time they were in use, the lagoons often overflowed directly into the adjacent wetland in the Highland State Recreation Area and contaminated the wetland water and sediments.

Sometime in the late 1970s, an underground delivery pipe from a former TCE storage tank ruptured and an estimated 250 gallons of TCE were lost to the environment. The contamination of groundwater by TCE and its breakdown products was first discovered in 1988, when water samples collected by the Oakland County Health Department from the Hi-Mill Manufacturing Company's production water wells revealed the presence of TCE and cis-1,2-dichloroethene.

The remedial investigation (RI) and feasibility study (FS) reports were finalized in 1993. The Record of Decision (ROD) was signed in September 1993 and called for no-action with monitoring. The state of Michigan did not concur with the ROD because the risk assessment did not consider significant analytical data collected during the RI which revealed contamination had migrated off-plant property at concentrations in excess of cleanup criteria under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. In addition, the EPA relied upon deed restrictions at the Hi-Mill Manufacturing Company property as a demonstration of protectiveness in spite of the fact that contamination was detected off the Hi-Mill Manufacturing Company's property, and no similar off-site restrictions were pursued.

The first statutory Five-Year Review (FYR) for this site was completed August 25, 2000.

During the period from August 2000 through March 2001, Conestoga-Rovers & Associates conducted four groundwater-source oxidation treatment events. Each event consisted of injecting potassium permanganate solution, as the oxidizer, into the subsurface environment at various locations. A detailed report on the treatment program's results was received August 19, 2003. Unfortunately, the report concluded that no change in concentration was observed for TCE before, during, or after the treatment period.

During 2005, the EPA authored the Second FYR with the MDEQ's review, to evaluate the implementation and performance of the remedy in order to determine if the remedy is or will be protective of human health and the environment. The FYR report concluded: The lack of institutional controls (ICs) off-site allows potential direct contact for workers that might be excavating soil in the median of M-59 where Hi-Mill's plume has migrated; due to installation of community wells close enough to Hi-Mill, conduct an assessment of whether these wells could be impacted by contaminated groundwater from the Hi-Mill property; and evaluate if the no-action remedy, as selected by the ROD, needs to be amended.

The EPA and the MDEQ began following up on the 2005 FYR issues in 2006. First, the EPA required that two municipal water sources be tested that are in close proximity to assure that Hi-Mill contaminants had not extended into the water supply. In a letter dated August 7, 2006, the EPA advised the Oakland County Drain Commissioner that the sampling conducted had not found concentrations that exceeded the reporting limits or anything as a cause for concern. In late November 2006, the EPA advised Hi-Mill of response actions that are being requested, including the replacement of some existing monitor wells and the installation of additional monitor wells. Monitor well installations began February 2008 and were completed between June 9 to June 12. Since installation, monitoring at the three newly installed wells, in addition to the installation of one replacement well, has not found evidence of contaminant concentrations at levels of concern in the M-59 median.

The MDEQ and EPA staff conducted an annual inspection of the site in 2010. The Third FYR was completed in 2010. The conclusions of the FYR were that the no-action remedy is currently protective of human health and the environment in the short term. It also concluded: TCE concentrations, both on-site and off-site, have increased since the time of the RI. In addition, the presence of a dense non-aqueous phase liquid in an on-site monitoring well has been confirmed. The combination of these two factors could impact the assumptions in the site's original risk assessment; potential dermal contact by off-site construction workers who may be involved in excavation work along Highway M-59 was not considered during the original risk assessment and is not being addressed by current ICs; two additional community water supply wells have been put into use near the site since the time the ROD was written. The addition of these wells, which have the potential to draw groundwater contaminated by the Hi-Mill site toward them, indicates that the ingestion of site groundwater is more likely than it was at the time the ROD was signed. Additional groundwater monitoring is being conducted to provide continued assurance that the Hi-Mill groundwater contamination plume has had no impact to the wellhead protection area estimated for two of the new community wells; and lastly, a third exposure pathway that was not evaluated in the original risk assessment is the vapor intrusion pathway. In May 2005, Conestoga-Rovers & Associates conducted air sampling at the Hi-Mill Manufacturing facility to assess potential employee exposures to TCE and vinyl chloride, and to determine the facility's compliance with permissible exposure limits for TCE and vinyl chloride established by the Michigan Occupational Safety and Health Administration. Results indicated vinyl chloride was below the detection limit at all of the sampling locations, but there were detections of TCE at 7 of the 11 indoor sampling locations. None of the air samples collected for TCE and vinyl chloride were above their respective permissible exposure limits.

The Agencies need to determine whether any additional follow-up activities are needed to address the vapor intrusion pathway.

The MDEQ was advised that the facility owner passed away. Site inspections in 2012 suggested operations had ceased.

As a result of the death of the remaining site property owner and subsequent unpaid taxes, the property was sold at a county tax foreclosure sale in October 2013. The new property owner completed a baseline environmental assessment to document current site conditions which was submitted to the MDEQ's Southeast Michigan District Office for review.

The EPA completed the Fourth FYR in September 2015. The EPA is evaluating whether any remaining assets exist to address remaining obligations at the site. Since required environmental groundwater sampling at the site is not occurring, the EPA is evaluating a sampling regimen and source removal while working with the new property owner to assess future remedial options at the site.

SITE STATUS
The EPA did not complete any site actions during the fiscal year, reporting period (October 2016-October 2017).

ENFORCEMENT STATUS
None.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/28/1993**

This is a no-action ROD with long-term groundwater monitoring. The MDEQ did not concur with the ROD.

Response Accomplishments: Completed

Remedial Investigation

The potentially responsible party (PRP) funded the RI/FS with federal lead and state support. The EPA retained services of an oversight contractor who also reviewed the Human Health Risk Assessment and the Ecological Risk Assessment.

Start Date: 10/15/1988	Primary Cost:	$0	Source: Private
End Date: 06/15/1993	Secondary Cost:	$234,000	Source: Federal

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Design

Start Date: 03/15/1994	Primary Cost:	$0	Source: Private
End Date: 09/30/1995	Secondary Cost:	$71,000	Source: Federal

5 Year Review The EPA determined that the No-Action With Monitoring and Deed Restriction remedy was protective.

Start Date: 01/01/2000	Primary Cost:	$0	Source: Federal
End Date: 08/25/2000	Secondary Cost:	$0	Source:

Remedial Action The PRP is voluntarily implementing a groundwater treatment effort of oxidation of chlorinated solvents using potassium permanganate injection.

Start Date: 08/15/2000	Primary Cost:	$0	Source: Private
End Date: 01/31/2001	Secondary Cost:	$0	Source: Federal

5 Year Review Findings: lack of ICs off-site raises potential direct contact issue for workers that might be excavating soil in the median of M-59 where Hi-Mill's plume has migrated; assess community wells close enough to Hi-Mill on whether these wells could be impacted by contaminated groundwater from the Hi-Mill property; ascertain if free product on Hi-Mill property requires that the no-action remedy, as selected by the ROD, be re-evaluated.

Start Date: 01/31/2005	Primary Cost:	$0	Source: Federal
End Date: 08/25/2005	Secondary Cost:	$0	Source:

Remedial Investigation The EPA sent correspondence dated November 29, 2006, requesting a work plan to accomplish additional investigatory goals, in large part, to confirm whether the no-action with monitoring ROD is appropriate given increasing concentrations in well SW-1. New wells were added to the site's overall monitoring program.

Start Date: 02/18/2008	Primary Cost:	$0	Source: Private
End Date: 06/12/2008	Secondary Cost:	$0	Source:

5 Year Review The conclusions of the FYR were that the no-action remedy is currently protective of human health and the environment in the short term.

Start Date: 01/25/2010	Primary Cost:	$0	Source: Federal
End Date: 09/27/2010	Secondary Cost:	$0	Source:

5 Year Review The Fourth FYR was completed in September 2015 and was determined protective of human health and the environment in the short term.

Start Date: 07/26/2014	Primary Cost:	$0	Source:
End Date: 09/14/2015	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Ongoing

Operation and Maintenance

Years ago, six shallow wells and two intermediate wells were installed to augment the RI monitoring wells for the long-term monitoring. Vertical aquifer sampling was employed to aid in well screen placement. In addition, the property owners placed a deed restriction on the plant property to restrict groundwater use. Long-term monitoring of groundwater is ongoing. The PRP's voluntary treatment did not alter the TCE contamination at the site. In response to the EPA requesting more investigation, the PRPs initiated that work in February 2008. Results of this investigation may impact the current monitoring program for the site.

Start Date: 10/01/1995	Primary Cost:	$0	Source: Private
End Date: 01/01/2025	Secondary Cost:	$62,000	Source: Federal

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$6,244	$0	$0	$6,244	$0

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$95,000	$0	$0	$95,000	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$5,370	$0	$0	$5,370	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$405	$0	$0	$404	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$9,172	$0	$0	$9,172	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$44	$0	$0	$44	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$2,998	$0	$0	$2,998	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$93	$0	$0	$93	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$45,000	$0	$0	$36,781	$0
Totals:	$164,326	$0	$0	$156,106	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: J & L Landfill
Hamlin Road
Rochester Hills , MI

County: Oakland
MDEQ District Location: Southeast MI
Managed By: RRD-Superfund

Federal Site Code: 2P
State Site ID#: 63000007
State Site Score: 29

LOCATION
The Jones & Laughlin (J & L) Landfill is a 16.7-acre landfill located near the northwest corner of Hamlin and Dequindre Roads in Rochester Hills, Michigan. It is surrounded on three sides by landfills and has at least seven other landfills within a one-mile radius. Residential areas exist adjacent to and within 1,000 feet of the site. There are drainage ditches in close proximity to the site that drain into the Clinton River, which is located approximately one-mile downgradient.

SITE HISTORY
After being mined for sand and gravel, it is believed that the site was operated as a landfill as early as 1951. Starting in 1957, slag from Jones & Laughlin Steel Company's steel manufacturing facility in Warren was disposed of at this landfill. During 1967 or 1968, baghouse dust filters were installed for the electric arc furnace dust at the steel facility in Warren. The dust collected in these air pollution control devices was disposed of along with the slag. This dust is a listed waste under the Resource Conservation and Recovery Act, 1976 PA 94-580, as amended (RCRA).

Few records exist for waste disposal at the site prior to 1972. A rough estimate has been made that, between 1968 and 1980, 25,140 cubic yards of electric arc furnace dust and 224,590 cubic yards of slag were disposed of at the site. The buried waste is believed to be up to 25 feet deep with some of the waste located in the groundwater. Metals contained in the electric arc furnace dust include chromium oxide, manganese oxide, nickel oxide, and zinc. These metals potentially pose an environmental and public health hazard.

The EPA completed a remedial investigation (RI) in 1991. Based on these findings, the EPA issued a Record of Decision (ROD) in 1994 requiring the installation of the technical equivalent of a hazardous waste landfill cap on the site. The intent of the cap is to minimize infiltration of precipitation into the landfill and to eliminate risks associated with direct contact with landfill materials.

The findings of the RI and additional 1994 and 1995 groundwater sampling events indicated that the following compounds were leaving the property in groundwater at concentrations exceeding Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), generic residential drinking water standards: benzene, methylene chloride, pentachlorophenol, aluminum, arsenic, iron, manganese, lead, sodium, and barium. Because approximately 1,500 people within three miles of the site depend on shallow private wells as a source of drinking water, there is a public health threat.

LTV Steel, the owner of the property, in response to a Unilateral Administrative Order issued by the EPA, completed construction of the technical equivalent of a hazardous waste landfill cap by the end of 1997. LTV Steel monitored the landfill cap and performed groundwater monitoring as part of the landfill cap operation and maintenance (O & M).

The EPA issued a Focused Feasibility Study and ROD on September 30, 1997, to address the groundwater portion of the site. The ROD for groundwater calls for limited groundwater and residential well monitoring as well as a contingency for an alternate water supply if the EPA determines that downgradient wells indicate that there is an unacceptable risk due to contamination from the J & L Landfill site. The MDEQ did not concur with the remedy because it did not meet state environmental laws and cleanup standards and lacked adequate action levels and contingencies. Contrary to the state's position, the EPA determined that the Michigan Hazardous Waste Management Act (Act 64; now known as Part 111, Hazardous Waste Management, of the NREPA) was not an Applicable or Relevant and Appropriate Requirement.

LTV Steel developed a groundwater monitoring plan. In lieu of implementing the groundwater monitoring plan, LTV Steel elected to develop an alternate water supply plan to identify and connect nearby residential wells downgradient to municipal water to eliminate potential exposure to contaminated groundwater. LTV Steel also conducted a survey to identify the location of private water wells downgradient of the site. This information was used to offer replacement of private water wells with a connection to the municipal water supply and to properly abandon nearby unused residential wells in August 2002.

In September 2001, the EPA completed a Five-Year Review (FYR) of the landfill cap remedy, determined that the remedy is protective, and required the following actions: continued monitoring of the landfill cap, institutional controls (ICs), completion of the alternate water supply plan, and implementation of a deed restriction for site land use and associated contaminated groundwater.

A deed restriction was drafted for the adjacent downgradient properties in early 2003. LTV Steel declared bankruptcy at some point during this time. The execution of the documents became the EPA's responsibility due to the bankruptcy. Because surrounding residents had been connected to a municipal water supply, and because the old residential wells had been properly abandoned, the EPA determined that deed restrictions on properties impacted by the landfill's plume were no longer necessary.

The EPA and LTV Steel reached a settlement based on the bankruptcy filing wherein funding was established to continue the monitoring at the site. The state and the EPA agreed to enter into a cooperative agreement that obligates the MDEQ to conduct yearly monitoring and maintenance of the site.

In 2010, due to the ongoing shifting of the landfill gas vents, the MDEQ conducted a limited methane investigation at the southern/residential boundary of the site, to determine whether or not the landfill is venting properly. The investigation found methane in the soils in excess of recommendations found in the RCRA and above standards cited in Michigan’s Part 115, Solid Waste Management, of the NREPA. The MDEQ recommended that the extent of the off-site methane be evaluated and monitored, and steps taken to make sure that no receptors were impacted.

A FYR was signed on June 1, 2011. It determined that the remedy remained protective for both the groundwater and landfill cap operable units. The Five-Year Review also noted the need for updated ICs and the need for gas vent and monitoring well system maintenance.

MDEQ staff used site funding to purchase turbine tops for the vents and replaced most of the snorkel-type tops in December 2011 and early 2012. A proposal with anticipated cost ramifications for repairing well casings, repairing and replacing wells, additional methane investigation, and to continue routine annual O & M activities, was addressed through a grant application for the EPA’s review and approval. This proposal was submitted to the EPA in early 2013.

A new cooperative agreement was finalized and signed in May 2013 which will continue through 2016. Improvements to the landfill cap included a new access road that was constructed in September 2013. Also in 2013, MDEQ staff initiated talks with the EPA to complete required Restrictive Covenant (RC) documents for the site. A site survey that was necessary for the RC was completed in December 2013.

A well replacement for monitor well MW-3D was completed in August 2014 by MDEQ field services. Annual groundwater sampling was completed in September 2014 and an annual report that included the results of this sampling event was sent to the EPA in December 2014.

A well abandonment for monitoring well GW-01S was completed in July 2015 by MDEQ field services. Annual groundwater sampling was completed in September 2015 and an annual report that included the results of this sampling event was sent to the EPA in early 2016. The RC was completed in late spring of 2015 and the permanent marker was set near the entrance of the site.

The annual groundwater sampling was completed in August 2016 and an annual report that included the results of this sampling event was sent to the EPA in January 2017. Sampling ports for methane sampling were installed on all landfill vents and maintenance on groundwater wells GW-06 and MW-07 was completed in September 2016 by MDEQ field services. The fifth FYR was completed and signed by EPA on May 20, 2016. The protectiveness statement determined that the remedy is still protective in both the landfill cap and groundwater operable units in the short-term. To ensure long-term protectiveness, additional methatne monitoring and evaluation of off-site source contamination migration at the western site boundary need to be completed. Continued maintenance and monitoring of the site remedy components, ICs and groundwater are also needed to ensure protectiveness of human health and the environment.

SITE STATUS

Ongoing maintenance and monitoring of the site continued in 2017. Upgrades on the methane vents were completed and frequent sampling of these vents were scheduled throughout the year. The annual groundwater sampling event was completed in August 2017 and the results will be included in the annual report that is scheduled to be completed by December 2017. There were no other issues to report during frequent site visits to inspect the cap and fencing surrounding the site.

ENFORCEMENT STATUS

The potentially responsible party (PRP), LTV Steel, performed work for the landfill cap and groundwater pursuant to an Order issued by the EPA. LTV Steel is liable under the Comprehensive Environmental Response, Compenstation, and Liability Act, 1980 PL 96-510, as amended, and may also be liable under the NREPA. On January 9, 2001, LTV Steel filed Chapter 11 under the bankruptcy code, but settled with the EPA to assure funding for continued maintenance activities and groundwater monitoring.

The J & L Landfill property reverted to Oakland County ownership through the tax reversion process. The state of Michigan requested, and Oakland County did, transfer of the parcels to the Michigan Land Bank Fast-Track Authority. The property is not available for sale given the contamination conditions.

SPECIAL CONSIDERATIONS

None.

OPERABLE UNITS

00	Entire Site
01	Landfill Cap
02	Groundwater

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Investigation

Site-wide sampling including: waste borings and soil, sediment, surface water, and groundwater samples. The RI Report was completed December 31, 1990. A Feasibility Study and proposed Remedial Action Plan followed.

Start Date: 04/05/1989 Primary Cost: $803,000 Source: Federal
End Date: 06/30/1994 Secondary Cost: $0 Source:

5 Year Review

The EPA completed a FYR of the landfill cap remedy wherein they determined the remedy to still be protective and recommended the following actions: continued O & M and monitoring of the landfill cap, continued ICs and completion of the alternate water supply plan, implementing a deed restriction for site land use and associated contaminated groundwater.

Start Date: 09/01/2001 Primary Cost: $0 Source: Federal
End Date: 09/28/2001 Secondary Cost: $0 Source:

Operation and Maintenance

Conduct long-term monitoring of on-site groundwater and O & M of the landfill. The PRP filed for bankruptcy and will not continue these activities. They settled with the EPA monetarily to cover costs of O & M and long-term monitoring of groundwater.

Start Date: 01/01/2002 Primary Cost: $460,000 Source: Federal
End Date: 01/25/2003 Secondary Cost: $0 Source:

5 Year Review

Second FYR conducted by the EPA concluded that the remedy was still protective.

Start Date: 01/01/2005 Primary Cost: $0 Source: <None>
End Date: 08/23/2006 Secondary Cost: $0 Source:

5 Year Review

The FYR protectiveness statement determined that the remedy is still protective in both the landfill cap and groundwater Operable Units.

Implementation of ICs is necessary. Also, the landfill gas vents and some ballards and monitoring wells are in need of maintenance work.

Start Date: 11/01/2010 Primary Cost: $0 Source:
End Date: 06/01/2011 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The fourth FYR was completed and signed by EPA in May 2016. The protectiveness statement determined that the remedy is still protective in both the landfill cap and groundwater operable units in the short-term. To ensure long-term protectiveness, additional methatne monitoring and evaluation of off-site source contamination migration at the western site boundary need to be completed. Continued maintenance and monitoring of the site remedy components, ICs and groundwater are also needed to ensure protectiveness of human health and the environment.

Start Date: 07/15/2015	Primary Cost:	$0	Source:
End Date: 06/01/2016	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance Through a grant with the EPA, the state conducts yearly groundwater sampling and reports the findings to the EPA.

Start Date: 09/25/2005	Primary Cost:	$98,000	Source: Federal
End Date: 04/29/2016	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

5 Year Review

Start Date: 06/27/2020	Primary Cost:	$0	Source:
End Date: 06/27/2021	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Landfill Cap

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 06/30/1994**

The ROD called for the technical equivalent of a hazardous waste cap consisting of: 1 foot clay, geosynthetic clay liner 60 milliliter flexible membrane liner, geonet with geotextile filter fabric drainage layer, 36 inches clean fill layer, and 6 inches topsoil. During construction, the cap was modified as follows: 12 inches of sand was used for the drainage layer instead of the geonet and the clean fill layer was reduced to 24 inches (the sand drainage layer became part of the 42 inches of frost protection). Additional remedy components include: abandonment of existing culvert, installing a passive gas management system, vegetative cover placement, and site fencing. These additional components have been implemented.

OPERABLE UNIT 01: Landfill Cap

Response Accomplishments: Completed

Remedial Design

Start Date: 06/27/1995	Primary Cost:	$0	Source: Private
End Date: 05/19/1996	Secondary Cost:	$83,000	Source: Federal

Response Accomplishments: Construction Complete

Remedial Action Landfill cap construction.

Start Date: 05/19/1996	Primary Cost:	$0	Source: Private
End Date: 12/16/1997	Secondary Cost:	$112,000	Source: Federal

OPERABLE UNIT 02: Groundwater

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/1997**

Remedy includes groundwater use deed restrictions, installation of additional on-site groundwater monitoring wells, and conducting routine groundwater monitoring of residential wells and on- and off-site monitoring wells. The ROD provided for a contingency of providing residences with an alternate water supply in the event that there is an unacceptable risk due to contamination from the J & L Landfill site. The PRP, LTV Steel, is to implement an alternate water supply in lieu of long-term off-site and residential well monitoring.

LTV Steel connected downgradient property owners into the municipal water system. Many of the property owners refused to allow LTV Steel to connect them.

Response Accomplishments: Completed

Remedial Investigation Supplemental groundwater investigation (in addition to the December 30, 1990, RI Report) to evaluate conditions and how to address the groundwater contamination. Results of additional investigation led to September 30, 1997, ROD.

Start Date: 07/12/1994	Primary Cost:	$28,000	Source: Federal
End Date: 09/30/1997	Secondary Cost:	$0	Source:

Remedial Design The PRP, LTV Steel, elected to develop an alternate water supply plan in lieu of long-term monitoring of downgradient residential wells and monitoring wells.

Start Date: 01/01/1999	Primary Cost:	$0	Source: Private
End Date: 02/01/2003	Secondary Cost:	$0	Source:

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V965853-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$98,500	$0	$0	$98,500	$0

Cooperative Agreement Number V965853-02 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Operation and Maintenance	$152,000	$0	$0	$149,899	$0

Cooperative Agreement Number V96585303 : Open

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Operation and Maintenance	$236,238	$0	$0	$210,520	$39,129
Totals:	$486,738	$0	$0	$458,919	$39,129

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$680	$0	$0	$678	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$11,833	$0	$0	$11,694	$0

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$44,200	$0	$0	$43,970	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$15,000	$0	$0	$3,407	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$55,000	$0	$0	$50,031	$0

Cooperative Agreement Number V995339-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$32,925	$0	$0	$32,925	$0
Totals:	$159,638	$0	$0	$142,704	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Rose Township Dump
1065 Demode Road
Rose Township , MI

County: Oakland
MDEQ District Location: Southeast MI
Managed By: RRD-Superfund

Federal Site Code: 82
State Site ID#: 63000057
State Site Score: 45

LOCATION
The Rose Township Dump site is located off Demode Road between Fish Lake Road and Buckhorn Lake Road near Rose Center in rural northwestern Oakland County.

SITE HISTORY
Dumping of industrial waste at this 110-acre site took place between 1966 and 1968. Barrels containing liquid wastes were left on the surface, buried, or drained onto the ground and into pits on the property. The contents of a number of tank trucks were also reportedly emptied at the site. Surface waters, soils, and groundwater at the site became contaminated with polychlorinated biphenyls (PCBs), chlorinated solvents, other organic contaminants, and heavy metals.

In 1979, the Michigan Toxic Substances Control Commission declared a toxic substance emergency at the site. Approximately 5,000 barrels were removed from the site under a special state funding appropriation to address the emergency. In January 1983, about 1,500 tons of the most heavily PCB-contaminated surface soils were removed from the site using funds remaining from the 1979 special state appropriation.

With the state as the lead agency, a remedial investigation and feasibility study (RI/FS) was completed in July 1987. The initial Record of Decision (ROD) for the site was signed in September 1987. The ROD called for extraction of groundwater by purge wells and treatment by air stripping, as well as thermal destruction of contaminants in approximately 50,000 cubic yards of soil. This included 25,000 cubic yards of PCB-contaminated surface soils, and 25,000 cubic yards of deeper soils contaminated with volatile organic compounds (VOCs). The potentially responsible parties (PRPs) began incineration of the PCB-contaminated soil in September 1992, using an on-site infrared system. Incineration was completed by November 1992. However, only the surface PCB-contaminated soils were incinerated; the deeper soils impacted with VOCs were left untreated.

The ROD Amendment #1, issued by the EPA in January 1989, selected soil flushing as the method for treating the deeper VOC-contaminated soils. The state did not concur with the ROD because it did not believe this method would be effective at the site. Later treatability tests of the soil flushing method demonstrated that it would not work well on the type of soils at this site. As a result, ROD Amendment #2 was issued in September 1995 and selected soil vapor extraction (SVE) as the method to treat the remaining deeper soils. The state concurred with this amendment.

In 1995, the EPA, the PRPs, and the MDEQ determined that enhancements to the groundwater treatment system were needed in order to more effectively address the groundwater. The design of these modifications was completed in 1995. Construction of the new groundwater extraction and air stripping treatment system took place in late 1995 and early 1996. The modified groundwater treatment system became fully operational in February 1996.

The EPA completed a Five-Year Review (FYR) on July 18, 1997. The only recommendation of the review was continued operation of the SVE and groundwater extraction and treatment systems until final soil and groundwater cleanup levels, as set forth in the ROD and Consent Decree, were achieved. The review concluded that with the continued operation of the systems, the remedy selected for the Rose Township site remained protective of human health and the environment.

The EPA completed a Second FYR on June 28, 2002. This Second FYR found that a protectiveness determination of the remedy could not be made at that time and further information was needed. This review stated that additional information would be obtained by completing the installation and sampling of wells near the northern boundary of the site to determine if the plume had migrated off-site. Also, it suggested that additional monitoring wells may need to be installed to fully delineate the northwest margin of the plume. Off-site migration of contaminated groundwater had been verified.

Additional monitoring wells were installed in late 2003 through 2006 to better characterize the extent of the groundwater contamination. Modifications to the groundwater extraction operations were made as prescribed by a treatment system optimization plan in 2007 and 2008 in an attempt to fully capture the groundwater contaminant plume. The SVE system attained cleanup goals and was shut down January 12, 2006. The PRP group also performed a significant amount of work on the groundwater treatment system optimization.

The PRPs agreed to take over area residential well sampling from the Oakland County Health Department in 2005. Residential wells near the site have been tested, and the water was deemed safe for continued human consumption, with the exception of two nearby residences. Concentrations of vinyl chloride (VC) in one residential drinking water well gradually increased then exceeded the regulatory limit of 2.0 micrograms per liter (µg/L). The residence was supplied a temporary mini groundwater treatment system in the basement; then, in November 2008, received a replacement drinking water well. The new well did not perform adequately and was subsequently replaced. The PRPs promptly replaced another residential well when the detections reached 2.0 µg/L VC in March 2009. Due to nearby homeowner concerns, the Oakland County Health Department performed a one-time sampling event in 2009 to confirm that four selected upgradient residential wells in the immediate area were not contaminated.

In June 2009, Chrysler Corporation, the lead PRP, filed for bankruptcy and abandoned the project. The EPA retained Weston as an interim contractor for the site until the other PRPs could be notified and become part of the PRP group. Due to the previous lax system of maintenance, damages, wear and tear, and biofouling of wells occurred. At the request of the EPA, necessary treatments and replacements to the groundwater treatment system were implemented by Weston.

The EPA completed the Third FYR of the protectiveness of the remedy at the site in 2007. The FYR concluded that a protectiveness determination of the remedy could not be made until further information of plume capture was obtained. A capture zone evaluation for the recently increased extraction pumping rates at the easternmost edge of the VOC plume was performed to determine if the entire VOC plume was being captured with the new pumping configuration and the new extraction rates. However, due to the Chrysler bankruptcy, the evaluation efforts were terminated until the system was again operational and necessary repairs were made. The FYR Addendum for protectiveness was completed in 2009. The long-term protectiveness determination stated that the system was functioning as designed and cited several studies that had been done prior to Chrysler shutting the system down.

The new PRP group took control of the site in late 2010. They have taken over site

responsibilities and now collect samples from the monitoring wells and the residential wells. Site repairs requested by the EPA were completed.

The Fourth FYR was signed on June 11, 2012. It stated that the remedy was functioning as intended and was protective of human health and the environment. An Explanation of Significant Difference (ESD) was completed in 2013 to add the need for institutional controls for restrictive covenants (RC) on site property to prevent exposure from contaminated soils and groundwater. RCs recommended in the FYR, were filed by the PRPs on all site property parcels in 2014. In 2015, the PRP group proposed an optimization concept to accelerate groundwater remediation to the EPA and MDEQ however, efforts on the optimization process have been placed on hold due to the PRP group concerns about cost.

SITE STATUS
The Fifth FYR was finalized on May 24, 2017. Recommendations were to conduct institutional control (IC) monitoring, increase operation and maintenance (O & M) actvities on extraction and monitoring wells, continue monitoring or replace impacted residential wells and evaluate sentinal wells for early detection of contaminants that could threaten residential wells.

In 2017, two residential wells impacted by VOC below drinking water criteria, were replaced by the PRP group to provide uncontaminated drinking water from an unimpacted groundwater aquifer for the occupants. The new wells will eliminate the requirement for monthly monitoring of the resident's well water.

The PRP group continues to perform monitoring and groundwater treatment and routine O & M activities. Trend monitoring is also currently being performed to determine if total capture of the plume is occurring.

ENFORCEMENT STATUS
Chrysler Corporation (now Chrysler LLC) filed for bankruptcy in 2009, and terminated all site activities. The EPA notified other signatories and formed a new group of PRPs. The EPA also hired a contractor (Weston) to take over on an interim basis until the PRPs again resume site activities under an EPA Consent Decree. Other PRPs are Akzo Coatings, Detrex Corporation, Fabricon Automotive, Federal Screw Works, Ford Motor Company, General Motors Company, Michigan Industrial Finishes, Hoechst Celanese Corporation, RPM, Inc., TRW, Inc., and Uniroyal. The property owner (Dorsey) at the time of the dumping was determined to be a non-viable party. Ford Motor Company is now the primary PRP entity for site communications and management.

SPECIAL CONSIDERATIONS
None

OPERABLE UNITS

00	Entire Site
01	State emergency source control.

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/1987**

The selected remedy called for groundwater extraction and treatment via air strippers. Surficial soils were incinerated.

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 01/18/1989**

The EPA selected, without state concurrence, treatment of remaining soils via soil flushing. However, treatability studies showed the soils were not amenable to this treatment so did not proceed to remedial design or remedial action (RA).

Record of Decision *Amendment:* 2 *ESD:* 0 **Effective 08/25/1995**

The remedy of SVE of remaining soils on-site was selected. This amendment received state concurrence.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 04/05/2013**

The purpose of the April 5,2013, ESD was to add the IC of RCs as a requirement of the 1987 ROD.

Response Accomplishments: Completed

Remedial Investigation An EPA funded, state-lead RI/FS took place. State funds are advance match to be credited against future RA match requirements.

Start Date: 09/01/1985	Primary Cost:	$963,475	Source:	Federal
End Date: 07/31/1987	Secondary Cost:	$94,860	Source:	State

Remedial Design The PRPs designed a groundwater extraction and treatment system and on-site incinerator for contaminated surficial soils. An SVE soils treatment system was designed. PRP costs are unknown, EPA costs are for oversight.

Start Date: 04/01/1988	Primary Cost:	$0	Source:	Private
End Date: 09/30/1995	Secondary Cost:	$279,000	Source:	Federal

Remedial Action The PRPs installed a groundwater extraction system with air stripper treatment. The RA also included incineration of surface PCB-contaminated soils and the installation of an on-site SVE soil treatment system. PRP costs were estimated from the ROD Amendment.

Start Date: 03/01/1992	Primary Cost:	$32,547,000	Source:	Private
End Date: 11/30/1996	Secondary Cost:	$260,000	Source:	Federal

5 Year Review The EPA conducted a FYR.

Start Date: 06/15/1997	Primary Cost:	$0	Source:	Federal
End Date: 07/18/1997	Secondary Cost:	$0	Source:	

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The EPA completed a second FYR.

Start Date: *03/07/2002* Primary Cost: $0 Source: Federal
End Date: *06/28/2002* Secondary Cost: $0 Source:

5 Year Review The Third FYR was completed in June 2007 and concluded that a protectiveness determination could not be made without additional information. The addendum with that determination was completed in 2009.

Start Date: *11/06/2006* Primary Cost: $0 Source: Federal
End Date: *06/21/2007* Secondary Cost: $0 Source:

5 Year Review The Fourth FYR was completed on June 11, 2012, less than five years from the final date of the previous FYR. The review indicated that the remedy was functioning as intended and protective of human health and the environment.

Start Date: *10/11/2011* Primary Cost: $0 Source: Federal
End Date: *06/11/2012* Secondary Cost: $0 Source:

5 Year Review The Fifth FYR was finalized on May 24, 2017. Recommendations were to conduct IC monitoring, increase O & M actvities on extraction and monitoring wells, continue monitoring or replace impacted residential wells and evaluate sentinal wells for early detection of contaminants that could threaten residential wells.

Start Date: *01/12/2017* Primary Cost: $0 Source:
End Date: *05/24/2017* Secondary Cost: $0 Source:

Response Accomplishments: Ongoing

Operation and Maintenance The PRPs conduct O & M of the groundwater extraction and treatment system. Estimated costs have been taken from the ROD Amendment. The actual O & M costs for 2016 were $399,000.

Start Date: *10/15/1995* Primary Cost: $1,737,000 Source: Private
End Date: *10/15/2028* Secondary Cost: $0 Source:

Response Accomplishments: Future Need

5 Year Review A sixth FYR will be needed in 2022.

Start Date: *09/29/2021* Primary Cost: $0 Source: Federal
End Date: *09/29/2022* Secondary Cost: $0 Source:

OPERABLE UNIT 01: State emergency source control.

Response Accomplishments: Completed

Interim Response	Removal of 5,000 barrels of liquid waste and 1,500 tons of contaminated soils.			
Start Date: 06/30/1979		Primary Cost:	$416,487	Source: State
End Date: 06/30/1983		Secondary Cost:	$0	Source:

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005787-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$1,058,339	$94,860	$0	$1,043,816	$0
Totals:	$1,058,339	$94,860	$0	$1,043,816	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$4,387	$0	$4,387	$4,387	$4,387

Cooperative Agreement Number V995260-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$8,588	$0	$0	$8,588	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$28,685	$0	$0	$28,685	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$51,962	$0	$0	$51,962	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$27,792	$0	$0	$27,792	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$34,156	$0	$0	$34,156	$0

Cooperative Agreement Number V995258-03 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$20,791	$0	$0	$20,791	$0

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$23,014	$0	$0	$23,014	$2,397

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$94,744	$0	$0	$94,387	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$147,703	$0	$0	$147,690	$0
Totals:	$441,822	$0	$4,387	$441,451	$6,784

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Springfield Twp. Dump
Woodland Trail
Davisburg , MI

County: Oakland
MDEQ District Location: Southeast MI
Managed By: RRD-Superfund

Federal Site Code: A7
State Site ID#: 63000061
State Site Score: 35

LOCATION
The Springfield Township Dump site is located in Springfield Township, Michigan, about three miles south of Davisburg. The site covers approximately four acres and is surrounded by dense woods. There are 25 residences located within one-mile of the site with the nearest being about 800 feet from the site.

SITE HISTORY
The Springfield Township Dump site was used for the illegal disposal of liquid industrial wastes between 1966 and 1968. Approximately 1,500 drums containing paint sludges, solvents, polychlorinated biphenyls (PCBs), oils, and grease were left on-site. Soils were found to be contaminated with PCBs, organic chemicals, and metals. The groundwater aquifer beneath the site is contaminated with both organic and inorganic contaminants. Sampling of nearby residential wells has shown no obvious migration of off-site contaminants to date. However, there are wells in the vicinity of the downgradient path of contaminated groundwater.

In 1979 and 1980, in response to the declaration of a toxic substances emergency by the Toxic Substances Control Commission, 1,500 barrels and some of the contaminated soils were removed with state funds. In January 1983, an additional 711 tons of PCB-contaminated soils were removed. The total cost of these actions was $500,000.

A remedial investigation (RI) was conducted during the spring and summer of 1985, with a follow-up phase in 1986. RI/feasibility study (FS) reports were prepared by the MDEQ in 1987. The lead was turned back to the EPA in February 1988. The RI report was finalized and released in July 1989. The FS report was finalized in July 1990. The Record of Decision (ROD) was issued in September 1990. It called for removal and incineration of highly contaminated soils; solidification of soils and ash containing metals above cleanup levels, in-situ soil vapor extraction (SVE) of remaining contaminated soils down to the water table, and purging, treatment, and on-site discharge of contaminated groundwater.

The EPA deemed the potentially responsible parties (PRPs) proposal for the remedial design inadequate and began design work in April 1991. Pre-design fieldwork in June, July, and August 1991 revealed a much larger volume of contaminated soil on the site than indicated by the RI work and the ROD. The EPA decided to move ahead at the site with an Administrative Order by Consent for implementation of the portion of the remedy involving the groundwater pump and treat (P & T) system and the SVE system. In March 1992, the PRPs agreed to implement the design for the groundwater P & T system and the SVE system. In August 1992, the PRPs began fieldwork on the pre-design for the groundwater and soil cleanup systems. In 1993, the EPA issued an Explanation of Significant Difference (ESD) changing the groundwater treatment system and modifying the background concentrations for arsenic and lead in groundwater.

In December 1993, the Michigan Department of Natural Resources (MDNR) through discussions with the PRPs, the EPA, and the Michigan Legislature, removed itself from

involvement with the site. The ROD was amended in June 1998 and the EPA and the PRPs completed a remedial action (RA) consisting of groundwater treatment, soil washing with SVE polishing, and installation of a cap.

The groundwater extraction and treatment system began operation in 1994. It consists of extracting approximately 8 to 10 gallons per minute, treating it with granular activated carbon, and reinjection into the aquifer up gradient of the contamination.

The EPA signed a ROD Amendment in 1998 to change the way the PCB-laden soils would be cleaned up from on-site and the PRPs began the PCB-cleanup in 1999. The PRPs excavated the PCB-laden surface soils and treated them using a soil washing system located on-site. Most of the treated soil batches achieved the treatment goals and were replaced back into the ground. Several batches did not achieve the cleanup goal and were either re-treated or disposed of in an off-site licensed facility. The PRPs treated and/or disposed of an estimated total 12,000 cubic yards of PCB-laden soils. The soil washing work was completed in early 2000. A soil cover was then placed over the treated area and grass was planted.

The state was not involved in this site from approximately 1995 until the spring of 2005 because of communication issues and a lack of progress in involvement with the EPA. In 2005, the PRP consultants proposed a potassium permanganate injection pilot study and the EPA solicited state involvement at that time. MDEQ staff provided technical input into the design and oversight of the pilot study and have been working cooperatively with the EPA since that time. The results of the study were mixed and not further pursued.

The PRPs began installation of the SVE equipment in May 2000. In addition, the PRPs decided to construct and operate an air sparging (AS) system to augment the groundwater P & T system in an effort to speed up the restoration of the groundwater quality at the site. The SVE and AS equipment installation was completed in early August 2000 and the PRPs began operating the systems shortly thereafter. The RA began on May 10, 1999, and was completed by June 13, 2001. The Operation and Maintenance (O & M) began in June 2001. The sparge system has been operated intermittently as concentrations rebound in the groundwater. The vapor extraction portion of the SVE was deemed no longer necessary as volatile organic compound concentrations dropped and post treatment was no longer needed. The sparge system was being operated on an intermittent basis until Chrysler filed for bankruptcy in 2009.

The PRP group prepared and submitted work plans for field work between 2005 and 2009, but a final useable draft was not completed before Chrysler filed for bankruptcy. Other signatories to the ROD have now taken over response activities at the site.

A Second Five-Year Review (FYR) was completed in September 2004. The Second FYR concluded that the remedy was protective of human health and the environment in the short-term and that long-term protectiveness of the remedy is dependent on the effectiveness of the treatment systems. The MDEQ expressed concerns regarding the incomplete plume characterization and resulting uncertainty of short-term protectiveness. The FYR also identified a number of issues with the O & M of the remedy.

The Third FYR was completed September 14, 2009, and noted that long-term protectiveness was unknown based on lack of activity of responsible parties on-site.

In 2009, through the adjudication of the bankruptcy, Chrysler was relieved of all environmental liabilities. As a result, the P & T and SVE systems were shut down. The EPA negotiated with the other signatories to the Consent Decree and a new PRP group was formed and agreed to perform site activities.

The new PRPs began implementation of site response activities in 2010 and performed the previously agreed upon enhanced characterization work plan. They performed additional site characterization, then evaluated and repaired the P & T system. The evaluation and data review revealed that the system was not effectively removing the contaminants during the treatment period, even prior to the shutdown. The new PRP group also completed the overdue residential well sampling. Based upon the results from the late 2011 field work, planning for an additional phase of investigation of the source area contamination began in 2012. Source investigation work began in late 2013 with the installation of soil borings and groundwater monitoring wells.

The Fourth FYR was completed on September 8, 2014. The FYR found the remedy to be protective in the short-term with long-term protectiveness dependent upon confirmation of the adequacy of the soils and groundwater treatment with further remediation if needed, filing deed restrictions to prevent exposures to contaminated soils and groundwater and updating the long-term O & M plans to ensure that sampling protocols reflect current technical standards.

On December 8, 2015, a restrictive covenant (RC) was placed on the Nickson property, a residence located on the site to prevent exposures to potentially contaminated groundwater. The residence is currently unoccupied. A RC for groundwater use on the property adjacent to the site was recorded at the Oakland County Register of Deeds on August 8, 2016.

The PRP group is working to investigate and remediate the site. To date, they completed both Phase 1 of their investigation and Phase 2 of the source area investigation. The PRPs are currently evaluating treatment options for source area soils and impacted groundwater. Additional groundwater investigation was conducted on the property adjacent to the site in September 2016 which defined the extent of groundwater contamination.

SITE STATUS

In 2016, low levels of 1,4-dioxane were detected in several monitoring wells located at the Springfield Township Dump site. The PRP group will continue to monitor groundwater on a quarterly basis for one year to determine if 1,4-dioxane should be added to the list of contaminants of concern for monitoring. The MDEQ Drinking Water and Municipal Assistance Division will monitor residential wells in 2018 for 1,4-dioxane as a precautionary measure to protect residential drinking water.

ENFORCEMENT STATUS

The PRPs were identified at this site; they installed the RA and performed O & M efforts pursuant to legal agreements with the EPA. The lead PRP (Chrysler) filed for bankruptcy and was relieved from environmental liabilities in 2009. Ford Motor Company is now the lead PRP under the original Consent Decree and has taken a leadership role for response actions at the site.

SPECIAL CONSIDERATIONS

Some area residential wells have recently shown very low detections of potentially site-related chemical treatment residues. The wells are being monitored to ensure the protectivess of residential drinking water.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 00 *ESD:* 0 **Effective 09/29/1990**

Major components of the remedy include: Excavation and thermal destruction of soils with solidification and on-site disposal of the incinerator ash, installation of an in-situ SVE system, and installation and operation of a groundwater P & T system.

Record of Decision *Amendment:* 0 *ESD:* 1 **Effective 11/18/1993**

The EPA issued an ESD to change the groundwater treatment system (to not treat for lead or arsenic) due to use of calculated rather than established background concentrations being utilized for arsenic and lead criteria in groundwater. Costs remained unchanged from the 1990 ROD.

Record of Decision *Amendment:* 01 *ESD:* 0 **Effective 06/18/1998**

The 1998 ROD Amendment allows for soil washing, solvent extraction, or low temperature thermal desorption rather than incineration. It also allows PCB treatment residuals below 5 parts per million (ppm) to be backfilled on-site with a one-foot cover of clean soil and limits excavation to 6 feet unless PCB concentrations exceed 50 ppm. Soil and groundwater cleanup standards were also modified.

Response Accomplishments: Completed

Interim Response

In 1979, 1,500 barrels and some contaminated soil were removed using state funds; and in January 1983, an additional 711 tons of PCB-contaminated soil was removed from the site using state funds.

Start Date: 01/01/1979 Primary Cost: $500,000 Source: State

End Date: 03/01/1983 Secondary Cost: $0 Source:

Remedial Investigation

Fieldwork for the RI was conducted in the spring and summer of 1985 with follow-up work in 1986. An RI/FS report was prepared by the MDNR in 1987. The project lead was transferred to the EPA in February 1988. The EPA issued a revised RI report in July 1989 and a revised FS report in July 1990.

Start Date: 01/01/1985 Primary Cost: $670,000 Source: Federal

End Date: 09/01/1985 Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Design The EPA initiated design work in April 1991. Pre-design fieldwork was conducted in June, July, and August 1991. In March 1992, the PRPs agreed to design the groundwater pump and treat and the SVE systems.

Start Date:	*04/01/1991*	Primary Cost:	$0	Source: Private
End Date:	*01/01/1999*	Secondary Cost:	$1,261,000	Source: Federal

5 Year Review The 1999 FYR outlined the Remedial Objectives, Quality Assurance/Quality Control, and Monitoring Program. It stated the need for groundwater extraction, treatment, and monitoring; and recommended that the treatment system continue to be operated until the groundwater cleanup levels, as set forth in the ROD, are achieved. It also stated that the PCB-laden soil and SVE remedial actions would be implemented August 1999 through Sept 2000 (it lasted until June 13, 2001).

Start Date:	*04/01/1999*	Primary Cost:	$0	Source: Federal
End Date:	*07/02/1999*	Secondary Cost:	$0	Source:

Remedial Action The PRPs initiated the RA for groundwater in 1994, the RA for PCB in 1999, and the SVE system in 2000. The estimated costs are from the 1998 ROD amendment and include the O & M costs. The system was operational June 13, 2001.

Start Date:	*05/10/1999*	Primary Cost:	$3,300,000	Source: Private
End Date:	*06/13/2001*	Secondary Cost:	$304,000	Source: Federal

5 Year Review The Second FYR was completed in 2004, and determined that the remedy was protective in the short-term. Long-term protectiveness is dependent on effectiveness of the remedy. The MDEQ expressed concerns regarding the incomplete plume characterization and resulting uncertainty of short-term protectiveness. The FYR also identified a number of issues with the O & M of the remedy.

Start Date:	*03/01/2004*	Primary Cost:	$0	Source: Federal
End Date:	*07/02/2004*	Secondary Cost:	$0	Source:

5 Year Review The Third FYR was completed on September 14, 2009. The EPA determined that short-term protectiveness was acceptable because there were no known receptors. The long-term protectiveness was uncertain because Chrysler, the primary PRP, filed bankruptcy and was relieved of their environmental liabilities. The P & T system had been shut down since June 2009. The other signatories to the Consent Decree were contacted and have taken over response activities at the site.

Start Date:	*08/25/2008*	Primary Cost:	$0	Source: Federal
End Date:	*09/14/2009*	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The Fourth FYR was completed on September 8, 2014. The FYR found the remedy to be protective in the short term with long-term protectiveness dependent upon confirmation of the adequacy of the soils and groundwater treatment with further remediation if needed, filing deed restrictions to prevent exposures to contaminated soils and groundwater and updating the long-term O & M plans to ensure that sampling protocols reflect current technical standards.

Start Date: 01/06/2014 Primary Cost: $0 Source: Federal

End Date: 09/08/2014 Secondary Cost: $0 Source:

Response Accomplishments: Ongoing

Operation and Maintenance Effectiveness of the soils and groundwater treatment is currently being evaluated. O & M will continue to be needed for the maintenance of the SVE system, groundwater treatment system, and the cap. Deed restrictions will remain indefinitely to prevent future contact with residual soil contamination that will remain on-site and will need to be monitored to ensure protectiveness. In 2017, approximately $380,000 were spent on O & M activities.

Start Date: 06/13/2001 Primary Cost: $3,615,000 Source: Private

End Date: 12/31/2025 Secondary Cost: $0 Source:

Response Accomplishments: Future Need

5 Year Review The Fifth FYR will be needed in 2019.

Start Date: 09/03/2018 Primary Cost: $0 Source: Federal

End Date: 06/28/2019 Secondary Cost: $0 Source:

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005776-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$547,373	$0	$0	$547,373	$0
Totals:	$547,373	$0	$0	$547,373	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$5,904	$0	$5,904	$5,904	$5,904

Cooperative Agreement Number V005843-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$110,000	$0	$0	$108,019	$0

Cooperative Agreement Number V01E007761 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$44,704	$0	$0	$44,704	$0

Cooperative Agreement Number V00E183-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$4,114	$0	$0	$3,835	$0

Cooperative Agreement Number V00E183-02 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$7,880	$0	$0	$7,880	$0

Cooperative Agreement Number V00E00776-0 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$10,340	$0	$0	$10,340	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$36,788	$0	$0	$36,788	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$18,602	$0	$0	$18,602	$1,441

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$11,402	$0	$0	$11,402	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$30,000	$0	$0	$30,000	$0
Totals:	$279,734	$0	$5,904	$277,474	$7,346

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Southwest Ottawa County Land
2901 N. 160th Ave
Holland , MI

County: Ottawa
MDEQ District Location: Grand Rapids
Managed By: RRD-Superfund

Federal Site Code: EH
State Site ID#: 70000024
State Site Score: 41

LOCATION
The Southwest Ottawa County Landfill is located on 160th Avenue between James and Riley Streets in a mixed residential and agricultural area. Lake Michigan is approximately one and one-half miles to the west, and Lake Macatawa is located approximately one and one-half miles to the south.

SITE HISTORY
The 43-acre Southwest Ottawa County Landfill operated as a state licensed landfill, until its closure in 1981. The landfill was constructed and began operation by Ottawa County in 1968 and received solvents, heavy metals, sludge, oils, municipal refuse, and drums containing unspecified wastes. Major contaminants in the groundwater from a mixture of municipal and industrial waste in the landfill included: benzene, chlorobenzene, lead, antimony, aluminum, sodium, zinc, aldrin, manganese, cadmium, vanadium, beryllium, heptachlor, dieldrin, endrin, and arochlor 1254. All of the above contaminants were present at levels above the state's generic residential criteria. The site was added to the National Priorities List (NPL) in September 1983.

A groundwater investigation conducted in 1979 by the Ottawa County Road Commission, under the direction of the Michigan Department of Natural Resources (MDNR), indicated that the groundwater was contaminated with benzene, ethyl benzene, xylene, trichloroethylene, chlorobenzene, 1,1-dichloroethane, 1,2-dichloroethane, methylene chloride, and iron. Groundwater data received from an investigation of an adjacent downgradient NPL site (Waste Management-Holland Lagoons) located within the groundwater contaminant plume from the Southwest Ottawa County Landfill indicated that the groundwater was also contaminated with inorganics above generic residential criteria of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 201). These contaminants were: aluminum, antimony, beryllium, cadmium, lead, manganese, vanadium, and zinc. An isolated area of pesticides above Part 201 criteria was also discovered. A preliminary feasibility study for treating the groundwater was completed in 1980.

In 1981, a private drinking water well evaluation indicated some area residential wells were contaminated, although the source of contamination was never completely identified. The state issued a Consent Order that required the county to close and cap the landfill and required potentially affected residential wells to be replaced by connection to the municipal water system.

In 1985, the MDNR signed a Groundwater Restoration Agreement with the Ottawa County Board of Commissioners. That agreement included installation of a multi-well groundwater extraction system to minimize risks to public health and the environment from use of, and contact with, contaminated groundwater, and to prevent migration of contaminants to other residential wells and Lake Michigan. The treatment system began operation in August 1987. In 1994, a water main was extended in order to provide municipal water to residences affected, or potentially affected, by groundwater contamination migrating from the site.

The First Five-Year Review (FYR) was written by the EPA in 1995. The EPA recommended that the groundwater monitoring data be reviewed to ascertain if the site was progressing toward the cleanup standards and whether the entire contamination plume was being captured.

The Second FYR was also written by the EPA in 1997. This FYR was accelerated because the previous review was written more than five years after the construction completion date of August 3, 1987. The recommendations in this review were similar to those listed in the 1995 review.

In April 2000, the MDEQ filed a lawsuit against Ottawa County. The state's litigation with Ottawa County was filed when negotiations with Ottawa County to enforce and update the 1985 Groundwater Restoration Agreement to meet current state standards and to address the questionable effectiveness of the extraction and treatment system failed.

In 2003, the MDEQ wrote the Third FYR to evaluate the success of the selected remedy. The MDEQ provided funding to conduct a remedial investigation (RI) of the site in 2003. The data indicated contaminant concentrations exceeding criteria were bypassing the treatment system in two locations. The MDEQ concluded that the current remedy was not protective of human health or the environment. The EPA, however, revised the protectiveness statement to indicate that the evaluation of long-term protectiveness would be deferred to a later date. The EPA finaled the report in September 2003. The MDEQ's investigation report was finaled in October 2004.

Ottawa County completed the installation of the municipal water supply line throughout the downgradient area within the groundwater plume boundary. The 2003 MDEQ investigation confirmed that the contaminants which were detected in downgradient residential wells since the late 1980's were migrating from the landfill.

The out-of-court settlement of the April 2000 lawsuit between the state and Ottawa County was resolved on March 14, 2005, with the signing of the Stipulation and Order of Dismissal (Order). Per terms of the Order, Ottawa County was to implement the expansion and enhancement of the current treatment system, connect all residences within the groundwater plume into the expanded municipal water supply, replace the landfill cap, develop land use restrictions and a groundwater ordinance for the area downgradient from the landfill which overlies the contamination plume, and continue operation of the current downgradient treatment system. After these tasks were completed, the county was required to provide information to the MDEQ which supported that the new enhanced remedy was functional and capturing and treating the groundwater contamination plume before it migrated from the landfill.

Ottawa County completed the construction of the landfill cap in late 2006 and submitted supporting documentation. In 2008, the county completed hookup of all residences, except for four residents who refused hookup, within the groundwater plume into the expanded municipal water supply. Per the Order, the county installed new extraction wells around the landfill in 2008.

With funding provided by the EPA, the MDEQ developed and wrote the Fourth FYR report for the site in 2008. The protectiveness statement in the report consisted of the following: construction of the revised remedy is underway and is expected to be protective of human health and the environment upon completion. In the interim, exposure pathways that could result in unacceptable risks were controlled.

In 2009, Ottawa County implemented land use restrictions and a groundwater ordinance.

The county also completed the installation of the new extraction wells system around the landfill as well as expansion to the treatment building. The new system has been operating since mid-2009. The final monitoring plan was reviewed and accepted by the MDEQ in August 2012. Ottawa County continues to operate both the new extraction well system around the landfill as well as the older downgradient treatment system. Annual groundwater sampling began under the 2012 Monitoring Plan. The MDEQ conducted split sampling in September 2013 for metals analysis, oversight, and verification of sampling and analysis methods in conjunction with the annual sampling conducted by Ottawa County. In 2015, elevated levels of dissolved methane were detected in groundwater monitoring wells. The MDEQ requested that Ottawa County include additional groundwater monitoring wells for sampling, perform an evaluation of the vapor intrusion (VI) pathway and identify potential receptors.

Annual groundwater sampling was conducted in the fall of 2015 and the results were submitted to the MDEQ on January 26, 2016. Representatives from Ottawa County provided data from their investigation for dissolved methane in groundwater and the potential vapor intrustion pathway to the MDEQ Technical and Program Support Team in December 2016.

SITE STATUS
Discussions between the EPA, the MDEQ and Ottawa County continue to assess appropriate future reuse for the landfill, compliance with groundwater surface water interface criteria, optimization of the extraction well system around the landfill and downgradient system. Some data has been collected to assess potential VI pathways, but the MDEQ has requested a more robust investigation.

The county has proposed installation of a slurry wall with hydraulic control to prevent migration of groundwater contamination from the landfill. Preliminary plans for the slurry wall are expected to be submitted to MDEQ for review in 2018.

ENFORCEMENT STATUS
Ottawa County is the liable party both under the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL96-510, as amended and Part 201, and is operating and maintaining the groundwater pump and treat system established under the 1985 Groundwater Restoration Agreement.

The state's April 2000 litigation with Ottawa County was settled with the signing of the Order on March 14, 2005. The Order required Ottawa County to implement improvements to the treatment system with installation of the new extraction well system along the west and south boundary of the landfill, connection of all residences within the groundwater plume into the expanded municipal water supply, development of land use restrictions and a groundwater ordinance, replacement of the landfill cap, and continuing to operate the current downgradient treatment system.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site
01	Groundwater Plume

OPERABLE UNITS

02	Landfill Cap

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review The FYR recommended improvements needed for the pump and treat system in order to adequately capture and treat the groundwater contamination plume.

Start Date: *01/01/1995* Primary Cost: $0 Source: Federal
End Date: *09/25/1995* Secondary Cost: $0 Source:

5 Year Review The Second FYR was also written by the EPA in 1997. This Five-Year Review was accelerated because the previous review was written more than five years after the construction completion date of August 3, 1987. The recommendations in this review were similar to those listed in the 1995 review.

Start Date: *01/01/1997* Primary Cost: $10,000 Source: Federal
End Date: *10/27/1997* Secondary Cost: $0 Source:

5 Year Review The Third FYR report was finaled by the EPA in September 2003. The Agencies, however, did not agree on what the protectiveness statement should say. Eventually, it was agreed that protectiveness would be deferred until the remedy under the Order was implemented.

Start Date: *01/01/2003* Primary Cost: $0 Source: Federal
End Date: *09/29/2003* Secondary Cost: $0 Source:

Remedial Design As part of the Order, Ottawa County developed and submitted a remedial design for re-capping the landfill and installation of up to four new extraction wells around the landfill. Capping of the landfill was completed in 2006, and installation of the new extraction wells system was completed in late 2008.

Start Date: *01/01/2005* Primary Cost: $2,000,000 Source: Private
End Date: *12/31/2008* Secondary Cost: $0 Source:

Remedial Action Ottawa County completed the remedial actions (RAs) required under the Order. This included replacement of the landfill cap, expansion and enhancement of the current treatment network, hookup of all residences within the groundwater plume into the expanded municipal water supply, and development of land use restrictions and a groundwater ordinance. These RAs were completed in 2009.

Start Date: *04/01/2005* Primary Cost: $4,500,000 Source: Private
End Date: *03/31/2009* Secondary Cost: $0 Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

With funding provided by the EPA, the MDEQ developed and wrote the Fourth FYR report for the site in 2008. The protectiveness statement in the report stated that the construction of the revised remedy was underway and was expected to be protective of human health and the environment upon completion. In the interim, exposure pathways that could result in unacceptable risks were being controlled. Further information on the effectiveness of the revised remedy, via groundwater monitoring, would be obtained once the new extraction wells system had been installed and begun operation and the implementation of the Institutional Controls was completed. Upon completion of all of the required RAs under the Order, the evaluation of the effectiveness of the remedy would commence.

A FYR is not required for this site because it is designated as a state lead enforcement site and sites in this catagory currently do not require a FYR. However, if the EPA approves deleting of any operable unit of the site proposed by the PRPs, a FYR will be required.

Start Date: 10/01/2007	Primary Cost:	$20,000	Source:	Federal
End Date: 09/30/2008	Secondary Cost:	$0	Source:	

Response Accomplishments: Ongoing

Operation and Maintenance

All of the RAs required under the Order were completed in 2012. The county developed a monitoring and operation and maintenance plan for the new extraction system that was approved by the MDEQ in August 2012. The county continues to perform annual groundwater monitoring. The county has been requested to perform VI investigation for volatile organics and methane from the groundwater contamination.

Start Date: 03/31/2009	Primary Cost:	$2,900,000	Source:	Private
End Date: 03/01/2039	Secondary Cost:	$0	Source:	

OPERABLE UNIT 01: Groundwater Plume

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 01/09/1985**

Groundwater Restoration Agreement to implement a groundwater extraction and treatment system.

OPERABLE UNIT 01: Groundwater Plume

Response Accomplishments: Completed

Remedial Investigation A groundwater investigation was conducted by the Ottawa County Road Commission under the direction of the MDNR.

Start Date: 01/01/1979	Primary Cost:	$0	Source: Private
End Date: 12/31/1981	Secondary Cost:	$0	Source:

Remedial Design Design of groundwater treatment system.

Start Date: 08/30/1980	Primary Cost:	$0	Source: Private
End Date: 07/30/1986	Secondary Cost:	$0	Source:

Operation and Maintenance According to the 1985 Groundwater Restoration Agreement, the downgradient treatment system is to remain active until the groundwater plume contaminants are below the listed criteria. The system began operating before the final Groundwater Restoration Agreement was signed. Annual groundwater sampling of the site monitoring well network continued under the Groundwater Restoration Agreement until the new August 2012 monitoring plan, required by the Order, was developed and approved by the MDEQ.

Start Date: 10/17/1984	Primary Cost:	$274,000	Source: Private
End Date: 08/01/2012	Secondary Cost:	$0	Source:

Remedial Action Groundwater extraction and treatment system and san/clay cap installed. Extend water main to provide municipal water to residences affected, or potentially affected, by the groundwater contamination.

Start Date: 01/01/1986	Primary Cost:	$0	Source: Private
End Date: 09/22/1994	Secondary Cost:	$0	Source:

Alternate Water Bottled water was provided to residents affected by groundwater contamination coming from the site.

Start Date: 01/01/1993	Primary Cost:	$170,000	Source: State
End Date: 04/20/1993	Secondary Cost:	$0	Source:

Remedial Investigation The state provided funding to conduct a RI at the site to meet the requirements of the FYR. The sampling was performed in April and May 2003. The RI report was finaled in October 2004.

Start Date: 06/01/2002	Primary Cost:	$280,000	Source: State
End Date: 10/30/2004	Secondary Cost:	$0	Source:

Remedial Design Under the Order, the county provided design information on four new extraction wells to be placed along the west and south borders of the landfill. These new extraction wells are to capture and treat the groundwater plume at the landfill and prevent migration of the groundwater contamination from the landfill.

Start Date: 03/31/2005	Primary Cost:	$4,500,000	Source: Private
End Date: 03/31/2009	Secondary Cost:	$0	Source:

OPERABLE UNIT 01: Groundwater Plume

Response Accomplishments: Completed

Operation and Maintenance	Split sampled groundwater monitoring wells for metals and general chemical constituents to evaluate groundwater extraction system effectiveness.			
Start Date: 09/09/2013		Primary Cost:	$50,000	Source: State
End Date: 09/17/2013		Secondary Cost:	$0	Source:

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V985560-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$19,283	$0	$0	$19,243	$0

Cooperative Agreement Number V00E192-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$20,000	$0	$0	$19,826	$0

Cooperative Agreement Number V975853-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$35,647	$0	$0	$35,647	$0

Cooperative Agreement Number V995339-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Investigation	$2,874	$0	$0	$2,798	$0
Totals:	$77,804	$0	$0	$77,514	$0

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LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: Sturgis Municipal Wells
309 N. Prospect
Sturgis , MI

County: Saint Joseph
MDEQ District Location: Kalamazoo
Managed By: RRD-Superfund

Federal Site Code: J1
State Site ID#: 75000016
State Site Score: 37

LOCATION
The Sturgis Municipal Wells site is located in the city of Sturgis, St. Joseph County, Michigan, approximately two miles north of the Indiana state line.

SITE HISTORY
Routine sampling by the Michigan Department of Public Health (MDPH) in 1982 revealed two of the four municipal water supply wells serving the city of Sturgis were contaminated with the industrial solvents trichloroethylene (TCE) and tetrachloroethylene (PCE). In 1983, the city asked approximately 10,000 residents in its service area to limit their water usage. In 1984, the city began utilizing a new well (the Oaklawn), bringing the total to three usable wells (the Broadus, Lakeview, and Oaklawn) and two contaminated wells (the Layne and Jackson). In 1985, the Broadus well was found to be contaminated. In 1989, the MDPH advised the city not to rely on the Layne, Jackson, and Broadus wells. The city is now relying on the Thurston Woods wells, and the Oaklawn and Lakeview wells, to serve their needs.

The site was placed on the National Priorities List in October 1984. The state of Michigan served as the lead agency for site investigations. The MDEQ undertook a remedial investigation (RI)/feasibility study from September 1987 through May 1991. Results of the RI documented large plumes of TCE- and PCE-contaminated groundwater in at least two aquifers, as well as in soils of two source areas (referred to as the Kirsch Company and Wade Electric source areas). Levels of TCE and PCE exceed state and federal standards in both the groundwater and soil. It is unclear how the releases occurred at the two source areas; however, both were former industrial sites where solvent degreasing was known to have been practiced.

A Record of Decision (ROD) outlining the chosen remedial action (RA) was issued in September 1991. The selected remedy included extraction and treatment of the contaminated groundwater until the former Michigan Environmental Response Act, 1982 PA 307, as amended, Type B levels are met, soil vapor extraction (SVE) of the contaminated on-site soils, and excavation of the remaining contaminated soils that cannot be treated by SVE.

In 1992, the EPA designed an interim groundwater extraction and treatment system. The goal of the interim response was to halt the migration of contaminants toward uncontaminated city municipal wells. The EPA issued a Unilateral Administrative Order (Order) to the potentially responsible party (PRP) for completion of the interim response. The PRP completed the design and began construction of the groundwater extraction and treatment system in the late summer/early fall of 1993. Construction of the interim extraction and treatment system, designated as Extraction Well 1 (EW-1), was completed in May 1994.

In early 1993, the EPA and the MDEQ entered into settlement negotiations with the PRP for the remedial design (RD)/RA of the ROD remedies. Because these negotiations were not

successful, the EPA decided to fund the RD/RA. The MDEQ was chosen as the lead Agency and began the design in 1994.

During the fall of 1994, the MDEQ's consultants conducted a pre-design investigation at the site to determine the exact nature and extent of soil contamination at the Kirsch Company and Wade Electric source areas for the purpose of designing soil remediation systems. A deep aquifer hydrogeological investigation was also conducted to determine whether contamination exists further downgradient than the Agencies had believed. Results of the deep aquifer investigation revealed that there is indeed groundwater contamination further downgradient and that additional investigation was warranted. After the pre-design investigation was complete, the state's consultant began the engineering design for the SVE systems.

During much of 1996, the state negotiated a settlement with the PRP for their takeover of all activities at the site under the direction of the MDEQ. In late summer, an agreement was reached and a Consent Decree (Decree) and Statement of Work were lodged in federal court under the authority of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). The Decree was entered by the court on October 25, 1996.

Also during 1996, the EPA issued a ROD Amendment that altered the 1991 remedy for the site. The ROD Amendment changed groundwater and soil cleanup standards to comply with current state law, eliminated the Wade Electric source area from requiring SVE remediation, and eliminated the requirement of excavation of soils contaminated with polynuclear aromatic hydrocarbons (PNAs) due to changes in the state cleanup criteria.

In late 1997 and early 1998, the PRP conducted an investigation to determine if the interim extraction and treatment system was capturing and removing the entire groundwater contaminant plume and whether or not it could be designated as the final groundwater remedy for the site. In early fall of 1998, a report was submitted to the MDEQ detailing the results of the investigation. In early 1999, the MDEQ determined that an additional groundwater extraction and treatment system was needed to fully capture the lower aquifer contaminant plume and protect a series of industrial pumping wells in the northwest part of Sturgis. The design for the new system called for the installation of an extraction well that would pump 2,000 gallons of contaminated water per minute. The water would be treated by a new 70-foot-tall, 10-foot-diameter air stripper. Contaminant laden off-gasses would be treated with two 13,000 pound vapor phase granular activated carbon units. The project was delayed due to difficulties between the city of Sturgis and Newell Rubbermaid, Inc. (the successor to Kirsch Company) regarding permitting of the discharge of treated effluent into the city's storm and retention pond. These difficulties were resolved and the RD/RA continued under a revised schedule. Construction of the new groundwater extraction and treatment system, designated as Extraction Well 2 (EW-2), was completed in early 2002, with full-time operation commencing on May 13, 2002.

Construction of the SVE system at the Kirsch source area began in December 1996, was completed in March 1997, and became operational at that time. The SVE work was completed in the spring of 2000. Cleanup verification sampling conducted immediately following system shutdown shows an area of contamination above cleanup criteria. The PRPs conducted additional cleanup verification sampling in the summer of 2001 and submitted a report to the MDEQ. The report advocated no further RA in the Kirsch Company source area. Subsequent discussions with Newell Rubbermaid, Inc. resulted in an agreement to install a groundwater extraction well immediately downgradient of the Kirsch Company source area to remove highly contaminated water in the shallow aquifer beneath the source area. Construction of the shallow aquifer extraction well, designated Extraction Well 3 (EW-3), began in August 2003. Construction was completed in November 2003.

During 2006, the MDEQ was approached by the PRP with a proposal to shut down EW-1. The state entered into discussions with the PRP and ultimately agreed to a modified shutdown proposal, in return for intense verification sampling, increased pumping at EW-2 and potentially additional soil and groundwater remediation at the Wade Electric source area. EW-1 was shut down in January 2007. The MDEQ later required it to be turned back on, due to groundwater chemical and hydraulic data that appeared to indicate a loss of capture of the plume when EW-1 is turned off. In the fall of 2008, Newell Rubbermaid, Inc. undertook a drilling program to determine the northern and southern extent of plume migration and plume capture. The report on this field effort was submitted to the MDEQ in late 2008. Results of the investigation appear to support the theory that capture of the deep aquifer contaminant plume can be maintained with the pumping of EW-2 only. However, in order to prove this theory, the MDEQ required Newell Rubbermaid, Inc. to undertake a year-long study of water levels in targeted monitoring wells, while EW-1 is turned off, in order to demonstrate plume capture even with seasonal fluctuations in aquifer characteristics. This study was completed in April 2010. Based upon the results of the study, permanent shutdown of EW-1 was approved by the MDEQ.

In the summer of 2007, Newell Rubbermaid, Inc. conducted a limited soil and groundwater investigation at the Wade Electric source area. Results of this investigation demonstrate the existence of TCE contamination in both soil and groundwater at the Wade Electric source area, in concentrations above Part 201 generic residential criteria.

A major redevelopment project, aimed at turning the former Kirsch Company Plant #1 into retail and residential space was initiated in 2009. The MDEQ was involved in reviewing work plans and overseeing the work to ensure that it complies with all applicable environmental regulations. The project was to be completed in phases. As a result of sampling conducted by the developer as part of work done in support of a Baseline Environmental Assessment, high levels of TCE were discovered. The MDEQ requested that Newell Rubbermaid, Inc. conduct an expanded drilling and sampling program to determine the extent of TCE contamination under and around the former Kirsch Company Plant #1, as well as a reassessment of the soils on the east side of Prospect Street, where SVE had previously been conducted. Results of these studies indicate that widespread TCE contamination still exists on both properties.

The MDEQ completed the Third Five-Year Review (FYR) for the site June 2010. The FYR concluded that the remedy is protective in the short term because actions to date prevent current exposures. In the long term, the site and its remedies are expected to be protective of human health and the environment upon attainment of groundwater cleanup goals, which is expected to require 20 to 30 years to achieve.

In 2011/12, Newell Rubbermaid, Inc. constructed a new plant to treat contaminated groundwater from EW-3 which is fully operational. Demolition of the old EW-1/EW-3 treatment plant took place in late 2013.

Most of 2013 was spent negotiating and implementing a work plan with Newell Rubbermaid, Inc. to conduct a soil leach testing study for the purpose of potentially setting site-specific cleanup standards for TCE and PCE in soil.

Most of 2014 was spent evaluating results of the leach testing study conducted by Newell Rubbermaid, Inc. The MDEQ hired an outside statistical expert to assist in evaluating the Rubbermaid leach testing study and subsequent statistical analysis.

In 2015 MDEQ completed the Fourth FYR for the site. The FYR stated that the remedy is

is protective in the short term because actions to date prevent current exposures. However, in order for the remedy to be protective in the long term, soil and groundwater remedial actions will need to be completed, which are expected to require 20 to 30 years. The FYR made several recommendations, including the placement of deed restrictions, continuing to work with EPA to address the Wade Electric property, continuing to work with the PRP to implement adequate remedial actions at the Kirsch source area, working with the PRP to take action to reduce TCE concentrations in the area of monitoring well W-44 and address the vapor intrusion (VI) exposure pathway at the site.

SITE STATUS

The PRP, Newell Rubbermaid, Inc., is currently operating the groundwater extraction and treatment systems in accordance with the Decree.

An expanded soil and groundwater pre-design investigation is needed at the Wade Electric source area. Newell Rubbermaid, Inc. claims no liability for this part of the site. The MDEQ needs to further engage EPA, to secure federal dollars to undertake the expanded investigation. The MDEQ is currently working to develop a detailed scope of work and cost estimate for the EPA to evaluate.

The PRP recently purchased the portion of the property west of Prospect. The redevelopment project is no longer taking place and the buildings are scheduled to be demolished between November 2017 and January 2018. Demolition is expected to take over a month because the building materials are being recycled by the demolition contractor. Contamination in the soil underneath the northern building on the property has not been adequately characterized. After the buildings are removed from the property additional soil samples will be collected. Once all of the soils on the portion of the property west of Prospect are characterized, the contaminated soils on this portion of the property will be excavated. The excavation will include soils to a depth of 5 feet. After the soil excavation is completed, a soil vapor extraction/air sparge (AS) system will be installed to address the soil contamination from 5 to 60 feet. It is expected that the SVE/AS system will be installed in 2018.

In 2015 the leach testing study and statistical evaluation was completed. The final revised report was submitted to MDEQ in November 2015. It was originally anticipated that site-specific criteria would be developed using the leach testing study and statistical evaluation, however, in 2017 it was determined that, because of the discovery of a VI issue at the site, that MDEQ would not be approving the use of a site-specific criteria that would have been less protective than what was identified in the Record of Decision (ROD). Soil removal on the parcel of property to the east of Prospect is expected to take place in 2019, along with the installation of an SVE/AS system.

Late in 2015 the PRP submitted a draft VI investigation workplan. The VI investigation began in the spring of 2016. The first phase of the investigation included the installation of passive and active soil gas sampling points throughout the property and the installation of sub-slab vapor pins in the buildings located on the property. This phase also included the installation of passive soil gas sampling points throughout the neighborhood surrounding the property. Sub-slab results in the Industrial Pipe And Maintenance building resulted in the installation of a sub-slab depressurization system in the building to mitigate vapors. The second phase of the investigation included the installation of active soil gas samplers throughout the neighborhood. The third phase of the investigation involved the collection of indoor air samples from all of the houses along Hatch Street between Fourth and Prospect and all the homes on Fourth and Prospect, north of West Street. Newell has gained access to 38 homes, with nine remaining. Of the 38 homes that had indoor air samples collected, five had vapor mitigation systems installed and three required evacuation. in 2017, MDEQ

and the PRP worked together to identify the likely vapor plume. All homes within this area, that did not already have a mitigation system installed, had sub-slab vapor pins installed to collect a sample from underneath the slab of the home to identify the potential for vapors to enter into the home. This included the installation of sub-slab monitoring points in 17 homes. Of the 17 homes sampled, ten of them identified concentrations of vapors that could potentially result in concentrations inside the homes that would pose a risk. The PRP decided to presumptively install mitigation systems at these ten homes. The installation of these mitigation systems will be completed in December 2017 and the PRP will continue to monitor all homes in the area of the vapor plume.

During the VI investigation there were high concentrations of TCE in soil gas samples collected in the parking lot located south of Hatch Street and west of Prospect Street. The PRP collected soil samples from the parking lot and found concentrations of TCE in the soil above allowable concentrations identified in the ROD. The PRP is developing a plan to remove contaminated soils to a depth of 5 feet and then install a SVE/AS system to address soils from 5 to 60 feet.

ENFORCEMENT STATUS
All work at the site is being conducted by the PRP (who is liable under both the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, as amended, and Part 201 in accordance with the 1996 Decree.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/30/1991**

The soil remedy consists of SVE and PNA excavation at the Wade Electric and Kirsch Company source areas. Groundwater is to be remedied via pump and treat methods. Operation and maintenance (O & M) costs include $46,600 per year to run the SVE systems and $565,000 per year to run the pump and treat system. Groundwater pump and treat was estimated to take place for a period of 20 years.

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 1 *ESD:* 0 **Effective 09/10/1996**

The amended ROD changes cleanup standards to be consistent with current standards. This change eliminates the need for any soil remediation at the Wade Electric source area as well as the need for excavation of PNA contaminated soil at the Kirsch Company source area. The amendment also changes the cleanup standards for the volatile organic compound cleanup in both soils at the Kirsch Company source area as well as groundwater throughout the site.

Response Accomplishments: Completed

Remedial Investigation

State-lead, fund-financed Remedial Investigation (RI) was conducted to identify and delineate source areas and determine the nature and extent of the groundwater contaminant plume in shallow and deep aquifers. This was accomplished primarily through the use of soil gas surveys, soil borings, and the installation and sampling of vertically profiled groundwater monitoring wells.

Start Date: 09/01/1987	Primary Cost:	$2,264,087	Source: Federal
End Date: 05/01/1991	Secondary Cost:	$0	Source:

Interim Response

Interim groundwater extraction and treatment was conducted by a PRP pursuant to an EPA Order and later pursuant to a Decree with the MDEQ. The estimated private party costs shown include capital and annual operating costs of the interim response.

Start Date: 10/01/1993	Primary Cost:	$10,000,000	Source: Private
End Date: 12/31/2001	Secondary Cost:	$0	Source: <None>

Remedial Design

This design was for an SVE system at the Kirsch Company source area and supplemental groundwater investigation. It was originally conducted by state consultants but was subsequently taken over by the PRP pursuant to a Decree between the state and the Kirsch Company. Design costs incurred by the PRP are estimated at approximately $120,000.

Start Date: 10/01/1994	Primary Cost:	$840,970	Source: Federal
End Date: 01/01/1996	Secondary Cost:	$120,000	Source: Private

Remedial Action

This RA consisted of the construction and operation of the Kirsch Company SVE system. Costs associated with this portion of the project were incurred entirely by the PRP and are unknown to the state.

Start Date: 12/01/1996	Primary Cost:	$0	Source: Private
End Date: 03/01/1997	Secondary Cost:	$0	Source:

5 Year Review

The First FYR for the site was conducted in 1999 and reaffirmed the remedial decisions made in the amended ROD.

Start Date: 01/01/1999	Primary Cost:	$0	Source: <None>
End Date: 10/15/1999	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

Remedial Design This subsequent RD was for the engineering work associated with a second groundwater extraction and treatment system. This system, in conjunction with the interim response system, constitutes the final remedy for the deep aquifer at the site. Costs shown are estimated.

Start Date: *01/20/1999*	Primary Cost:	$100,000	Source:	Private
End Date: *04/01/2001*	Secondary Cost:	$0	Source:	

Remedial Action This subsequent RA was for the construction and operation of the second groundwater extraction and treatment system. EW-2 pumps at a rate of 2,000 gallons per minute. Treatment of the groundwater is accomplished via air stripping. Off-gasses are treated with vapor phase carbon. Costs shown are estimated.

Start Date: *06/18/2001*	Primary Cost:	$4,000,000	Source:	Private
End Date: *05/13/2002*	Secondary Cost:	$0	Source:	

Remedial Action This subsequent RA was for the installation of a shallow groundwater extraction well near the Kirsch source area. This well, designated EW-3, is piped to the existing air stripper for EW-1.

Start Date: *08/28/2003*	Primary Cost:	$250,000	Source:	Private
End Date: *11/21/2003*	Secondary Cost:	$0	Source:	

5 Year Review The Second FYR started on September 1, 2004. The document was signed by the EPA on June 30, 2005. The FYR concluded that the remedy is protective in the short term. All expenditures of state funds have been recovered from the PRP, in accordance with the Decree.

Start Date: *09/01/2004*	Primary Cost:	$0	Source:	<None>
End Date: *06/30/2005*	Secondary Cost:	$0	Source:	

5 Year Review The Third FYR started on June 1, 2009. The document was signed by the EPA on June 30, 2010. The FYR concluded that the remedy is protective in the short term because actions to date prevent current exposures. In the long term, the site and its remedies are expected to be protective of human health and the environment upon attainment of groundwater cleanup goals, which is expected to require 20 to 30 years to achieve.

Start Date: *06/01/2009*	Primary Cost:	$0	Source:	State
End Date: *06/30/2010*	Secondary Cost:	$0	Source:	

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Completed

5 Year Review

The Fourth FYR stated that the remedy is protective in the short term because actions to date prevent current exposures. However, in order for the remedy to be protective in the long term, soil and groundwater remedial actions will need to be completed, which are expected to require 20 to 30 years. The FYR made several recommendations, including the placement of deed restrictions, continuing to work with EPA to address the Wade Electric property, continuing to work with the PRP to implement adequate remedial actions at the Kirsch source area, working with the PRP to take action to reduce TCE concentrations in the area of monitoring well W-44 and address the VI exposure pathway at the site.

Start Date:	*06/01/2014*	Primary Cost:	$0	Source:
End Date:	*06/25/2015*	Secondary Cost:	$0	Source:

Response Accomplishments: In Progress

Remedial Investigation

This RI involved the completion of a VI investigation on the site and also in the surrounding neighborhood. Costs associated with this portion of the project were incurred entirely by the PRP and are unknown by the State.

Start Date:	*06/06/2016*	Primary Cost:	$0	Source:
End Date:	*12/31/2018*	Secondary Cost:	$0	Source:

Remedial Action

This RA involves the installation of vapor mitigation systems in a commercial building on the property and at 15 homes in the neighborhood to the south of the site. Costs associated with this portion of the project were incurred entirely by the PRP and are unknown to the state.

Start Date:	*08/19/2016*	Primary Cost:	$0	Source:
End Date:	*12/01/2017*	Secondary Cost:	$0	Source:

Remedial Design

Engineering design and pilot studies related to addressing TCE contaminated soils at the Kirsch Company Plant #1 on both the east and west sides of Prospect Street.

Start Date:	*06/01/2017*	Primary Cost:	$200,000	Source: Private
End Date:	*09/30/2019*	Secondary Cost:	$0	Source:

Response Accomplishments: Ongoing

Operation and Maintenance

This includes the operation of the pump and treat systems until cleanup standards are reached. This is expected to take an estimated 20 to 30 years. Costs associated with O&M are based on an estimated $600,000 per year for an estimated 20 years for a total of $12,000,000.

Start Date:	*05/13/2002*	Primary Cost:	$600,000	Source: Private
End Date:	*01/01/2022*	Secondary Cost:	$0	Source:

OPERABLE UNIT 00: Entire Site

Response Accomplishments: Ongoing

Operation and Maintenance This O & M is associated with the routine indoor air sampling that will be conducted in the neighborhood surrounding the site. Costs associated with this portion of the project were incurred entirely by the PRP and are unknown to the state.

Start Date:	*12/01/2016*	Primary Cost:	$0	Source:
End Date:	*01/01/2036*	Secondary Cost:	$0	Source:

Response Accomplishments: Future Need

Remedial Design Engineering design of an expansion of the existing deep aquifer pump and treat system to address far downgradient TCE impacts.

Start Date:	*09/28/2018*	Primary Cost:	$250,000	Source: Private
End Date:	*09/30/2019*	Secondary Cost:	$0	Source:

Remedial Design Conduct pre-design soil and groundwater at the Wade Electric source area. Design remediation system to address this contamination. Costs shown below are estimates.

Start Date:	*09/28/2018*	Primary Cost:	$300,000	Source: Private
End Date:	*09/30/2019*	Secondary Cost:	$0	Source:

Remedial Action Implement RA to address soil contamination at the Kirsch Company Plant #1 on both the east and west sides of Prospect Street along with the IPM Parking lot.

Start Date:	*10/01/2018*	Primary Cost:	$2,000,000	Source: Private
End Date:	*03/31/2020*	Secondary Cost:	$0	Source:

5 Year Review The next FYR is due in June 2020.

Start Date:	*06/01/2019*	Primary Cost:	$0	Source:
End Date:	*06/01/2020*	Secondary Cost:	$0	Source:

Remedial Action Construction and one year of operation of an expansion to the deep aquifer pump and treat system to address far downgradient TCE impacts.

Start Date:	*09/30/2019*	Primary Cost:	$1,500,000	Source: Private
End Date:	*09/30/2020*	Secondary Cost:	$0	Source:

Remedial Action Implement RA to address soil and groundwater contamination at the Wade Electric source area. Costs shown below are estimates.

Start Date:	*10/01/2019*	Primary Cost:	$1,500,000	Source: Private
End Date:	*09/30/2037*	Secondary Cost:	$0	Source:

FEDERALLY FUNDED COOPERATIVE AGREEMENTS

Cooperative Agreement Number V005932-01 : Closed

Lead Agency Activity	Activity Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Design	$1,179,232	$0	$0	$840,970	$0
Remedial Investigation	$2,264,462	$0	$0	$2,264,087	$0
Totals:	$3,443,694	$0	$0	$3,105,057	$0

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V985560-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
5 Year Review	$1,146	$0	$0	$1,146	$0

Cooperative Agreement Number V995260-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Negotiations	$42,790	$0	$0	$42,790	$0

Cooperative Agreement Number V995258-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
PRP Oversight	$50,640	$0	$0	$50,432	$0

Cooperative Agreement Number V995259-01 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Remedial Design	$1,175	$0	$0	$1,175	$0
Totals:	$95,751	$0	$0	$95,543	$0

LEGISLATIVE REPORT
Fiscal Year 2017

Site Name: DSC McLouth Steel-Gibraltar Pl
28000 West Jefferson
Gibraltar , MI

County: Wayne
MDEQ District Location: Southeast MI
Managed By: RRD-Superfund

Federal Site Code: QW
State Site ID#: 82001496
State Site Score: 18

LOCATION

DSC McLouth Steel-Gibraltar Plant site was the former McLouth Steel Company Holdings until 1996, then purchased by Detroit Steel Corporation (DSC) Ltd. also in 1996, and is located at 28000 West Jefferson in the city of Gibraltar, Wayne County, Michigan. The entire site is comprised of approximately 350 acres total. The inactive Countywide Landfill, located at 15701 Vreeland Road is in the western portion of the site. The Countywide Landfill historically accepted steel production waste from McLouth Steel Products Plant in Trenton as well as the Gibraltar plant, and later operated as a demolition debris landfill. A former quarry with an adjacent pond, is located south of the landfill.

The eastern half of the site consists of the former Landfills 1A and 1B, their associated leachate collection and treatment lagoons, and the Tandem Mill Pond. The leachate lagoons historically discharged fluids through an outfall into the Frank and Poet Drain.

The Frank and Poet Drain, which flows into Brownstown Creek in the southern area of the site, and the Penn Central Railroad tracks bisect the site generally from north to south. Both are located between Countywide Landfill and the Landfills 1A and 1B. Brownstown Creek intersects the Frank and Poet Drain in the southern portion of the site and then connects to the Detroit River to the southeast. The site is bounded by West Jefferson Avenue to the east, Vreeland Road to the north, Fort Street and open land to the west, and Gibraltar Road to the south. Land use around the site include industrial to the north, small industrial and commercial to the east and south, and residential to the southeast. The Humbug Marsh Unit of the Detroit River International Wildlife Refuge and the Detroit River is located adjacent and east of the site.

SITE HISTORY

Operable Unit (OU) 00 Entire Site

The McLouth Steel Products Company Gibraltar Plant was developed in the early 1950's. Operations at the plant included steel finishing, annealing, pickling, and cold rolling processes as well as associated storage and shipping operations. McLouth Steel filed for Chapter 11 Bankruptcy on September 29, 1995. Plant operations ceased in July 1996. On July 11, 1996, the sale of McLouth's assets to Hamlin Holdings, Incorporated, was approved by the Bankruptcy Court. On August 14, 1996, title for the McLouth Steel-Gibraltar Plant and other assets were by contemporaneous assignment transferred to Detroit Steel Company (DSC).

DSC did not file a Baseline Environmental Assessment (BEA) within 45 days of purchasing the site and the MDEQ determined DSC became legally liable for hazardous substance releases or threat of release to the environment from the leachate lagoons, Tandem Mill Pond, Landfills 1A and 1B, and Countywide Landfill. DSC conducted environmental investigations at the site beginning in 1997.

An Administrative Order (Docket No. R7003-5-99-003) between the EPA and DSC was

executed on June 21,1999, instructing DSC to conduct both immediate emergency measures and continuing emergency measures in addressing the oily waste material located in the Tandem Mill Pond to protect wildlife or wildlife habitat from any harmful effects of solid waste. DSC identified the source of the accumulating free oil waste in the Tandem Mill Pond as a sewer discharge pipe (oily water from the plant's basements) and residual oil which adhered to the pond banks.

DSC developed a BEA, dated May 22, 1997, for the southwest corner of the site. However, development of this area never occured.

In July 1999, the EPA received a report titled Project and Environmental Summary for the Made in Detroit Development Group. This report was the first proposed Brownfield type of development to include the entire DSC site. However, this proposed Brownfield redevelopment was never undertaken.

A Consent Order (WMD Order No. 111-15-99) (Order) was finalized between DSC, the MDEQ, and the Michigan Department of Attorney General in December 1999. The Order instructed DSC to do the following: investigation and evaluation of remedial measures through remedial action plans; submit a Quality Assurance Plan and Health and Safety Plan; submit interim measures work plans and implement the work to address exposure of migrating birds to floating oil in the Tandem Mill Pond; mitigate all conditions that posed an imminent or substantial threat to human health or the environment; and create a trust fund for disbursement of funds for corrective action and response activities. A November 2000 BEA was also completed at this time.

From 2000 through 2003, limited operations resumed at the plant building but ceased at the end of 2003. During the interim, DSC performed maintenance and limited environmental cleanup at the site. As of December 2002, DSC's ability to address most the environmental issues was severely limited by financial constraints.

Leachates from Landfills 1A and 1B and Countywide Landfill were contaminated with many compounds including lead, mercury, and polychlorinated biphenyls (PCBs). Analytical data from samples collected on and off the site revealed these contaminants in surface water, sediment, groundwater, and soils above background levels.

In 2006 a Phase II Environmental Site Assessment for the building was completed, followed by a September 2006 BEA and Compliance with Due Care Obligations documents.

On July 10, 2007, the plant and 42-acres of property surrounding the plant was placed under control of a court appointed receiver. Subsequently, the plant and surrounding land was sold to Steel Rolling Holdings, Incorporated, which operated the plant as a rolling mill.

Responding to a request by the MDEQ in 2010, the EPA Emergency Response Branch, constructed a leachate collection system for the Countywide Landfill, filled the eastern and western leachate ponds with stone and covered them with clay, installed a loading pipe with level indicator, leveled and graded the cap, and seeded the exposed area of the landfill. Three aerators were also added to the leachate treatment system for the ponds and lagoons. The Emergency Response Branch referred the site for National Priorities List (NPL) consideration because of the need for long-term cleanup actions, including the need for a final remedy to cap the Landfills 1A and 1B and Countywide Landfill; close the ponds and lagoons; find an alternative leachate disposal method and conduct long-term remedial action to minimize and dispose of leachate.

The MDEQ conducted an NPL reassessment of the entire site (including the Countywide

Landfill, Tandem Mill Pond, the Lagoons, and Landfills 1A and 1B) on July 24, 2013. Despite the interim actions being conducted through the operation of the Countywide Landfill leachate collection system, uncontrolled exposures still existed at the site. The report documented that the site continued to pose a threat to human health and the environment; therefore, the EPA assigned a contractor to score the site and prepare a Hazard Ranking System Score documentation record. A support letter from the Governor of Michigan to the EPA requesting placement of the site onto the NPL was signed on February 15, 2014.

The plant was purchased from Steel Rolling Holdings in February 2015 by the Ferrogon Corporation and per agreement between EPA and MDEQ, carved out of the current site property as a Brownfield Redevelopment. The plant is undergoing remedial investigation (RI) and redevelopment under state and county Brownfield Reuse Programs.

In a letter dated February 16, 2015, from DSC to the Wayne County Treasurer, DSC gave notice of its intention to discontinue payment of property taxes for the entire site and to begin the transfer of ownership/control of the property to Wayne County through the tax reversion process.

The site was added to NPL site on March 26, 2015.

Ferrogon completed development of a Phase I Environmental Site Assessment, dated February 2, 2015, a new BEA dated April 1, 2015, and a Phase II Environmental Site Assessment dated April 5, 2015.

Remedial investigation and removal actions at the plant continued throughout 2015.

OU 01 Countywide Landfill

Countywide Landfill is located directly west of the Frank and Poet Drain, the Penn Central Railroad Track and the former McLouth Gibraltar Plant. The landfill is approximately 244-acres in size and was historically used for steel production waste disposal associated with both the McLouth Trenton and Gibraltar plants. The landfill was licensed as a Type II landfill under Act 87 of Public Acts of 1965 in September 1, 1976, for the entire 244-acres. DSC obtained the landfill in 1996 as part of the McLouth Steel bankruptcy sale of the site. The landfill was licensed to operate as a Type III landfill from 1989 through 2007 to allow it to receive and dispose of construction debris. The landfill has not received any additional waste material from 2010 to current day. Percolation of water through the waste produced a leachate similar to that produced in Landfills 1A and 1B which historically migrated into Brownstown Creek and Frank and Poet Drain. At times the leachate has been found to contain barium, carbazole, mercury, silver, PCBs, selenium, vanadium, zinc, cyanide, carbon disulfide, phosphate, napthalene, phenol, and 2,4-dimethlyphenol.

Historical aerial photographs from the 1970's show a quarry located south of Countywide Landfill. The quarry became a landfilling area in the late 1970's into the mid 1980s when all but a small portion of the quarry was filled. The unfilled area of the quarry contained ponded water.

Between August 2008 and March 2009, the MDEQ assessed the permeability of the Countywide Landfill cap, collected and disposed of approximately six million gallons of leachate, and arranged for additional clay to be added to the cap.

On August 14, 2008, DSC verbally notified the MDEQ that it lacked financial resources to continue operating the treatment system. The MDEQ notified the EPA of the potential threat if the treatment system was abandoned, including leachate breakthrough and eventual release of the leachate to the Frank and Poet Drain. The MDEQ issued a violation notice to

DSC on September 2, 2008, and requested assistance from the EPA in a letter dated September 16, 2008.

With DSC becoming financially unviable, the major issue confronting the site was the faulty Countywide Landfill leachate collection system and the potential overflow of leachate into the Frank and Poet Drain. The leachate collection system included two leachate wet wells and pumps equipped with floats. Currently, the floats do not work, requiring manual activation of the pumps. Leachate breakthroughs continued to occur without proper operation of the pumps. One of the landfill cells is adjacent to Jefferson Avenue and uncontrolled leachate breakthroughs may result in public contact with the leachate.

On March 1, 2009, the Emergency Response Branch mobilized to the site to conduct removal actions. The Emergency Response Branch completed construction of the Countywide Landfill upper leachate collection lines, collected and disposed of more than three million gallons of leachate, filled the eastern and western leachate ponds with stone and then covered with clay; leveled and graded the cap; seeded the exposed cap areas, and conducted engineering and treatability testing for a leachate treatment system. The Emergency Response Branch referred the entire DSC site for NPL consideration because of the long term cleanup actions required for the entire site, including Countywide Landfill. The EPA had indicated a willingness to construct one system to handle both the Countywide Landfill and Landfills 1A and 1B leachate collection with the stipulation that an entity was available to take over the operation after one year. However, the combined leachate system was never constructed.

Countywide Landfill is no longer operational and does not have an operating license.

Through 2015, the MDEQ Office of Waste Management and Radiological Protection managed the Countywide Landfill leachate collection and hauling off-site for proper disposal through a State Contract funded by the Perpetual Care Fund and a forfeited landfill surety bond, totaling $1.6 million dollars, which was established for financial assurance required when the site was previously licensed under Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Approximately 10,000 gallons per week of leachate was pumped and hauled off-site for proper disposal.

Additional MDEQ site maintenance and leachate management activities, also paid from the Perpetual Care Fund, via the services of a full-time contract employee hired to pump and haul leachate, included the collection of leachate from seven standpipes located at the toe of the slope of the Countywide Landfill and leachate from a storage tank prior to discharge to the Vreeland Road sewer which discharges into the South Huron Valley Utility Authority wastewater treatment plant for disposal. In an effort to address storm water management issues, clean clay soils from a city of Detroit construction project was hauled on-site and used to fill in some of the storm water ponds. In the past, soils from Michigan Department of Transportation projects have been used to cap the landfill.

OU 02 Tandem Mill Pond, Leachate Lagoon System and Landfills 1A and 1B

Landfills 1A and 1B, and the associated leachate treatment ponds and lagoons along with the closed Tandem Mill Pond, which historically received liquid wastes from the McLouth milling operation, are located on the east side of the site and south of the former McLouth Gibraltar Steel Mill building. Both Landfills 1A and 1B have been retrofitted with a partial perimeter leachate collection system. Leachate from Landfill 1B is discharged directly to the Tandem Mill Pond while leachate from Landfill 1A was dishcharged into the Acid Dosing Pond prior to disposal into the Tandem Mill pond.

Landfills 1A and 1B historically received steel production waste that was created during operation of the rolling facility. Percolation of groundwater and precipitation through the waste created a leachate containing high levels of phenolic compounds, metals, pH greater than 12.5 standard units, biological oxidation demand, and toxicity. DSC installed a pretreatment system to treat leachate from Landfills 1A and 1B before it was discharged into the water treatment ponds. DSC also installed a water pretreatment system for oil and grease removal that discharged to the city of Gibraltar Sanitary Sewer System.

Landfill 1B was filled from the 1960s into the early 1970s, prior to landfill licensing requirements. It was subsequently covered with a clay cap. Landfill 1A was included in an industrial waste landfil license issued to McLouth Steel in 1976. This area was filled during the late 1970s and early 1980s, then capped in 1984. Wastes placed in these two landfills included wastewater treatment plant filter cake, air pollution control sludges and dusts, iron and steel scale and grit, refractory materials and slag. Areas 2 and 3 located west of these landfills were included in the original license, but were never developed.

The steel plant's wastewater treatment system included a series of basins and ponds, including the Tandem Mill Pond. The Tandem Mill Pond was an oil separation pond approximately 6.2 acres in size that was sectioned into at least four smaller ponds. Each section of the Tandem Mill Pond was divided by soil and gravel berms with overgrown vegetation along the berms. Two larger ponds, the Acid Dosing Pond and the Sludge Drying Pond are located south of the Tandem Mill Pond. Process water and cooling water containing lubricating, hydraulic, rolling, and slushing oils, both petroleum and animal based, from the plant was pumped into the Tandem Mill Pond where it was acidified with spent sulfuric acid from the Acid Dosing Pond to allow oil to separate from the water. Water from the Tandem Mill pond was then pumped through Outfall No. 01B (via the National Pollution Discharge and Elimination System [NPDES] Permit No. MI004227) into the Frank and Poet Drain. Separated oil was periodically removed by skimming and then disposed of off-site. The composition of the non-aqueous materials in the Tandem Mill Pond included free-floating oil and rag. The rag appeared as a congealed emulsion of animal oils and fats, sediment, and water. Since the rag was a denser material, it tended to accumulate on the bottom of the Tandem Mill pond. In 1997, approximately 300,000 gallons of free-floating oil and rag material were removed from the Tandem Mill Pond. By May 1999, approximately 57,500 gallons were removed, with an additional 4,800 gallons removed by June 1999.

DSC implemented an oil management program to eliminate the oil discharges from the Tandem Mill Pond. Automatic discharges from the basement sumps of the plant were ceased in August 1999. The water from the basement sumps was then pumped into a vacuum truck and discharged into an oil/water separator tank. The water was drained into the Tandem Mill Pond, while the oil was disposed of off-site.

On June 22, 1999, after the discovery of 15 dead or dying migratory birds in the Tandem Mill Pond area, the EPA issued a Resource Conservation and Recovery Act Administrative Order (Docket No. R7003-5-99-003) to DSC for imminent and substantial endangerment associated with oil accumulation.

DSC prepared a Continuing Emergency Measures Work Plan, which was approved by the EPA on November 24, 1999, to prevent any migratory birds from exposure to oil present in and around the Tandem Mill Pond, therefore, preventing any harmful acute, sub-acute, or chronic effects.

The ponds and three retention basins served as leachate collection ponds for Landfills 1A and 1B. The leachate was treated chemically, biologically and by aeration before discharging into the Frank and Poet Drain under a now expired NPDES Permit with no

future financial assurance mechanism. Oils and storm water also accumulated in the ponds and lagoons and mixed in with the leachate and discharge fluids. The system does not currently receive any wastewater from the steel mill. The treatment system consisted of four lagoon cells and a pH adjustment station. The leachate was pumped from two wet wells into Pond 1. It was subsequently pH adjusted and mechanically aerated before discharging through Outfall No. 01B into the Frank and Poet Drain. Without proper operation and maintenance of the treatment system, the ponds would occasionally overflow into an adjacent ditch that leads to the Frank and Poet Drain. The first pond contains untreated leachate with a pH of 11-12 standard unites and levels of ammonia and phenols which are toxic to aquatic life. Discharges from the final treatment pond have often violated NPDES Permit limits for Chronic and Acute Whole Effluent Toxicity when the wastewater did not receive adequate aeration prior to discharge. Under DSC ownership, the system was not properly maintained to ensure compliance with Permit limits.

In 2000, DSC began to dewater the Tandem Mill Pond in an effort to close the pond. By spring 2001, sediment on the western side of the pond was exposed. Up to four feet of sediment and clay was removed to ensure there was no mixing of contaminated and clean soils.

On February 7, 2007, the EPA issued a letter of non-compliance in connection with the 1999 Order. Observations recorded as a result of inspections conducted by the MDEQ and the U.S. Fish and Wildlife Service in January 2007 identified free oil on the surface of the Tandem Mill Pond and in soil adjacent to the pond area. Personnel also observed wildlife deterrents to be unused or non-operational. In a letter dated March 13, 2007, a request was sent to the EPA for an evaluation of the Tandem Mill Pond to determine if a time critical removal action was needed.

Emergency Response Branch also returned to the site in October 2015 to investigate and initiate leachate monitoring and hauling of fluids from the Landfills 1A and 1B leachate sumps. Initial sampling indicated pH levels up to 12.4 S.U. to consider the leachate fluids hazardous materials to be hauled off site for appropriate disposal.

In October 2016, EPA began development of the RI/Feasibility Study (FS) Work plan outlining the site-wide RIs.

SITE STATUS

OU 00 Entire Site

Although no longer physically part of the Superfund Site, Brownfield remediation work continued at the former McLouth Steel Plant throughout 2016. Work included removal of interior asbestos; removal and disposal of oily sludge from the basements and the cleaning, pumping, disposal, and backfilling of trenches and pits located in the building; installing stormwater improvements/upgrades and the removal and/or capping of existing storm water components within the facility that historically connected with the former settling ponds/lagoons. Additional work included excavation areas surrounding piping runs thus exposing former drainage lines/pipes to cut and cap thereby assuring that past connections are severed so that potential contaminant fluids can no longer be transported to the former settling ponds/lagoons. In 2017, a two year quarterly sampling investigation of the building monitoring well network began.

In the spring of 2017, EPA conducted a site-wide Groundwater and Surface Water Investigation as part of the RI/FS development. The work plan for this specific investigation was developed, reviewed, commented on and approved by both the EPA and MDEQ in the fall of 2016.

Throughout 2017, the EPA consultant and the MDEQ continued collaboration on reviewing, commenting and developing the site wide RI/FS workplans.

OU 01 Countywide Landfill

Beginning in October 2015, as an interim action, EPA initiated a quarterly sampling plan to collect surface water samples from several ponds northeast of the Countywide Landfill and from the leachate collection ditch and the leachate collection sump for the landfill. The sampling was conducted in October 2015, March, June, September, October 2016 and January, March, June and October 2017. The October 2017 sampling event was the last to be done for this interim action. Sample analysis indicated contaminants of concern are present in the water bodies but at very low concentratons or non-detect.

With the depletion of the Perpetual Care Fund, a new leachate hauling contract was implemented by the State in October 2016. In 2017, the contract was extended for one year to October 2018. The 2017 average volumes of leachate collected and hauled away for disposal remained consistent with volumes reported in 2016. It is expected the leachate hauling from the landfill will continue into the near future until the site-wide EPA remedy is implemented.

OU 02 Tandem Mill Pond, Leachate Lagoons and Landfills 1A and 1B

As part of the emergency response by the Emergency Response Branch in 2016, two leachate haulings were conducted. Field tests indicated the leachate collected from the Tandem Mill Pond, the Leachate Lagoons and Landfills 1A and 1B, were considered hazardous material as pH readings from 12.4 and above were recorded. Emergency Response Branch continued to visually monitor this area until October 2016. At that time an Interim Record of Decision (ROD) was developed and implemented to allow an EPA Contractor to continue the visual monitoring of the leachate to determine when the leachate would be collected and removed. EPA is funding this action with a ten percent match funding from the MDEQ under the State Superfund Contract (SSC). This Interim ROD action is expected to proceed through 2021, or until the entire site-wide remedy is implemented.

ENFORCEMENT STATUS

The EPA issued an Administrative Order (AOC) on June 21, 1999, instructing DSC to conduct both immediate emergency measures and continuing emergency measures in addressing the oily waste material located in the Tandem Mill Pond to protect wildlife or wildlife habitat from any harmful effects of solid waste.

Both the Trenton and Gibraltar facilities were subject to the requirements of the Comprehensive Corrective Action and Remedial Consent Order (Order) (WMD Order No.111-15-99) executed on December 17, 1999. The Order was spread over fifteen years and until 2002 DSC was performing remedial actions in accordance with the Order's schedule. DSC as of 2003 had spent approximately $4.5 million to perform corrective and remedial actions at the facilities. At Gibraltar this included: 1) emergency measures, floating oil removal and 70 percent closure of the Tandem Mill Pond, 2) construction of leachate collection system for Landfills 1A and 1B, 3) leachate collection, treatment and disposal from Landfills 1A and 1B.

On June 22, 1999, after the discovery of 15 dead or dying migratory birds in the Tandem Mill Pond area, the EPA issued a Resource Conservation and Recovery Act Administrative Order (Docket No. R7003-5-99-003) to DSC for imminent and substantial endangerment associated with oil accumulation.

SPECIAL CONSIDERATIONS
None.

OPERABLE UNITS

00	Entire Site
01	Countywide Landfill
02	TMP, Leachate Lagoons and LF1A &1B

OPERABLE UNIT 00: Entire Site

Response Accomplishments: In Progress

Remedial Investigation
EPA began the RI/FS process at this site in October 2016, beginning with the development of the initial draft RI/FS workplan.

Start Date: 08/10/2015 Primary Cost: $1,500,000 Source: Federal
End Date: 03/01/2020 Secondary Cost: $0 Source:

OPERABLE UNIT 01: Countywide Landfill

Response Accomplishments: Completed

Emergency
At the request of the MDEQ, Emergency Response Branch updated the current Countywide Landfill leachate collection system, filled in the eastern and western leachate ponds with stone and covered with clay; installed a loading pipe with level indicator, leveled and graded the cap and seeded the exposed areas of the landfill.

Start Date: 03/22/2009 Primary Cost: $2,000,000 Source: Federal
End Date: 03/12/2010 Secondary Cost: $0 Source:

Monitoring
The EPA contractor completed quarterly sampling events (October 2015, January, April, July, October 2016; January, March, June, and October 2017) of the surface water ponds, drainage ditch and leachate collection sump for the Countywide Landfill. The sampling timeframe ended with the October 2017 event.

Start Date: 10/01/2015 Primary Cost: $150,000 Source: Federal
End Date: 10/01/2017 Secondary Cost: $0 Source:

OPERABLE UNIT 01: Countywide Landfill

Response Accomplishments: In Progress

Interim Response

The previous MDEQ contract funded by a Perpetual Care Fund and managed by the office of Waste Management and Radiological Protection, for the collection, removal and the disposal of non-hazardous leachate from the Countywide Landfill ended in September 2016. A new MDEQ leachate hauling contract began on October 1, 2016 to continue these activities. The contract was renewed for one year in 2017 to October 2018. It is anticipated the contract will be renewed, as needed, until the site-wide remedy is in place.

Start Date:	*10/01/2016*	Primary Cost:	$150,000	Source: State
End Date:	*10/01/2018*	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: TMP, Leachate Lagoons and LF1A &1B

Response Accomplishments: Decision Documents

Record of Decision *Amendment:* 0 *ESD:* 0 **Effective 09/02/2016**

The interim ROD was signed by the EPA on September 2, 2016 and the MDEQ concurred with the interim ROD.

The interim ROD was developed to continue the 2015 pumping and collection of leachate from the collection ponds for Landfills 1A and 1B which was begun by Emergency Response Branch in 2015 as a time critical action. The removal action is needed to stablize the leachate. EPA estimated that approximately two million gallons of leachate are generated each year from these two landfills. EPA will collect the leachate from the ponds two leachate collection sumps and haul it off-site for disposal at an approved facility. This interim action is funded to 2021, with the State providing a ten percent match of the annual costs via an SSC, and is intended to be in effect until the site-wide remedy is implemented.

Response Accomplishments: Completed

Emergency

Emergency Response Branch took over the visual inspection, collection and removal of hazardous leachate from Landfills 1A and 1B in October 2015. This action ended on October 1, 2016, when the interim ROD activities were implemented. As part of this emergency action, Emergency Response Branch performed at least two leachate collection removals for disposal off-site at an approved facility. Throughout the year, Emergency Response Branch conducted regular site visits to visually monitor the level of leachate collected in the two landfill leachate sumps.

Start Date:	*10/01/2015*	Primary Cost:	$2,000,000	Source: Federal
End Date:	*10/01/2016*	Secondary Cost:	$0	Source:

OPERABLE UNIT 02: TMP, Leachate Lagoons and LF1A &1B

Response Accomplishments: In Progress

Interim Response

The interim ROD was signed by the EPA on September 2, 2016. The MDEQ concurred with the interim ROD. The interim ROD will continue the pumping of leachate from the Landfills 1A and 1B sumps that was begun under the 2015 time critical removal action by Emergency Response Branch. The action will stabilize the leachate within the ponds associated with the two landfills. EPA estimates that approximately two million gallons of leachate is generated annually by the landfills. Collected leachate will be taken off-site for disposal at an approved facility. The State will fund ten percent of the annual cost through the interim response SSC signed September 27, 2016. The interim ROD activities will cover the next five years when it is assumed the site-wide remedy will be developed and implemented.

Start Date: 10/01/2016	Primary Cost:	$1,350,000	Source:	Federal
End Date: 10/01/2021	Secondary Cost:	$150,000	Source:	State

FEDERALLY FUNDED MULTI-SITE COOPERATIVE AGREEMENTS

Cooperative Agreement Number V03E00776 : Open

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$24,322	$0	$24,322	$24,322	$24,322

Cooperative Agreement Number V02E00776 : Closed

Support Agency Activity	Total Amount Awarded	State Share Of Award	Amount Awarded In FY 2017	Amount Expended Through FY 2017	Amount Expended In FY 2017
Management Assistance	$65,967	$0	$0	$65,967	$3,919
Totals:	$90,289	$0	$24,322	$90,289	$28,240

STATE SUPERFUND CONTRACTS

For Operable Unit 01 : Countywide Landfill : Open

Activity	Total Contract Amount	State Share Of Contract	Total Amount Expended	Total Contracted In FY2017
Interim Response	$1,500,000	$150,000	$0	$0
Totals:	$1,500,000	$150,000	$0	$0

APPENDIX A
INDEX OF SUPERFUND SITE SUMMARIES
Alphabetically by Site Name

SITE NAME	COUNTY	PAGE
Adams Plating Company	Ingham	201
Aircraft Components (D&L Sales)	Berrien	20
Albion-Sheridan Township Landfill	Calhoun	74
Allied Paper/Portage Creek/Kalamazoo River	Kalamazoo	243
American Anodco, Inc.	Ionia	220
Auto Ion Chemicals, Inc.	Kalamazoo	262
Bendix Corp./Allied Automotive	Berrien	29
Bofors Nobel, Inc.	Muskegon	434
Bronson Reel Company	Branch	47
Butterworth #2 Landfill	Kent	294
Cannelton Industries, Inc.	Chippewa	117
Charlevoix Municipal Well Field	Charlevoix	110
Chem Central	Kent	301
Clare Water Supply	Clare	124
DSC McLouth Steel Gibraltar Plant	Wayne	548
Duell & Gardner Landfill	Muskegon	446
Electrovoice	Berrien	39
Forest Waste Products	Genesee	153
G & H Landfill	Macomb	392
Grand Traverse Overall Supply Company	Leelanau	366
Gratiot County Landfill	Gratiot	164
H. Brown Company, Inc.	Kent	309
Hedblum Industries	Iosco	235
Hi-Mill Manufacturing Company	Oakland	502
Ionia City Landfill	Ionia	225
J & L Landfill (Avon Twp.)	Oakland	508
Kaydon Corporation	Muskegon	456
Kentwood Landfill	Kent	315
KL Avenue Landfill	Kalamazoo	269
L.A. Darling Subarea	Branch	51
Liquid Disposal, Inc.	Macomb	401
Mason County Landfill	Mason	426
McGraw Edison Corporation	Calhoun	82
Metamora Landfill	Lapeer	357
Michigan Disposal (Cork Street Landfill)	Kalamazoo	280
Motor Wheel, Inc.	Ingham	211
Muskegon Chemical Company	Muskegon	463
North Bronson Industrial Area	Branch	58
Organic Chemicals, Inc.	Kent	323

APPENDIX A INDEX OF SUPERFUND SITE SUMMARIES Alphabetically by Site Name		
SITE NAME	**COUNTY**	**PAGE**
Ott/Story/Cordova Chemical Company	Muskegon	468
Packaging Corporation of America	Manistee	421
Parsons Chemical Works, Inc.	Eaton	135
Peerless Plating Company	Muskegon	479
Petoskey Municipal Well Field	Emmet	142
Rasmussen's Dump	Livingston	378
Rockwell International Corp.	Allegan	1
Rose Township Dump	Oakland	516
Roto-Finish Co., Inc.	Kalamazoo	286
SCA Independent Landfill	Muskegon	490
Scott & Fetzer Corporation	Branch	67
Shiawassee River	Livingston	385
South Macomb Disposal Authority	Macomb	408
Southwest Ottawa County Landfill	Ottawa	531
Sparta Landfill	Kent	331
Spartan Chemical Company	Kent	337
Springfield Township Dump	Oakland	523
State Disposal Landfill	Kent	345
Sturgis Municipal Wells	St. Joseph	538
Tar Lake	Antrim	10
Ten Mile Drain	Macomb	414
Thermo-Chem, Inc.	Muskegon	494
Torch Lake	Houghton	188
U.S. Aviex	Cass	103
Velsicol Burn Pit	Gratiot	170
Velsicol Chemical Corp.	Gratiot	175
Verona Well Field	Calhoun	88
Wash King Laundry	Lake	350

APPENDIX B
LEGISLATIVE REPORT COMMONLY USED ACRONYM LIST

ACLs	alternate concentration limits
AOC	Administrative Order by Consent
ARARS	Applicable or Relevant and Appropriate Requirements
AS	air sparging
AS/SVE	air sparging/soil vapor extraction

BEA	Baseline Environmental Assessment
BTEX	benzene, toluene, ethylbenzene, and xylene

CA	Cooperative Agreement, also known as a grant
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510, as amended

DCE	dichloroethylene
DDT	dichlorodiphenyltrichloroethane
DEE	diethyl ether
DNAPL	Dense Non-Aqueous Phase Liquid
DPW	Department of Public Works

EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Difference

FFS	Focused Feasibility Study
FS	Feasibility Study
FY	Fiscal Year
FYR	Five Year Review

GSI	Groundwater/Surface water Interface

HBB	hexabromobenzene

IC	Institutional Control
ICIAP	Institutional Control Implementation Assurance Plan

LNAPL	Light Non-Aqueous Phase Liquid
LTHA	Lifetime Health Advisory
LTMP	Long-Term Monitoring Plan
LTNAMP	Long-Term Natural Attenuation Monitoring Plan
LTRA	Long-Term Remedial Action/Long Term Response Action
LTS	Long-Term Stewardship

MCL	Maximum Contaminant Level

APPENDIX B
LEGISLATIVE REPORT COMMONLY USED ACRONYM LIST

MDAG	Michigan Department of Attorney General
MDCH	Michigan Department of Community Health (formerly known as Michigan Department of Public Health)
MDEQ	Michigan Department of Environmental Quality (prior to October 1, 1995, the Michigan Department of Environmental Quality was a part of the Michigan Department of Natural Resources)
MDHHS	Michigan Department of Health and Human Services
MDNR	Michigan Department of Natural Resources
MNA	Monitored Natural Attenuation
MNR	Monitored Natural Recovery
µg/kg	micrograms per kilogram
µg/l	micrograms per liter

NAPL	Non-Aqueous Phase Liquid
NCP	National Contigency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NREPA	Natural Resources and Environmental Protection Act, 1994 PA 451, as amended

O & M	Operation and Maintenance
OU	Operable Unit

P & T	Pump and Treat
PAHs	Polycyclic Aromatic Hydrocarbons
PBB	polybromobiphenyl
PCB	polychlorinated biphenyl
PCE	perchloroethene, tetrachloroethene
PFCs	Perfluoroalkyl Chemicals
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PL	Public Law
PM	Project Manager
PNA	polynuclear aromatic hydrocarbons
POC	Point of Operational Compliance
POTW	Publicly Owned Treatment Works
ppb	parts per billion
PPE	Personal Protection Equipment
ppm	parts per million
PRP	Potentially Responsible Party

RA	Remedial Action

APPENDIX B
LEGISLATIVE REPORT COMMONLY USED ACRONYM LIST

RAP	Remedial Action Plan
RC	Restrictive Covenant
RCRA	Resource Conservation and Recovery Act, 1976 PL 94-580, as amended
RD	Remedial Design
RD/RA	Remedial Design/Remedial Action
RI	Remedial Investigation
RI/FFS	Remedial Investigation/Focused Feasibility Study
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Regional Project Manager

SARA	Superfund Amendments and Reauthorization Act, 1986 PL 99-499, as amended
SRD	Substantive Requirements Document
SSC	Superfund State Contract
SSD	subslab depressurization
SVE	Soil Vapor Extraction
SVOC	semivolatile organic compound
SVVS	Subsurface Volatilization and Ventilation System

TCE	trichloroethene
TCRA	Time Critical Removal Action
Tris	tris(2,3 dibromopropyl)phosphate

USACE	U.S. Army Corps of Engineers

VC	vinyl chloride
VI	vapor intrusion
VOCs	volatile organic compounds

WWTP	wastewater treatment plant