SITE STABILIZATION WORK PLAN FOR CLOSURE OF FOUR PRIMARY SETTLING BASINS

FORMER NODULAR INDUSTRIAL LAND
SAGINAW, MICHIGAN

Prepared For:

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1.0 INTRODUCTION

This report presents the proposed closure of the four primary settling basins (PSBs) by Revitalizing Auto Communities Environmental Response Trust (RACER) at the Former Nodular Industrial Lands in Saginaw, Michigan (Site) in order to help stabilize Site stormwater management (Work Plan). The Site location is presented on Figure 1.1 and the Site Plan is presented on Figure 1.2. The Site is undergoing Resource Conservation and Recovery Act (RCRA) Corrective Action under Administrative Order on Consent RCRA-05-2011-0023.

1.1 BACKGROUND

The four PSBs are part of the former wastewater treatment plant (WWTP) which was built in 1976 to treat the effluent water from the former Grey Iron Plant. Operation of the WWTP ceased in 2010, upon completion of the new treatment facility at the General Motors (GM) Saginaw Metal Casting Operations (SMCO) facility.

Operation of the PSBs began in 1977. The PSBs were built on low permeability glaciolacustrine clays that underlie the area. The clay is encountered at approximately 5 to 10 feet below ground surface (bgs) and extends to a depth of approximately 68 to 95 feet bgs. The clays are fine-grained and water does not enter readily or move freely within them as observed during extensive investigations at the Site. A thin veneer (up to 15 feet thick) of fill material comprises a majority of the surficial materials above the clay at the Site. The water table is generally encountered within 5 feet of the ground surface.

The PSBs consist of four nearly identical clay lined settling basins. Each PSB has a total volume of approximately 7 million gallons (35,000 cubic yards). The lagoons were previously used two at a time (in parallel) to settle solids from the WWTP (flocculation/coagulation) effluent. The PSBs were constructed by excavating into the underlying clay and using a combination of excavated clay and landfill clay to construct the sidewalls. The sediment in these PSBs was dredged one basin at a time, and approximately five to six total dredging events were completed per year during regular operations.

The dredged sediment from the PSBs consisted of very fine, silty material, generated from the foundry operations. The PSBs were cycled as they became filled with material. PSBs 1 and 2 (as presented on Figure 1.2) were most recently excavated in 2005 and 2004, respectively and currently contain a large amount of sediment material. The bottoms of

PSBs 1 and 2 contain varying amounts of sediment along with pooled water and vegetation. PSBs 3 and 4 were most recently excavated in June 2012 by GM LLC (the generator and owner of the waste) and contain no material.

A cross-section of the PSBs is presented on Figure 1.3. An inlet structure exists at the southwest end of each of the PSBs and an outlet structure is present at the northeast end of each of the PSBs. Surrounding the PSBs are compacted gravel paths.

This Work Plan presents the proposed closure activities for the PSBs.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS

2.1 PRIMARY SETTLING BASIN SEDIMENT

The Description of Current Conditions (DOCC), (EMCON, 1995), presented the analysis performed on the PSBs sediment for samples collected between 1983 and 1993. The historical analytical results of the sediment from the PSBs are presented in Appendix A. Samples were analyzed for metals, volatile organic compounds (VOCs), full base neutral extractables (BNE), formaldehyde, polychlorinated biphenyls (PCBs), and asbestos. In addition, the following tests were performed on the samples: ASTM Leaching Test, TCLP Analysis, and EP Toxicity.

The DOCC concluded that based on the data collected from 1983 to 1993 from the PSBs, low levels of metals and inorganics were present in the sediment (with the exception of beryllium, mercury, and nitrate which were not detected). Although the variety of metals and inorganics analyzed were present in the compositional analysis, only isolated occurrences or consistently low levels were identified in the ASTM leaching, TCLP and SPLP analyses. The data indicated that even under test conditions (which are typically more rigorous than real world leaching conditions) the metals and inorganics present did not pose a threat due to leaching.

Additional characterization of the PSBs sediment was completed by GMC in 2002 and 2005. Sixteen samples were collected and were analyzed for VOC, VOC-SPLP, semi-volatile organic compounds (SVOCs), SVOC-SPLP, metals, metals-TCLP, metals-SPLP, PCBs, general chemistry, general chemistry-TCLP (2002 event only), and general chemistry-SPLP. A summary of the analytical results of these samples are presented in Appendix A.

The sediment samples were screened against groundwater contact protection criteria and groundwater surface water interface protection criteria (GSI). The SPLP and TCLP results were screened against non-residential drinking water criteria.

The 2002 sampling event reported exceedances of three SVOCs, five metals, and one general chemistry parameter as compared to GSI Criteria. The 2002 exceedances are as follows:

- SVOCs: 2-methylphenol (4 samples), naphthalene (4 samples), and phenol (4 samples)
- Metals: arsenic (4 samples), chromium (4 samples), mercury (2 samples), selenium (4 samples), and silver (4 samples)
- General Chemistry: formaldehyde (8 samples)

The 2002 sampling event also reported exceedances of one SPLP-VOC, four SPLP-metals, and three TCLP-metals as compared to Non-residential drinking water criteria. The 2002 SPLP/TCLP exceedances are as follows:

- SPLP-VOC: benzene (7 samples)
- SPLP-Metals: aluminum (2 samples), iron (1 sample), lead (7 samples), and manganese (8 samples)
- TCLP-Metals: arsenic (4 samples), cadmium (3 samples), and lead (4 samples)

The manufacturing operations changed from cast iron to using only aluminum in December 2004, and as a result decreased metal concentrations in the sediment were observed. The 2005 sampling event reported exceedances of the criteria for one VOC, two SVOCs, three metals, and one general chemistry parameter. The 2005 exceedances are as follows:

- VOC: toluene (4 samples)
- SVOCs: 3&4-methylphenol (1 sample) and phenol (1 sample)
- Metals: arsenic (4 samples), chromium (4 samples), and selenium (4 samples)
- General Chemistry: formaldehyde (4 samples)

The 2005 sampling event also reported exceedances of five SPLP-metals, and three TCLP-metals as compared to Non-residential drinking water criteria. The 2005 SPLP/TCLP exceedances are as follows:

- SPLP-Metals: aluminum (6 samples), antimony (4 samples), iron (3 samples), lead (7 samples), and manganese (12 samples)
- TCLP-Metals: aluminum (4 samples), iron (3 samples), and manganese (4 samples)

The results of the 2002 and 2005 sampling events confirm the findings of the DOCC.

2.2 CLASSIFIED SAND

The classified sand staging area, located in Investigative Unit I (IU-I), contains sand and heavy particulate from the Grey Iron Plant (and previously the Former Nodular Iron Plant) foundry operations, recovered from the primary classifiers (i.e., separation of suspended particles by size). Influent water passes through one of the two classifier

units and large particles are permitted to drop out. Large particles are then raked from the classified and transported to the classified sands piles. The classifiers were designed to remove material that would not generally pass through a 150 mesh sieve. The classified sand consists predominantly of foundry molding and core sand, grit from the scrap cleaning operations, and coarse grit and metallic fines from the cupola emission control systems. The classified sand piles have been in existence since 1983 and the most recent approximations estimate a volume of 68,400 cubic yards. The classified sand piles are located on the RACER portion of IU-I. Analysis was performed on this material as part of the DOCC. The analytical results presented in the DOCC are provided in Appendix B. Additional sampling of the classified sands was completed in 2002. Samples were analyzed for VOCs, VOC-SPLPs, SVOCs, SVOC-SPLPs, metals, metals-TCLP, metals-SPLP, PCBs, Polynuclear Aromatic Hydrocarbons (PAHs), general chemistry, and general chemistry-SPLP. The results of these samples are presented in Appendix B.

Twelve samples were collected during the 2002 sampling event. The results were screened against groundwater contact protection criteria and GSI protection criteria. The SPLP and TCLP results were screened against non-residential drinking water protection criteria.

Exceedances of the criteria for one metal and one general chemistry parameter were reported. The 2002 exceedances are as follows:

- Metals: chromium (4 samples)
- General Chemistry: formaldehyde (2 samples)

The 2002 sampling event also reported exceedances of three SPLP-metals as compared to Non-residential drinking water criteria. The 2005 SPLP/TCLP exceedances are as follows:

- SPLP-Metals: aluminum (4 samples), iron (1 sample), and manganese (1 sample)

The manufacturing operations changed from cast iron to using only aluminum in December 2004 and metal concentrations in the classified sands decreased as presented in Appendix B.

2.3 RFI GROUNDWATER

As part of the RCRA Facility Investigation (RFI), groundwater sampling was conducted in the vicinity of the primary lagoons and the classified sand areas. Groundwater samples have been collected using both high-flow and low-flow purging techniques. Use of low-flow purging techniques commenced in 2001; however, the first full round of low-flow sampling was conducted in 2005, resulting in a significant reduction for reported concentrations of inorganics. A copy of the groundwater databox figures for IU H and IU I from the RFI – Phase 1C Report – Revised (CRA, March 2007) are provided in Appendix C.

2.4 DATA ANALYSIS

The results of the 2002 and 2005 PSB sediment and classified sand samples were screened against groundwater contact protection criteria. No exceedances of the groundwater contact protection criteria were reported. In addition, based on the design of the PSBs as observed during sediment excavation (i.e., clay bottom and sides) there is minimal likelihood of leachate, if any, from the sediments and sands coming into contact with the shallow or deep groundwater the area. When constructed the PSBs were excavated into a thick layer of native clay. This impermeable clay layer extends well below the bottom of the PSBs and creates a barrier between the PSBs and the underlying bedrock aquifer. In addition, groundwater samples collected in the vicinity of the PSBs as part of the RFI have not reported the constituents observed in the sediments.

The 2002 and 2005 sediment samples were also screened against GSI protection criteria. Eleven exceedances were reported as described in Section 2.1 and Section 2.2. Based on the proposed containment, no complete pathway will exist for the sediments and sands to come into contact with any surface water. The classified sands will be used as backfill in the clay lined PSBs and a minimum 2-foot thick layer of clay will be placed over top of the entire area. The clay will be graded to direct stormwater away from the area. The clay layer will also create a relatively impermeable layer which will prevent surface water from coming into contact with the classified sands and sediments. Furthermore, any water within the contained area will be removed prior to placement of the clay cover.

The SPLP and TCLP results from the 2002 and 2005 sediment sampling events were screened against non-residential drinking water protection criteria. Eight exceedances were reported as described in Section 2.1 and Section 2.2. To prevent the possibility of

groundwater on site being used for drinking water purposes, deed restrictions will be placed on the property to prevent the installation of drinking water wells.

Finally, the groundwater results were screened against MDEQ Industrial commercial II, III, and IV Drinking Water Criteria, MDEQ Groundwater Contact Criteria, MDEQ Industrial commercial II, III, and IV Groundwater Volatilization to Indoor Air Criteria, and MDEQ GSI criteria. Exceedances identified were not found in the classified sands or PSBs sediment/soil data with the exception of antimony at one location. Therefore, the classified sands and PSBs are not leaching into the groundwater.

The combination of a competent clay bottom, installation of a relatively impermeable 2-foot thick clay cover, and placing deed restrictions on the property ensures that the proposed closure for the PSBs is protective.

The following sections provide additional details on the proposed closure.

3.0 PROPOSED CLOSURE

The closure of the PSBs will consist of:

- Removal of the existing structures (inlet, outlet, plumbing, etc.)
- Backfill depression with classified sand from IU-I
- Placing a minimum 2 feet of clay over area
- Re-grading to direct water away from the area

The closure will serve two purposes: help stabilize stormwater management at the site by decreasing precipitation ponding and seepage into the secondary ponds and to utilize all of the sediment remaining in Lagoons 1 and 2 and classified sands stored in IU-I.

3.1 SCOPE OF WORK AND SCHEDULE

The following sections describe the cleanup activities related to on-Site work to be conducted under this Work Plan:

3.1.1 Contractor Procurement (15 Days)

3.1.2 Contractor Preparation of Health and Safety Plan (5 Days)

3.1.3 Soil Erosion Control Permitting (5 days, completed in conjunction with 3.1.2)

3.1.4 Mobilization/Site Preparation (30 days to complete 3.1.4 to 3.1.6)

3.1.5 Implementation

3.1.6 Site Restoration and Demobilization

3.1.1 PREPARATION OF HEALTH AND SAFETY PLAN

To ensure that all on-Site work is completed safely, a Site-specific Health and Safety Plan (HASP) will be prepared. A Site health and safety officer will complete a hazard analysis for all activities. The hazard analysis will identify the potential hazards, evaluate the level of personal protective equipment that will be used during the cleanup activities, and describe the personnel decontamination procedures required to control any potential personal exposures during implementation of this Work Plan.

The HASP will be prepared and implemented consistent with Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120.

3.1.2 CONTRACTOR PROCUREMENT

A qualified, OSHA 29 CFR 1910.120-trained contractor will be procured for closure of the PSBs. The contractor will be responsible for all activities described in Section 3.1.4.

3.1.3 MOBILIZATION/SITE PREPARATION

Upon mobilization of the contractor to the Site, the contractor will establish security controls and designate work zones by installing a temporary orange safety fence or caution tape, with warning signs, as necessary.

3.1.4 CLOSURE APPROACH

The closure of the PSBs will be completed in stages. The first stage will involve dewatering the PSBs. Water from the PSBs will be pumped into the secondary basin.

The second stage will involve removal of materials from the PSBs for off-Site recycling/disposal at appropriate disposal facilities. The following materials are to be removed:

- Concrete and steel inlet and outlet structures
- Steel railings
- All utilities including electrical and plumbing lines
- Vegetation located in and around the PSBs

Stage 3 will involve backfilling of the PSBs to grade with roughly 65,000 cubic yards of material from the classified sands piled located in IU-I. A 2-foot thick layer of clay from the clay pile in IU-I will be placed and compacted over the entire area. The area will be graded in such a manner that storm water is directed away from the area (see drawing in Appendix D). Finally, a layer of topsoil will be placed on top of the clay and the area will be hydroseeded.

3.1.5 PERMITTING

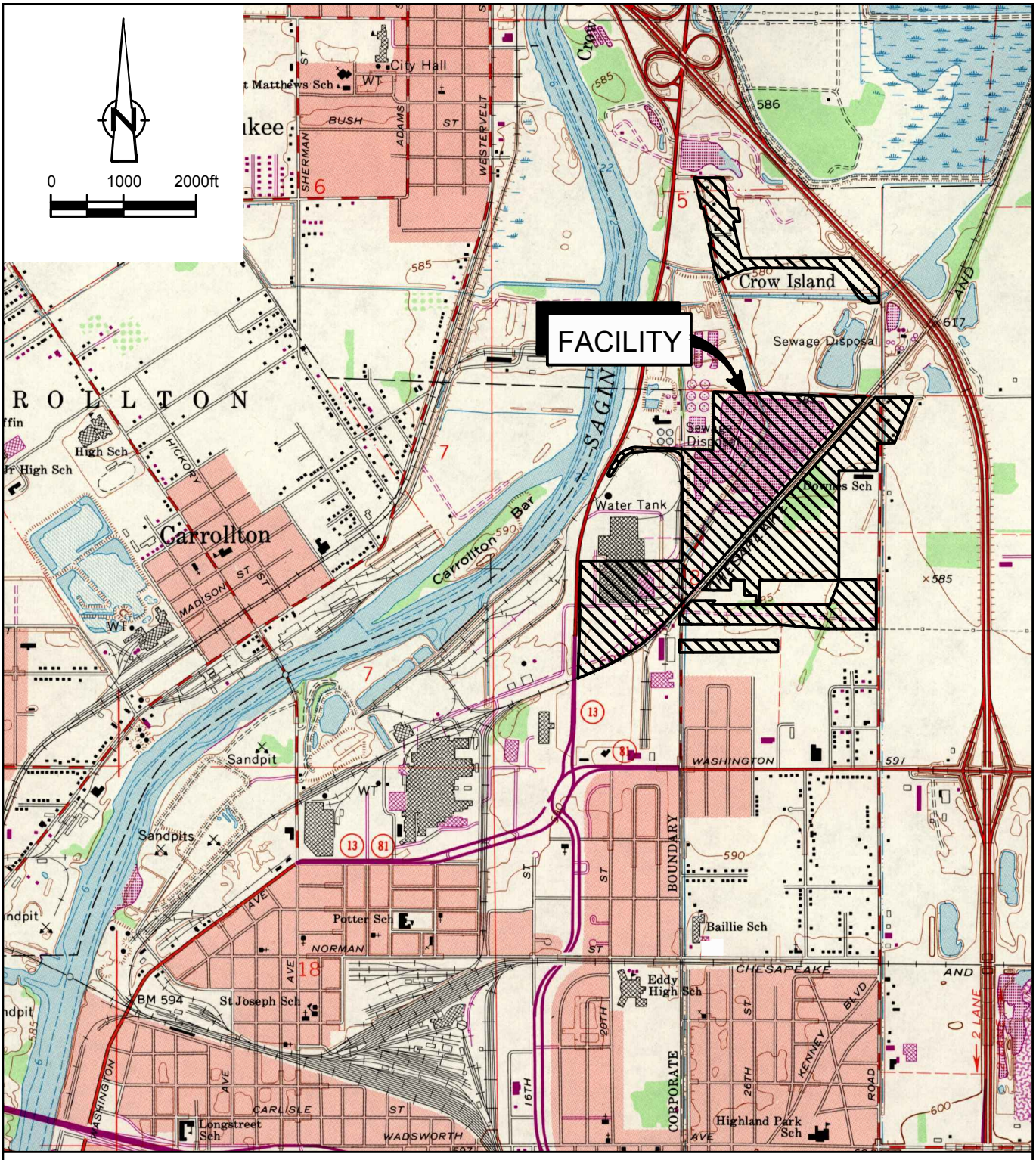
A City of Saginaw Soil erosion control permit will be obtained.

3.1.6 SITE RESTORATION AND DEMOBILIZATION

Once the work is completed, the contractor will remove any temporary fencing, temporary structures, equipment, and other materials and supplies brought onto the Site for the cleanup activities. The remaining stock pile areas will be graded to address any issues resulting from the excavation of the sand. The classified sand area and former PSBs area will be seeded to promote vegetative growth.

4.0 REPORTING/DOCUMENT PREPARATION

Upon the completion of this plan, a closure report will be prepared to present a summary of the remedial activities. The report will include a summary of the work completed and discuss any relevant observations made during the Site stabilization activities.

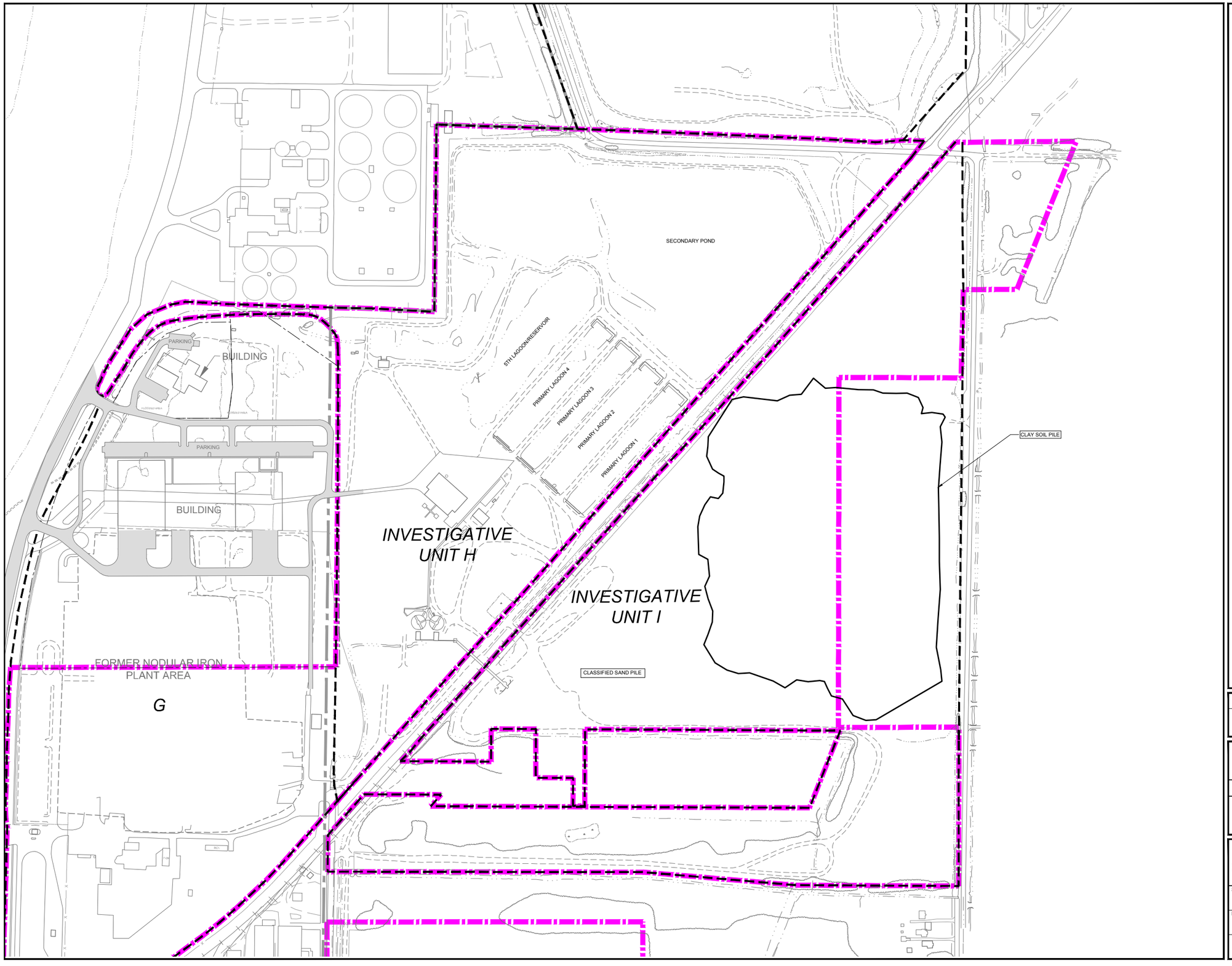


SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE; SAGINAW, MICHIGAN 1967

figure 1.1

SITE LOCATION
FORMER NODULAR INDUSTRIAL LANDS, RACER
Saginaw, Michigan

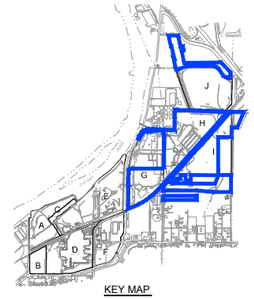
58502-T02(005)GN-WA004 JUL 9/2012



0 100 200 ft

LEGEND

- INVESTIGATIVE UNIT BOUNDARY
- LIMIT OF CLAY STOCKPILE (900,000 CUBIC YARDS)
- RACER PROPERTY



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

REVITALIZING AUTO COMMUNITES ENVIRONMENTAL RESPONSE

SAGINAW, MICHIGAN

SITE PLAN

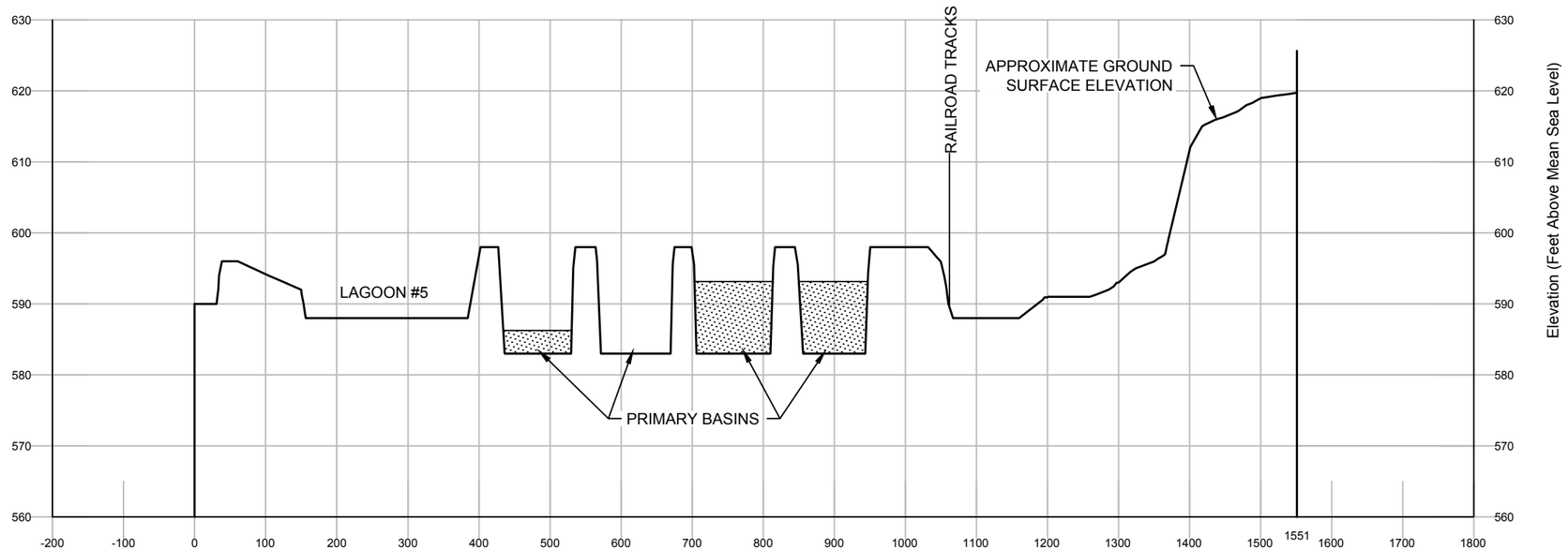
CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
SPICER SURVEY, OCTOBER 2009.

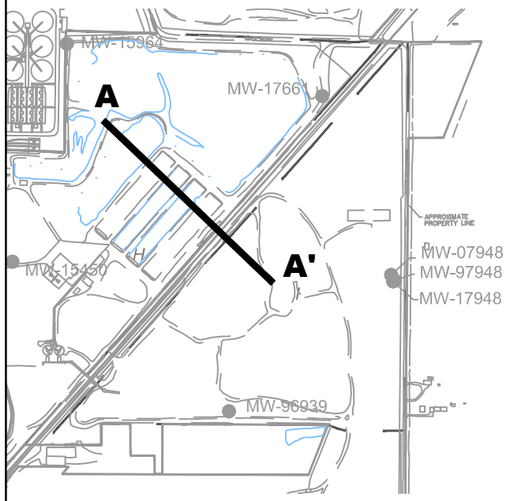
Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	MARCH 2012	
Scale: 1:200	Project N°: 58502-T02	Report N°: 005	Drawing N°: figure 1.2

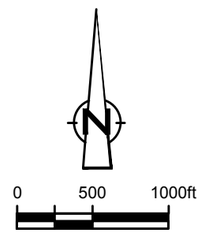
A
NORTHWEST

A'
SOUTHEAST



DISTANCE ALONG BASELINE
VERTICAL EXAGGERATION = 10X





LEGEND

MW-17661 — MONITORING WELL LOCATION AND IDENTIFIER

A—A' — CROSS SECTION LOCATION

FINE SAND

figure 1.3

CROSS SECTION A - A'
PRIMARY SETTING BASIN
NODULAR FACILITY, RACER
Saginaw, Michigan

58502-T02(005)GN-WA003 JUL 27/2012

APPENDIX A

PRIMARY SETTLING BASIN SEDIMENT DATA

APPENDIX A-1

DOCC PRIMARY SETTLING BASIN SEDIMENT ANALYTICAL RESULTS SUMMARY

PRIMARY SETTLING BASIN SEDIMENT

Compositional Analysis

Parameter mg/kg	10/12/88[1]			10\90[2]	1991[3]	11\16\92[4]				10/8/93[5]			
	1	2	3			1	2	3	4	1	2	3	4
Antimony		< 12		< 50	2.9								
Arsenic	9.7	8.6	9.2	6.3	5.1	0.88	1.4	1.8	2.2	3	3.4	3.7	2.4
Barium	150	150	170	150	110	51	55	48	52	84	84	95	67
Beryllium		< 1		< 1.1	< 1								
Cadmium	6.6	6.8	5.3	30	10	8.8	4	4	4	3.3	4	3.9	3.8
Chloride		270		420	130								
Chromium	160	150	200	180	130	50	58	51	55	77	78	83	58
Cobalt		6.8		< 11	< 10	1	2	2	2	3	3	4	2
Copper	120	100	130	120	110	40	44	4	47	60	14	75	43
Cyanide		7		< 5.7	< 5.2	< 0.5	< 0.5	1.1	1.2	1.3	1.2	1.4	1.4
Flouride		250		110	200								
Lead	1400	1200	910	1100	770	380	400	370	380	640	760	720	610
Lithium		10		< 10	< 10	< 5	< 5	< 5		< 5	< 5	< 5	< 5
Mercury	< 0.17	< 0.17	< 0.18	<0.23	< 0.21	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Molybdenum						< 5	6	6	5				
Nickel		33		30	32	10	10	10	10	20	21	23	10
Phenols		86		100	69								
Selenuim	< 1.5	< 1.6	< 1.4	1.4	< 1.2	0.2	0.3	0.3	0.3	0.9	1	1	0.7
Silver	< 2	< 2	< 2	< 2	< 2.1	0.48	0.67	0.57	0.75	1	1	1	1
Solids (%)	53	50	57	44	48.2	47	44	43	44	65	60	70	57
Zinc	29000	34000	27000	28000	30000	8300	10000	8000	7500	14000	16000	15000	9200
BOD				4600	3577								
Calcium				20000	18000	8200	8100	7200	7500	12000	11000	12000	13000
Corrosivity(pH)				9.7	10					7.6	8.6	8.9	8.8
Magnesium				3900	3800	1100	1500	1200	1500	2100	2000	2100	1500
Manganese				5700	4900	1700	1800	1800	1900	2700	2800	2700	2500
Nitrate				< 1.1	< 0.5								
Nitrite				< 0.45									
Nitrogen				3700	2900								
Phosphorous				3000	4200	4.9	24	3.7	< 2.5	11	2.5	3.4	3.4
Potassium				1900	1800	730	750	750	850	890	900	880	650
Sodium				1500	1400	550	540	530	600	700	880	590	410
Aluminum										5600	4600	5000	3300
Iron										28000	30000	32000	17000
Ammonia					150								

(1) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designation," February 1989. Verified with laboratory data.
(2) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designation," October 1990. No record of sampling date. No laboratory data.
(3) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of solid Wastes," January 1992. No record of Sampling date. No laboratory data.
(4) Results taken from laboratory data of samples collected 11/16/92.
(5) Results taken from laboratory data of samples collected 10/8/93.

TABLE 13.1

J:\PROJ\14068.63\LAG_OONS.XLS

PRIMARY SETTLING BASIN SEDIMENT

ASTM Leaching Test

Parameter mg/L	11/28/83[1]		2/14/85[2]	2/23/87[3]	10/20/87[4]	10/8/93[5]			
	#2	#3	#3			1	2	3	4
Arsenic	0.023	0.011	0.018	0.016	0.054				
Berium	< 0.2	< 0.2	0.8	< 0.02	0.02				
Cadmium	< 0.01	< 0.01	< 0.01	< 0.005	< 0.004				
Chromium	< 0.05	< 0.05	< 0.05	< 0.005	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05
Cyanide	< 0.02	< 0.02	0.03	< 0.04	< 0.01				
Copper	< 0.02	< 0.02	< 0.02	< 0.02	< 0.1				
Fluoride	27.5	30	19.7	4	1.6	2.6	2.1	2.1	2.1
Lead	0.01	0.011	< 0.005	0.031	0.025				
Mercury	< 0.0002	< 0.002	< 0.0002	0.004	< 0.0002				
Selenium	0.009	< 0.001	0.006	0.003	0.01				
Silver	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01				
Zinc	0.08	0.12	0.03	0.25	0.17				
pH	9.6	9.4	9.9	9.9	10.1				
Phenols	0.292	0.24	0.729	1.21	1.4				
Ammonia						1.2	0.5	0.4	0.1
BOD						< 3	< 3	< 3	< 3
Nitrate						< 1	1.2	2.2	1.4
TOC			35.2	21	25				
COD			92	60	83				

(1) Results taken from "Waste Characterization Study for Foundry Process Solid Wastes," January 1984. Revised February 1984. No laboratory data.
(2) Results taken from "Waste Characterization Study of Foundry Process Solid Wastes," January 1986. Verified with laboratory data.
(3) Results taken from "Summary Report: Sampling and Analysis of Foundry Process Solid Wastes," July 1987. Verified with laboratory data.
(4) Results taken from "Summary Report: Sampling and Analysis of Foundry Process Solid Wastes," January 1988. No laboratory data available.
(5) Results taken from laboratory data of samples collected 10/8/93.

TABLE 13.2

PRIMARY SETTLING BASIN SEDIMENT

TCLP Analysis

SPLP results

Parameter mg/L	10\90[1]	1991[2]			11\16\92[3]				10/8/93[4]				12/18/93[5]			
		1	2	3	1	2	3	4	1	2	3	4	1	2	3	4
Arsenic	< 0.003	0.016	0.008	< 0.006					< 0.002	< 0.002	< 0.002	< 0.002	0.003	0.004	0.01	0.007
Barium	0.11	0.15	< 0.055	< 0.053	< 1	< 1	< 1	< 1	0.22	0.19	0.18	0.19	0.34	0.31	0.37	0.38
Cadmium	0.007	0.0035	< 0.0006	0.00079	< 0.1	< 0.1	< 0.1	< 0.1	< 0.02	< 0.02	< 0.02	< 0.02	0.05	0.07	0.08	< 0.02
Copper	< 0.02	< 0.02	< 0.021	< 0.02	< 0.2	< 0.2	< 0.2	< 0.2	< 0.02	< 0.02	< 0.02	< 0.02	0.08	0.07	0.05	< 0.02
Chromium	0.02	0.079	< 0.01	< 0.01	< 0.2	< 0.2	< 0.2	< 0.2	< 0.025	0.03	< 0.025	0.1	< 0.025	< 0.025	< 0.025	< 0.025
Cyanide																
Lead	< 0.01	0.12	< 0.006	< 0.006	< 1	< 1	< 1	< 1	< 0.01	< 0.01	< 0.01	< 0.01	0.089	0.076	0.077	0.064
Mercury	0.0002	< 0.0004	< 0.0004	< 0.0004					< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Selenium	< 0.003	< 0.012	< 0.012	< 0.012	< 0.04	< 0.04	< 0.04	< 0.04	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Silver	< 0.02	< 0.002	0.002	< 0.002					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Zinc	150	420	160	130	130	120	160	140	0.26	0.11	0.67	1.5	140	170	180	41
pH																
Flouride	1.9	1.2	2.2	2.5												
Total Phenols	0.57	0.17	0.18	0.16												
Phosphorous	1.3	19	10	6.5												
Formaldehyde	1.3	2.272	1.667	1.675												
Benzene	< 0.1	0.006	0.007	0.0071												
Toluene	< 0.1	0.0021	0.0015	0.0017												
Xylene	< 0.1	< 0.003	< 0.003	< 0.003												
Phenol		0.022	0.018	0.014												
2,4-Dimethyl phenol		0.006	0.008	< 0.025												
Total Cresols		0.22	0.22	0.21												
Iron													0.3	< 0.04	< 0.04	20
Manganese													9.4	11	14	14
Tetrachloroethylene		< 0.002	0.0051	0.0048												

(1) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designation," October 1990. No record of sampling date. No laboratory data.
(2) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes," January 1992. No record of sampling date. No laboratory data.
(3) Results taken from laboratory data of samples collected 11/16/92.
(4) Results taken from laboratory data of samples collected 10/8/93.
(5) Results taken from laboratory data of samples collected 12/18/93.

TABLE 13.3

PRIMARY SETTLING BASIN SEDIMENT

EP Toxicity Test

Parameter mg/L	11/28/83[1] #2 & #3	2/4/85[2] Composite	2/23/87[3]	10/20/87[4]	10/12/88[5] 1	2	3	1991[6] 1	2	3
Arsenic	0.003	< 0.001	< 0.001	< 0.003	< 0.004	< 0.004	< 0.004	< 0.006	< 0.006	< 0.006
Barium	< 0.2	0.8	1	0.68	0.86	0.84	0.89	0.22	< 0.05	0.085
Cadmium	< 0.01	0.1	0.02	0.017	0.065	0.099	0.075	0.056	0.0086	0.023
Copper	< 0.02	0.02	< 0.02	< 0.01	0.09	0.09	0.11	< 0.02	< 0.02	< 0.02
Chromium	< 0.05	< 0.05	0.13	0.01	0.03	0.02	0.02	< 0.1	0.011	0.011
Cyanide	< 0.02	< 0.02								
Lead	< 0.8	0.2	0.5	1.3	2.3	3	3.2	0.08	0.02	0.066
Mercury	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0002	0.0004	< 0.004	< 0.0004	< 0.0004
Selenium	< 0.001	< 0.001	< 0.002	< 0.003	< 0.02	< 0.02	< 0.02	< 0.006	< 0.006	< 0.006
Silver	< 0.02	< 0.02	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.002	< 0.002	< 0.002
Zinc	235	264	0.25	300	240	270	330	220	200	140
pH	5		10	9.9	9.2	8.9	9			

(1) Results taken from "Waste Characterization Study for Foundry Process Solid Wastes," February 1984. Revised February 1984. No laboratory data.
(2) Results taken from "Waste Characterization Study of Foundry Process Solid Wastes," January 1986. Verified with laboratory data.
(3) Results taken from "Summary Report: Sampling and Analysis of Foundry Process Solid Wastes," July 1987. Verified with laboratory data.
(4) Results taken from "Summary Report: Sampling and Analysis of Foundry Process Solid Wastes," January 1988. No laboratory data available.
(5) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes fro Michigan Public Act 641 Disposal Designation," February 1989. Verified with laboratory data.
(6) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes," January 1992. No record of sampling date. No laboratory data.

TABLE 13.4

PRIMARY SETTLING BASIN SEDIMENT

VOCs/BNEs/Formaldehyde

Parameter ug/kg	10/12/88[1]	10\90[2]	1991[3]	11\16\92[4]				10/8/93[5]			
				1	2	3	4	1	2	3	4
Methylene Chloride	< 5	3	< 10	< 5	< 5	< 5	< 5	14	14	10	< 5
Chloroform	< 2.5	< 1	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,1-TCA	< 10	< 1	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	6
Benzene	2600	64	48	50	58	63	91	< 5	< 5	< 5	< 5
Toluene	1600	44	22	19	24	29	64	< 5	< 5	< 5	< 5
Xylene			22	22	30	34	59	< 5	< 5	< 5	< 5
Carbon Tetrachloride			< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene			< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene				< 5	< 5	< 5	7	< 5	< 5	< 5	< 5
mg/kg											
B(2-E)P	< 10	0.15	< 6.4								
Butyl P	< 2.5										
Di-n-P	< 2.5										
Dieth P	< 2.5										
Dimeth P	< 2.5										
Di-n-octyl P	< 15										
Phenol				27	29	20	26	20	20	18	9.5
2,4 Dimethyl phenol				3.5	3.6	2.6	3.2	3.1	3.5	3.7	2.3
Triaryl Phosphate Esters				0.86	0.89	0.78	1.9	5.3	7	5.5	5
mg/kg											
Formaldehyde	< 5	< 12.2	3.577					6	2	2.7	38
mg/kg											
Triphenol Phosphate		< 0.2	ND								
Tricesrsol Phosphate		< 1.3	ND								

(1) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designations," Februarty 1989. Verified with laboratory data.

(2) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designation," October 1990. No record of sampling date. No laboratory data.

(3) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes," January 1992. No record of sampling date. No laboratory data.

(4) Results taken from laboratory data of samples collected 11/16/92

(5) Results taken from laboratory data of samples collected 10/8/93.

TABLE 13.5

PRIMARY SETTLING BASIN SEDIMENT

PCBS

Parameter	11/28/83[1]		2/4/85[2]	2/23/87[3]	10/20/86[4]	10/12/88[5]	10/90[6]	1991[7]	11\16\92[8]			
mg/L	#2	#3							1	2	3	4
PCB Total												
PCB Constituants												
A1242	0.54	0.45	0.32	< 0.75	< 0.02	< 0.5	< 0.18		< 0.033	< 0.033	< 0.033	< 0.033
A1016				< 0.08	< 0.02	< 0.5	< 0.18		< 0.033	< 0.033	< 0.033	< 0.033
A1221				< 0.08	< 0.02	< 0.5	< 0.18		< 0.033	< 0.033	< 0.033	< 0.033
A1232				< 0.08	< 0.02	< 0.5	< 0.18		< 0.033	< 0.033	< 0.033	< 0.033
A1248				< 0.08	< 0.02	< 0.5	< 0.18	0.96	< 0.033	< 0.033	< 0.033	< 0.033
A1254				< 0.16	< 0.02	< 0.5	< 0.36		< 0.033	< 0.033	< 0.033	< 0.033
A1260				< 0.16	< 0.02	< 0.5	< 0.36		< 0.033	< 0.033	< 0.033	< 0.033

10/8/93[9]			
1	2	3	4
0.11	0.075	0.088	0.11
< 0.016	< 0.016	< 0.016	< 0.016
< 0.016	< 0.016	< 0.016	< 0.016
< 0.016	< 0.016	< 0.016	< 0.016
< 0.016	< 0.016	< 0.016	< 0.016
< 0.033	< 0.033	< 0.033	< 0.033
< 0.033	< 0.033	< 0.033	< 0.033

(1) Results taken from "Waste Characterization Study for Foundry Process Solid Wastes," January 1984. Revised February 1984. No laboratory data.

(2) Results taken from "Waste Characterization Study of Foundry Process Solid Wastes," January 1986. Verified with laboratory data.

(3) Results taken from "Summary Report: Sampling and Analysis of Foundry Process Solid Wastes," July 1987. Verified with laboratory data.

(4) Results taken from "Summary Report: Sampling and Analysis of Foundry Process Solid Wastes," January 1988. No laboratory data available.

(5) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designation," February 1989. Verified with laboratory data.

(6) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Desgnation," October 1990. No record of sampling date. No laboratory data.

(7) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes," January 1992. No record of sampling date. No laboratory data.

(8) Results taken from laboratory data of samples collected 11/16/92.

(9) Results taken from laboratory data of samples collected 10/8/93.

TABLE 13.6

PRIMARY SETTLING BASIN SEDIMENT

Asbestos

Parameter	10\12\88[1]	10\90[2]	1991[3]	11\16\92[4]				10/8/93[5]			
				1	2	3	4	1	2	3	4
Asbestos			0	0	0	0	0	< 1	< 1	< 1	< 1
Chrysotile	0	0									
Amosite	0	0									
Croc	0										

(1) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designation," February 1989. Verfied with laboratory data.

(2) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designation," October 1990. No record of sampling date. No laboratory data.

(3) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes," January 1992. No record of sampling date. No laboratory data.

(4) Results taken from laboratory data of samples collected 11/16/92.

(5) Results taken from laboratory data of samples collected 10/8/93.

TABLE 13.7

TABLE 13.8
05/26/89 SEDIMENT SAMPLING

Parameter	Station I.D. Sediment Sampling Results (mg/kg)									Water (mg/L)			
	A	B	C	D	E	F	G	H	I	J*	1	2	3
VOCs													
Chlorobenzene	3.5	<1.0	<1.0	140,000	6200	<1.0	3500	130,000	580	8.2	1.2	<1.0	<1.0
Benzene	<1.0	<1.0	<1.0	4700	<100	2.3	560	4900	<100	<1.0	<1.0	<1.0	<1.0
Toluene	41	<1.0	4.3	<7000	1600	<1.0	88	<6100	<1000	<1.0	<1.0	<1.0	<1.0
PCBs													
A1260	0.4	<0.5	<0.5	45.0	48.0	<0.5	0.8	120.0	7.1	15.0	75.0	57.0	170.0

Note: * J was a water sample

APPENDIX A-2

2002/2005 PRIMARY SETTLING BASIN SEDIMENT ANALYTICAL RESULTS SUMMARY

APPENDIX A-2

2002/2005 PRIMARY SETTLING BASIN SEDIMENT ANALYTICAL RESULTS SUMMARY
NODULAR FACILITY
SAGINAW, MICHIGAN

Sample Location:					*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*
Sample ID:					*1*	*1*	*1*	*2*	*2*	*2*	*3*	*3*	*3*	*4*	*4*
lab_sample_id					*3020806/7*	*3020808/9*	*3020811*	*3020806/7*	*3020808/9*	*3020811*	*3020806/7*	*3020808/9*	*3020811*	*3020806/7*	*3020808/9*
Sample Date:					*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*
Parameters:	*Units*	*Res/Non_Res/GW Prot_GW SW Interface Prot* a	*Res/Non_Res/GW Prot_GW Contact Prot* b	*Res/Non_Res/Non Res Drinking Water* c											
Volatile Organic Compounds															
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	44	27000	-	6.8 U	-	-	6.8 U	-	-	6.8 U	-	-	6.8 U	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	-	2700	-	6.8 U	-	-	6.8 U	-	-	6.8 U	-	-	6.8 U	-
Benzene	mg/kg	4	220	-	1.1	-	-	1.2	-	-	1.4	-	-	1.4	-
Chloromethane (Methyl chloride)	mg/kg	-	1100	-	0.68 U	-	-	0.68 U	-	-	0.68 U	-	-	0.68 U	-
Ethylbenzene	mg/kg	0.36	140	-	0.14 U	-	-	0.14 U	-	-	0.14 U	-	-	0.14 U	-
Methyl isoamyl ketone	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/kg	2.1	270	-	0.14 U	-	-	0.14 U	-	-	0.14 U	-	-	0.14 U	-
Toluene	mg/kg	5.4	250	-	0.47	-	-	0.54	-	-	0.63	-	-	0.66	-
Trichloroethene	mg/kg	4	440	-	0.14 U	-	-	0.14 U	-	-	0.14 U	-	-	0.14 U	-
Xylenes (total)	mg/kg	0.82	150	-	0.205 U	-	-	0.23	-	-	0.28	-	-	0.28	-
Volatile Organic Compounds - SPLP															
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	-	-	38	-	-	0.013	-	-	0.005 U	-	-	0.0054	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	-	-	5.2	-	-	0.011	-	-	0.005 U	-	-	0.005 U	-	-
Benzene	mg/L	-	-	0.005	-	-	0.0073[c]	-	-	0.001 U	-	-	0.0091[c]	-	-
Chloromethane (Methyl chloride)	mg/L	-	-	1.1	-	-	0.001 U	-	-	0.001 U	-	-	0.001 U	-	-
Ethylbenzene	mg/L	-	-	0.074	-	-	0.001 U	-	-	0.001 U	-	-	0.001 U	-	-
Methyl isoamyl ketone	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/L	-	-	0.1	-	-	0.001 U	-	-	0.001 U	-	-	0.001 U	-	-
Toluene	mg/L	-	-	0.79	-	-	0.0053	-	-	0.0023	-	-	0.0051	-	-
Trichloroethene	mg/L	-	-	0.005	-	-	0.001 U	-	-	0.001 U	-	-	0.001 U	-	-
Xylenes (total)	mg/L	-	-	0.28	-	-	0.003 U	-	-	0.003 U	-	-	0.003 U	-	-
Semi-volatile Organic Compounds															
2,4-Dimethylphenol	mg/kg	7.6	10000	-	2.05	-	-	3.36	-	-	2.62	-	-	2.8	-
2-Methylphenol	mg/kg	1	16000	-	6.6[a]	-	-	12.3[a]	-	-	8.21[a]	-	-	9.78[a]	-
3&4-Methylphenol	mg/kg	1	16000	-	-	-	-	-	-	-	-	-	-	-	-
3,4-Dichlorophenol	mg/kg	-	-	-	6.36	-	-	11.9	-	-	7.34	-	-	6.51	-
4-Chloro-3-methylphenol	mg/kg	0.28	3000	-	0.47 U	-	-	0.47 U	-	-	0.47 U	-	-	0.47 U	-
Acenaphthene	mg/kg	8.7	970	-	0.47 U	-	-	0.446	-	-	0.47 U	-	-	0.47 U	-
Aniline	mg/kg	0.33	2800	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	mg/kg	-	41	-	0.526	-	-	0.777	-	-	0.642	-	-	0.62	-
Benzyl chloride	mg/kg	-	72	-	0.47 U	-	-	0.47 U	-	-	0.47 U	-	-	0.47 U	-
Fluoranthene	mg/kg	5.5	730	-	0.24 U	-	-	0.519	-	-	0.459	-	-	0.24 U	-
Hexachlorobenzene	mg/kg	0.35	8.2	-	0.47 U	-	-	0.47 U	-	-	0.47 U	-	-	0.47 U	-
Naphthalene	mg/kg	0.73	2100	-	2.06[a]	-	-	3.53[a]	-	-	2.87[a]	-	-	2.56[a]	-
Nitrobenzene	mg/kg	3.6	220	-	0.47 U	-	-	0.47 U	-	-	0.47 U	-	-	0.47 U	-
Phenanthrene	mg/kg	2.1	1100	-	1.08	-	-	1.72	-	-	1.55	-	-	1.44	-
Phenol	mg/kg	9	12000	-	20.1 D[a]	-	-	43.3 D[a]	-	-	29.4 D[a]	-	-	32.2 D[a]	-

APPENDIX A-2

2002/2005 PRIMARY SETTLING BASIN SEDIMENT ANALYTICAL RESULTS SUMMARY
NODULAR FACILITY
SAGINAW, MICHIGAN

Sample Location:					*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*
Sample ID:					*1*	*1*	*1*	*2*	*2*	*2*	*3*	*3*	*3*	*4*	*4*	
lab_sample_id					*3020806/7*	*3020808/9*	*3020811*	*3020806/7*	*3020808/9*	*3020811*	*3020806/7*	*3020808/9*	*3020811*	*3020806/7*	*3020808/9*	
Sample Date:					*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	
Parameters:	*Units*	*Res/Non_Res/GW Prot_GW SW Interface Prot* a	*Res/Non_Res/GW Prot_GW Contact Prot* b	*Res/Non_Res/Non Res Drinking Water* c												
Semi-volatile Organic Compounds - SPLP																
2,4-Dimethylphenol	mg/L	-	-	1	-	-	0.005 U	-	-	0.005 U	-	-	0.005 U	-	-	
2-Methylphenol	mg/L	-	-	1	-	-	0.005 U	-	-	0.0225	-	-	0.00542	-	-	
3&4-Methylphenol	mg/L	-	-	1	-	-	-	-	-	-	-	-	-	-	-	
3,4-Dichlorophenol	mg/L	-	-	-	-	-	0.01 U	-	-	0.01 U	-	-	0.01 U	-	-	
4-Chloro-3-methylphenol	mg/L	-	-	0.42	-	-	0.005 U	-	-	0.005 U	-	-	0.005 U	-	-	
Acenaphthene	mg/L	-	-	3.8	-	-	0.005 U	-	-	0.005 U	-	-	0.005 U	-	-	
Aniline	mg/L	-	-	0.22	-	-	-	-	-	-	-	-	-	-	-	
Anthracene	mg/L	-	-	0.043	-	-	0.005 U	-	-	0.005 U	-	-	0.005 U	-	-	
Benzyl chloride	mg/L	-	-	0.032	-	-	0.005 U	-	-	0.005 U	-	-	0.005 U	-	-	
Fluoranthene	mg/L	-	-	0.21	-	-	0.005 U	-	-	0.005 U	-	-	0.005 U	-	-	
Hexachlorobenzene	mg/L	-	-	0.001	-	-	0.005 U	-	-	0.005 U	-	-	0.005 U	-	-	
Naphthalene	mg/L	-	-	1.5	-	-	0.00823	-	-	0.005 U	-	-	0.005 U	-	-	
Nitrobenzene	mg/L	-	-	0.0096	-	-	0.005 U	-	-	0.005 U	-	-	0.005 U	-	-	
Phenanthrene	mg/L	-	-	0.15	-	-	0.005 U	-	-	0.005 U	-	-	0.005 U	-	-	
Phenol	mg/L	-	-	13	-	-	0.005 U	-	-	0.005 U	-	-	0.005 U	-	-	
Metals																
Aluminum	mg/kg	-	1000000	-	15000	-	-	11000	-	-	22000	-	-	19000	-	
Antimony	mg/kg	94	49000	-	-	-	-	-	-	-	-	-	-	-	-	
Arsenic	mg/kg	4.6	2000	-	5.3[a]	-	-	4.8[a]	-	-	5.9[a]	-	-	5.8[a]	-	
Barium	mg/kg	-	1000000	-	150	-	-	130	-	-	160	-	-	140	-	
Beryllium	mg/kg	-	1000000	-	-	-	-	-	-	-	-	-	-	-	-	
Boron	mg/kg	100	1000000	-	-	-	-	-	-	-	-	-	-	-	-	
Cadmium	mg/kg	-	230000	-	13	-	-	9.8	-	-	7.5	-	-	10	-	
Chromium	mg/kg	3.3	140000	-	80[a]	-	-	73[a]	-	-	72[a]	-	-	68[a]	-	
Chromium VI (hexavalent)	mg/kg	3.3	140000	-	0.05 U	-	-	0.05 U	-	-	0.48	-	-	0.05 U	-	
Copper	mg/kg	-	1000000	-	120	-	-	110	-	-	110	-	-	120	-	
Iron	mg/kg	-	1000000	-	26000	-	-	25000	-	-	26000	-	-	24000	-	
Lead	mg/kg	-	-	-	1200	-	-	840	-	-	790	-	-	1300	-	
Manganese	mg/kg	-	180000	-	3900	-	-	3200	-	-	3800	-	-	4500	-	
Mercury	mg/kg	0.05	47	-	0.0529[a]	-	-	0.052 U	-	-	0.052 U	-	-	0.0772[a]	-	
Nickel	mg/kg	-	1000000	-	16	-	-	17	-	-	15	-	-	13	-	
Selenium	mg/kg	0.4	78000	-	1.5 J[a]	-	-	1.5 J[a]	-	-	2.3 J[a]	-	-	2.1 J[a]	-	
Silver	mg/kg	0.1	200000	-	3.6[a]	-	-	2.8[a]	-	-	2.9[a]	-	-	3.4[a]	-	
Thallium	mg/kg	4.2	15000	-	-	-	-	-	-	-	-	-	-	-	-	
Vanadium	mg/kg	190	1000000	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc	mg/kg	-	1000000	-	5200	-	-	3000	-	-	2700	-	-	3700	-	

APPENDIX A-2

2002/2005 PRIMARY SETTLING BASIN SEDIMENT ANALYTICAL RESULTS SUMMARY
NODULAR FACILITY
SAGINAW, MICHIGAN

Sample Location:					*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*
Sample ID:					*1*	*1*	*1*	*2*	*2*	*2*	*3*	*3*	*3*	*4*	*4*	*4*
lab_sample_id					*3020806/7*	*3020808/9*	*3020811*	*3020806/7*	*3020808/9*	*3020811*	*3020806/7*	*3020808/9*	*3020811*	*3020806/7*	*3020808/9*	*3020811*
Sample Date:					*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*
Parameters:	*Units*	*Res/Non_Res/GW Prot_GW SW Interface Prot*	*Res/Non_Res/GW Prot_GW Contact Prot*	*Res/Non_Res/Non Res Drinking Water*												
		a	b	c												
Metals - TCLP																
Aluminum	mg/L	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	mg/L	-	-	0.006	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	-	-	0.01	-	0.012 J[c]	-	-	0.015 J[c]	-	-	0.012 J[c]	-	-	0.018 J[c]	
Barium	mg/L	-	-	2	-	0.79	-	-	1.1	-	-	0.65	-	-	0.42	
Beryllium	mg/L	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	-	-	0.005	-	0.0099 J[c]	-	-	0.0055 J[c]	-	-	0.0039 J	-	-	0.0053 J[c]	
Chromium	mg/L	-	-	0.1	-	0.02 U	-	-	0.02 U	-	-	0.02 U	-	-	0.02 U	
Copper	mg/L	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	-	-	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	-	-	0.004	-	0.59[c]	-	-	0.31[c]	-	-	0.18[c]	-	-	0.087[c]	
Manganese	mg/L	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	-	-	0.002	-	0.0002 U	-	-	0.0002 U	-	-	0.0002 U	-	-	0.0002 U	
Nickel	mg/L	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	-	-	0.05	-	0.04 U	-	-	0.04 U	-	-	0.04 U	-	-	0.04 U	
Silver	mg/L	-	-	0.098	-	0.004 U	-	-	0.004 U	-	-	0.004 U	-	-	0.004 U	
Thallium	mg/L	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	-	-	0.062	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-
Metals - SPLP																
Aluminum	mg/L	-	-	0.05	-	-	0.1 U	-	-	0.16[c]	-	-	0.1 U	-	-	
Antimony	mg/L	-	-	0.006	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	-	-	0.01	-	0.0045 J	0.0054 J	-	0.0036 J	0.0037 J	-	0.0037 J	0.0038 J	-	0.004 J	
Barium	mg/L	-	-	2	-	0.081	0.079	-	0.3	0.26	-	0.22	0.25	-	0.26	
Beryllium	mg/L	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	-	-	0.005	-	0.00028 J	0.00028 J	-	0.0026 J	0.0021 J	-	0.00028 J	0.00032 J	-	0.00086 J	
Chromium	mg/L	-	-	0.1	-	0.002 U	0.002 U	-	0.0062	0.0048	-	0.002 U	0.002 U	-	0.0023	
Copper	mg/L	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	-	-	0.3	-	-	0.2 U	-	-	0.61[c]	-	-	0.2 U	-	-	
Lead	mg/L	-	-	0.004	-	0.008[c]	0.0081[c]	-	0.14[c]	0.12[c]	-	0.002 U	0.002 U	-	0.034[c]	
Manganese	mg/L	-	-	0.05	-	-	0.21[c]	-	-	0.68[c]	-	-	0.8[c]	-	-	
Mercury	mg/L	-	-	0.002	-	0.0002 U	-	-	0.0002 U	-	-	0.0002 U	-	-	0.0002 U	
Nickel	mg/L	-	-	0.1	-	-	0.002 U	-	-	0.0033	-	-	0.0049	-	-	
Selenium	mg/L	-	-	0.05	-	0.004 U	0.004 U	-	0.004 U	0.004 U	-	0.004 U	0.004 U	-	0.004 U	
Silver	mg/L	-	-	0.098	-	0.00068	0.0004 U	-	0.00087	0.00049 J	-	0.0004 U	0.00051 J	-	0.0004 U	
Thallium	mg/L	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	-	-	0.062	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	-	-	5	-	-	0.041	-	-	0.41	-	-	0.087	-	-	

APPENDIX A-2

2002/2005 PRIMARY SETTLING BASIN SEDIMENT ANALYTICAL RESULTS SUMMARY
NODULAR FACILITY
SAGINAW, MICHIGAN

Sample Location:					*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*
Sample ID:					*1*	*1*	*1*	*2*	*2*	*2*	*3*	*3*	*3*	*4*	*4*
lab_sample_id					*3020806/7*	*3020808/9*	*3020811*	*3020806/7*	*3020808/9*	*3020811*	*3020806/7*	*3020808/9*	*3020811*	*3020806/7*	*3020808/9*
Sample Date:					*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*
Parameters:	*Units*	*Res/Non_Res/GW Prot_GW SW Interface Prot* a	*Res/Non_Res/GW Prot_GW Contact Prot* b	*Res/Non_Res/Non Res Drinking Water* c											
Polychlorinated Biphenyls															
Aroclor-1016 (PCB-1016)	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-
Aroclor-1221 (PCB-1221)	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-
Aroclor-1232 (PCB-1232)	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-
Aroclor-1242 (PCB-1242)	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-
Aroclor-1248 (PCB-1248)	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-
Aroclor-1254 (PCB-1254)	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-
Aroclor-1260 (PCB-1260)	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-
Total PCBs	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-
Miscellaneous															
Chloride	mg/L	-	-	250	-	-	-	-	-	-	-	-	-	-	-
Fluoride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry															
Ammonia-N	mg/L	-	-	-	3.7 D	-	-	6.2 D	-	-	3.7 D	-	-	2.9 D	-
Biochemical oxygen demand (BOD)	mg/L	-	-	-	42	-	-	50	-	-	23	-	-	39	-
Chemical oxygen demand (COD)	mg/kg	-	-	-	33	-	-	39	-	-	39	-	-	45	-
Formaldehyde	mg/kg	2.4	60000	-	44.3[a]	-	-	36.5[a]	-	-	41[a]	-	-	34.8[a]	-
Percent solids	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	s.u.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH, lab	s.u.	-	-	-	8.16	-	-	7.79	-	-	7.54	-	-	7.23	-
Phosphorus	mg/L	-	-	240	20 D	-	-	19 D	-	-	51 D	-	-	41 D	-
Specific gravity	sg	-	-	-	1.31	-	-	1.38	-	-	1.27	-	-	1.25	-
Total solids	%	-	-	-	42.9	-	-	50.9	-	-	38.7	-	-	36.4	-
General Chemistry - TCLP															
Chloride	mg/L	-	-	250	-	23	-	-	24	-	-	25	-	-	22
Fluoride	mg/L	-	-	-	-	2	-	-	4.5	-	-	6.9	-	-	5.6
General Chemistry - SPLP															
Chloride	mg/L	-	-	250	-	16	-	-	14	-	-	17	-	-	17
Fluoride	mg/L	-	-	-	-	3.8	-	-	4.7	-	-	8.8	-	-	9.9
Formaldehyde	mg/L	-	-	3.8	-	-	0.461	-	-	0.1 U	-	-	0.1 U	-	-

Notes:

D Compounds at secondary dilution factor.
J Estimated concentration.
U Not present at or above the associated value.
- Not analyzed.
Exceeds Criteria.

APPENDIX A-2

2002/2005 PRIMARY SETTLING BASIN SEDIMENT ANALYTICAL RESULTS SUMMARY
NODULAR FACILITY
SAGINAW, MICHIGAN

Sample Location:				*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*
Sample ID:				*4*	*5*	*6*	*7*	*8*	*A5E240221-1*	*A5E240221-2*	*A5E240221-3*	*A5E240221-4*	*A5E240225-1*	*A5E240225-2*
lab_sample_id				*3020811*	*3020811*	*3020811*	*3020811*	*3020811*	*A5E240221-1*	*A5E240221-2*	*A5E240221-3*	*A5E240221-4*	*A5E240225-1*	*A5E240225-2*
Sample Date:				*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*
Parameters:	*Units*	*Res/Non_Res/GW Prot_GW SW Interface Prot* a	*Res/Non_Res/GW Prot_GW Contact Prot* b	*Res/Non_Res/Non Res Drinking Water* c										
Volatile Organic Compounds														
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	44	27000	-	-	-	-	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	-	2700	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	mg/kg	4	220	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane (Methyl chloride)	mg/kg	-	1100	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	0.36	140	-	-	-	-	-	-	-	-	-	-	-	-
Methyl isoamyl ketone	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/kg	2.1	270	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	5.4	250	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	4	440	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes (total)	mg/kg	0.82	150	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds - SPLP															
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	-	-	38	0.0052	0.0091	0.005 U	0.014	0.0051	-	-	-	-	0.01 U	0.01 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	-	-	5.2	0.005 U	0.0059	0.005 U	0.005 U	0.005 U	-	-	-	-	-	-
Benzene	mg/L	-	-	0.005	0.01[c]	0.0076[c]	0.0089[c]	0.008[c]	0.011[c]	-	-	-	-	0.0013	0.001 U
Chloromethane (Methyl chloride)	mg/L	-	-	1.1	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	-	-	-	-	0.001 U	0.001 U
Ethylbenzene	mg/L	-	-	0.074	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	-	-	-	-	0.001 U	0.001 U
Methyl isoamyl ketone	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.01 U	0.01 U
Styrene	mg/L	-	-	0.1	0.0043	0.001 U	0.001 U	0.001 U	0.001 U	-	-	-	-	0.001 U	0.001 U
Toluene	mg/L	-	-	0.79	0.0069	0.0057	0.003	0.0054	0.0043	-	-	-	-	0.001 U	0.001 U
Trichloroethene	mg/L	-	-	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	-	-	-	-	0.001 U	0.001 U
Xylenes (total)	mg/L	-	-	0.28	0.0043	0.004	0.003 U	0.003 U	0.0047	-	-	-	-	0.002 U	0.002 U
Semi-volatile Organic Compounds															
2,4-Dimethylphenol	mg/kg	7.6	10000	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/kg	1	16000	-	-	-	-	-	-	-	-	-	-	-	-
3&4-Methylphenol	mg/kg	1	16000	-	-	-	-	-	-	-	-	-	-	-	-
3,4-Dichlorophenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.28	3000	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthene	mg/kg	8.7	970	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	0.33	2800	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	mg/kg	-	41	-	-	-	-	-	-	-	-	-	-	-	-
Benzyl chloride	mg/kg	-	72	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg	5.5	730	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	mg/kg	0.35	8.2	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	0.73	2100	-	-	-	-	-	-	-	-	-	-	-	-
Nitrobenzene	mg/kg	3.6	220	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg	2.1	1100	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/kg	9	12000	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A-2

2002/2005 PRIMARY SETTLING BASIN SEDIMENT ANALYTICAL RESULTS SUMMARY
NODULAR FACILITY
SAGINAW, MICHIGAN

Sample Location:				*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*
Sample ID:				*4*	*5*	*6*	*7*	*8*	*A5E240221-1*	*A5E240221-2*	*A5E240221-3*	*A5E240221-4*	*A5E240225-1*	*A5E240225-2*
lab_sample_id				*3020811*	*3020811*	*3020811*	*3020811*	*3020811*	*A5E240221-1*	*A5E240221-2*	*A5E240221-3*	*A5E240221-4*	*A5E240225-1*	*A5E240225-2*
Sample Date:				*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*
Parameters:	*Units*	*Res/Non_Res/GW Prot_GW SW Interface Prot*	*Res/Non_Res/GW Prot_GW Contact Prot*	*Res/Non_Res/Non Res Drinking Water*										
		a	b	c										
Semi-volatile Organic Compounds - SPLP														
2,4-Dimethylphenol	mg/L	-	-	1	0.005 U	0.0198	0.005 U	0.005 U	0.005 U	-	-	-	-	0.005 U	0.005 U
2-Methylphenol	mg/L	-	-	1	0.005 U	0.044	0.0237	0.005 U	0.005 U	-	-	-	-	0.005 U	0.005 U
3&4-Methylphenol	mg/L	-	-	1	-	-	-	-	-	-	-	-	-	0.005 U	0.005 U
3,4-Dichlorophenol	mg/L	-	-	-	0.01 U	0.0147	0.01 U	0.01 U	0.01 U	-	-	-	-	-	-
4-Chloro-3-methylphenol	mg/L	-	-	0.42	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-	0.005 U	0.005 U
Acenaphthene	mg/L	-	-	3.8	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-	0.005 U	0.005 U
Aniline	mg/L	-	-	0.22	-	-	-	-	-	-	-	-	-	0.01 U	0.01 U
Anthracene	mg/L	-	-	0.043	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-	0.005 U	0.005 U
Benzyl chloride	mg/L	-	-	0.032	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-	0.005 U	0.005 U
Fluoranthene	mg/L	-	-	0.21	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-	0.005 U	0.005 U
Hexachlorobenzene	mg/L	-	-	0.001	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-	0.005 U	0.005 U
Naphthalene	mg/L	-	-	1.5	0.005 U	0.011	0.0076	0.00845	0.005 U	-	-	-	-	0.005 U	0.005 U
Nitrobenzene	mg/L	-	-	0.0096	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-	0.002 U	0.002 U
Phenanthrene	mg/L	-	-	0.15	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-	0.005 U	0.005 U
Phenol	mg/L	-	-	13	0.005 U	0.0479	0.005 U	0.005 U	0.005 U	-	-	-	-	0.005 U	0.005 U
Metals														
Aluminum	mg/kg	-	1000000	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	mg/kg	94	49000	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	4.6	2000	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/kg	-	1000000	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/kg	-	1000000	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/kg	100	1000000	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/kg	-	230000	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/kg	3.3	140000	-	-	-	-	-	-	-	-	-	-	-	-
Chromium VI (hexavalent)	mg/kg	3.3	140000	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/kg	-	1000000	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/kg	-	1000000	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/kg	-	180000	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/kg	0.05	47	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/kg	-	1000000	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/kg	0.4	78000	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/kg	0.1	200000	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/kg	4.2	15000	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/kg	190	1000000	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/kg	-	1000000	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A-2

2002/2005 PRIMARY SETTLING BASIN SEDIMENT ANALYTICAL RESULTS SUMMARY
NODULAR FACILITY
SAGINAW, MICHIGAN

Sample Location:					*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*
Sample ID:					*4*	*5*	*6*	*7*	*8*	*A5E240221-1*	*A5E240221-2*	*A5E240221-3*	*A5E240221-4*	*A5E240225-1*	*A5E240225-2*
lab_sample_id					*3020811*	*3020811*	*3020811*	*3020811*	*3020811*	*A5E240221-1*	*A5E240221-2*	*A5E240221-3*	*A5E240221-4*	*A5E240225-1*	*A5E240225-2*
Sample Date:					*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*
Parameters:	*Units*	*Res/Non_Res/GW Prot_GW SW Interface Prot* a	*Res/Non_Res/GW Prot_GW Contact Prot* b	*Res/Non_Res/Non Res Drinking Water* c											
Metals - TCLP															
Aluminum	mg/L	-	-	0.05	-	-	-	-	-	4[c]	2.7[c]	1.6[c]	3.2[c]	-	-
Antimony	mg/L	-	-	0.006	-	-	-	-	-	0.3 U	0.3 U	0.3 U	0.3 U	-	-
Arsenic	mg/L	-	-	0.01	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	-	-
Barium	mg/L	-	-	2	-	-	-	-	-	10 U	10 U	10 U	10 U	-	-
Beryllium	mg/L	-	-	0.004	-	-	-	-	-	0.005 U	0.005 U	0.005 U	0.005 U	-	-
Boron	mg/L	-	-	0.5	-	-	-	-	-	0.2 U	0.2 U	0.2 U	0.2 U	-	-
Cadmium	mg/L	-	-	0.005	-	-	-	-	-	0.1 U	0.1 U	0.1 U	0.1 U	-	-
Chromium	mg/L	-	-	0.1	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	-	-
Copper	mg/L	-	-	1	-	-	-	-	-	1 U	1 U	1 U	1 U	-	-
Iron	mg/L	-	-	0.3	-	-	-	-	-	40[c]	75.3[c]	32.9[c]	44.7[c]	-	-
Lead	mg/L	-	-	0.004	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	-	-
Manganese	mg/L	-	-	0.05	-	-	-	-	-	5[c]	5.1[c]	6.2[c]	5.3[c]	-	-
Mercury	mg/L	-	-	0.002	-	-	-	-	-	0.002 U	0.002 U	0.002 U	0.002 U	-	-
Nickel	mg/L	-	-	0.1	-	-	-	-	-	0.04 U	0.078	0.047	0.052	-	-
Selenium	mg/L	-	-	0.05	-	-	-	-	-	0.25 U	0.25 U	0.25 U	0.25 U	-	-
Silver	mg/L	-	-	0.098	-	-	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U	-	-
Thallium	mg/L	-	-	0.002	-	-	-	-	-	2 U	2 U	2 U	2 U	-	-
Vanadium	mg/L	-	-	0.062	-	-	-	-	-	0.05 U	0.05 U	0.05 U	0.05 U	-	-
Zinc	mg/L	-	-	5	-	-	-	-	-	1 U	1 U	1.2	1 U	-	-
Metals - SPLP															
Aluminum	mg/L	-	-	0.05	0.1[c]	0.1 U	0.1 U	0.1 U	0.1 U	0.072[c]	0.079[c]	0.174[c]	0.0774[c]	0.142[c]	0.05 U
Antimony	mg/L	-	-	0.006	-	-	-	-	-	0.0049	0.0034	0.0089[c]	0.0052	0.0112[c]	0.005
Arsenic	mg/L	-	-	0.01	0.0034 J	0.0046 J	0.0064 J	0.003 J	0.0083 J	0.002 U	0.002 U	0.0027	0.002 U	0.002 U	0.002 U
Barium	mg/L	-	-	2	0.23	0.11	0.11	0.23	0.12	0.0095	0.0094	0.0094	0.0093	0.0072	0.0115
Beryllium	mg/L	-	-	0.004	-	-	-	-	-	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Boron	mg/L	-	-	0.5	-	-	-	-	-	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Cadmium	mg/L	-	-	0.005	0.00074 J	0.00023 J	0.00031 J	0.00025 J	0.00039 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Chromium	mg/L	-	-	0.1	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.0023	0.002 U	0.002 U	0.002 U
Copper	mg/L	-	-	1	-	-	-	-	-	0.002 U	0.002	0.0062	0.002	-	-
Iron	mg/L	-	-	0.3	0.26	0.2 U	0.2 U	0.2 U	0.2 U	0.234	0.226	0.455[c]	0.249	0.274	0.153
Lead	mg/L	-	-	0.004	0.029[c]	0.0031	0.0077[c]	0.002 U	0.003	0.0085[c]	0.0075[c]	0.0523[c]	0.0152[c]	0.0308[c]	0.0042[c]
Manganese	mg/L	-	-	0.05	1[c]	0.14[c]	0.17[c]	0.56[c]	0.92[c]	0.669[c]	0.51[c]	0.362[c]	0.503[c]	0.253[c]	0.218[c]
Mercury	mg/L	-	-	0.002	-	-	-	-	-	0.0002 U	0.0002 U	0.0002 U	0.0002 U	-	-
Nickel	mg/L	-	-	0.1	0.0048	0.0021	0.0033	0.0031	0.0042	0.0037	0.0064	0.0026	0.0032	0.002 U	0.0021
Selenium	mg/L	-	-	0.05	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.002 U	0.002 U	0.002	0.002 U	0.002 U	0.002 U
Silver	mg/L	-	-	0.098	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.00069 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Thallium	mg/L	-	-	0.002	-	-	-	-	-	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vanadium	mg/L	-	-	0.062	-	-	-	-	-	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Zinc	mg/L	-	-	5	0.16	0.025	0.034	0.043	0.069	0.0167	0.0147	0.0791	0.0294	0.064	0.0134

APPENDIX A-2

2002/2005 PRIMARY SETTLING BASIN SEDIMENT ANALYTICAL RESULTS SUMMARY
NODULAR FACILITY
SAGINAW, MICHIGAN

Sample Location:					*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*
Sample ID:					*4*	*5*	*6*	*7*	*8*	*A5E240221-1*	*A5E240221-2*	*A5E240221-3*	*A5E240221-4*	*A5E240225-1*	*A5E240225-2*
lab_sample_id					*3020811*	*3020811*	*3020811*	*3020811*	*3020811*	*A5E240221-1*	*A5E240221-2*	*A5E240221-3*	*A5E240221-4*	*A5E240225-1*	*A5E240225-2*
Sample Date:					*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*2/28/2002*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*
Parameters:	*Units*	*Res/Non_Res/GW Prot_GW SW Interface Prot*	*Res/Non_Res/GW Prot_GW Contact Prot*	*Res/Non_Res/Non Res Drinking Water*											
		a	b	c											
Polychlorinated Biphenyls															
Aroclor-1016 (PCB-1016)	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor-1221 (PCB-1221)	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor-1232 (PCB-1232)	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor-1242 (PCB-1242)	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor-1248 (PCB-1248)	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor-1254 (PCB-1254)	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aroclor-1260 (PCB-1260)	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PCBs	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous															
Chloride	mg/L	-	-	250	-	-	-	-	-	14.5	14.3	13.8	13.9	-	-
Fluoride	mg/L	-	-	-	-	-	-	-	-	1 U	1	3.2	1.2	-	-
General Chemistry															
Ammonia-N	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biochemical oxygen demand (BOD)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical oxygen demand (COD)	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	2.4	60000	-	-	-	-	-	-	-	-	-	-	-	-
Percent solids	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	s.u.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH, lab	s.u.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	mg/L	-	-	240	-	-	-	-	-	-	-	-	-	-	-
Specific gravity	sg	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total solids	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry - TCLP															
Chloride	mg/L	-	-	250	-	-	-	-	-	-	-	-	-	-	-
Fluoride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry - SPLP															
Chloride	mg/L	-	-	250	-	-	-	-	-	-	-	-	-	-	-
Fluoride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/L	-	-	3.8	0.209	0.535	0.103	0.108	0.1 U	-	-	-	-	0.1 U	0.11

Notes:

D	Compounds at secondary dilution factor.
J	Estimated concentration.
U	Not present at or above the associated value.
-	Not analyzed.
	Exceeds Criteria.

APPENDIX A-2

2002/2005 PRIMARY SETTLING BASIN SEDIMENT ANALYTICAL RESULTS SUMMARY
NODULAR FACILITY
SAGINAW, MICHIGAN

Sample Location:					*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*
Sample ID:					*A5E240225-3*	*A5E240225-4*	*A5E240225-5*	*A5E240225-6*	*A5E240225-7*	*A5E240225-8*	*A5E240213-1*	*A5E240213-2*	*A5E240213-3*	*A5E240213-4*
lab_sample_id					*A5E240225-3*	*A5E240225-4*	*A5E240225-5*	*A5E240225-6*	*A5E240225-7*	*A5E240225-8*	*A5E240213-1*	*A5E240213-2*	*A5E240213-3*	*A5E240213-4*
Sample Date:					*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/20/2005*	*5/20/2005*	*5/20/2005*	*5/20/2005*
Parameters:	*Units*	*Res/Non_Res/GW Prot_GW SW Interface Prot* a	*Res/Non_Res/GW Prot_GW Contact Prot* b	*Res/Non_Res/Non Res Drinking Water* c										
Volatile Organic Compounds														
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	44	27000	-	-	-	-	-	-	-	6.4 UD	6.4 UD	6.4 UD	6.4 UD
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	-	2700	-	-	-	-	-	-	-	-	-	-	-
Benzene	mg/kg	4	220	-	-	-	-	-	-	-	0.42 UD	0.78 D	0.42 UD	0.42 UD
Chloromethane (Methyl chloride)	mg/kg	-	1100	-	-	-	-	-	-	-	2.1 UD	2.1 UD	2.1 UD	2.1 UD
Ethylbenzene	mg/kg	0.36	140	-	-	-	-	-	-	-	0.42 UD	0.42 UD	0.42 UD	0.42 UD
Methyl isoamyl ketone	mg/kg	-	-	-	-	-	-	-	-	-	21 UD	21 UD	21 UD	21 UD
Styrene	mg/kg	2.1	270	-	-	-	-	-	-	-	0.42 UD	0.42 UD	0.42 UD	0.42 UD
Toluene	mg/kg	5.4	250	-	-	-	-	-	-	-	17 D[a]	7.2 D[a]	7.4 D[a]	16 D[a]
Trichloroethene	mg/kg	4	440	-	-	-	-	-	-	-	0.42 UD	0.42 UD	0.42 UD	0.42 UD
Xylenes (total)	mg/kg	0.82	150	-	-	-	-	-	-	-	1.3 UD	1.3 UD	1.3 UD	1.3 UD
Volatile Organic Compounds - SPLP														
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	-	-	38	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	-	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	-	-	5.2	-	-	-	-	-	-	-	-	-	-
Benzene	mg/L	-	-	0.005	0.001 U	0.0031	0.001 U	0.001 U	0.001 U	0.001 U	-	-	-	-
Chloromethane (Methyl chloride)	mg/L	-	-	1.1	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	-	-	-	-
Ethylbenzene	mg/L	-	-	0.074	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	-	-	-	-
Methyl isoamyl ketone	mg/L	-	-	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	-	-	-
Styrene	mg/L	-	-	0.1	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	-	-	-	-
Toluene	mg/L	-	-	0.79	0.001 U	0.001 U	0.001 U	0.048	0.023	0.001 U	-	-	-	-
Trichloroethene	mg/L	-	-	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	-	-	-	-
Xylenes (total)	mg/L	-	-	0.28	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-	-	-	-
Semi-volatile Organic Compounds														
2,4-Dimethylphenol	mg/kg	7.6	10000	-	-	-	-	-	-	-	12 UD	12 UD	12 UD	12 UD
2-Methylphenol	mg/kg	1	16000	-	-	-	-	-	-	-	12 UD	12 UD	12 UD	12 UD
3&4-Methylphenol	mg/kg	1	16000	-	-	-	-	-	-	-	12 UD	12 D[a]	12 UD	12 UD
3,4-Dichlorophenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.28	3000	-	-	-	-	-	-	-	12 UD	12 UD	12 UD	12 UD
Acenaphthene	mg/kg	8.7	970	-	-	-	-	-	-	-	12 UD	12 UD	12 UD	12 UD
Aniline	mg/kg	0.33	2800	-	-	-	-	-	-	-	12 UD	12 UD	12 UD	12 UD
Anthracene	mg/kg	-	41	-	-	-	-	-	-	-	12 UD	12 UD	12 UD	12 UD
Benzyl chloride	mg/kg	-	72	-	-	-	-	-	-	-	12 UD	12 UD	12 UD	12 UD
Fluoranthene	mg/kg	5.5	730	-	-	-	-	-	-	-	12 UD	12 UD	12 UD	12 UD
Hexachlorobenzene	mg/kg	0.35	8.2	-	-	-	-	-	-	-	12 UD	12 UD	12 UD	12 UD
Naphthalene	mg/kg	0.73	2100	-	-	-	-	-	-	-	12 UD	12 UD	12 UD	12 UD
Nitrobenzene	mg/kg	3.6	220	-	-	-	-	-	-	-	7.5 UD	7.5 UD	7.5 UD	7.5 UD
Phenanthrene	mg/kg	2.1	1100	-	-	-	-	-	-	-	12 UD	12 UD	12 UD	12 UD
Phenol	mg/kg	9	12000	-	-	-	-	-	-	-	12 UD	32 D[a]	12 UD	12 UD

APPENDIX A-2

2002/2005 PRIMARY SETTLING BASIN SEDIMENT ANALYTICAL RESULTS SUMMARY
NODULAR FACILITY
SAGINAW, MICHIGAN

Sample Location:					*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*
Sample ID:					*A5E240225-3*	*A5E240225-4*	*A5E240225-5*	*A5E240225-6*	*A5E240225-7*	*A5E240225-8*	*A5E240213-1*	*A5E240213-2*	*A5E240213-3*	*A5E240213-4*
lab_sample_id					*A5E240225-3*	*A5E240225-4*	*A5E240225-5*	*A5E240225-6*	*A5E240225-7*	*A5E240225-8*	*A5E240213-1*	*A5E240213-2*	*A5E240213-3*	*A5E240213-4*
Sample Date:					*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/20/2005*	*5/20/2005*	*5/20/2005*	*5/20/2005*
Parameters:	*Units*	*Res/Non_Res/GW Prot_GW SW Interface Prot*	*Res/Non_Res/GW Prot_GW Contact Prot*	*Res/Non_Res/Non Res Drinking Water*										
		a	b	c										
Semi-volatile Organic Compounds - SPLP														
2,4-Dimethylphenol	mg/L	-	-	1	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-
2-Methylphenol	mg/L	-	-	1	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-
3&4-Methylphenol	mg/L	-	-	1	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-
3,4-Dichlorophenol	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	mg/L	-	-	0.42	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-
Acenaphthene	mg/L	-	-	3.8	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-
Aniline	mg/L	-	-	0.22	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	-	-	-
Anthracene	mg/L	-	-	0.043	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-
Benzyl chloride	mg/L	-	-	0.032	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-
Fluoranthene	mg/L	-	-	0.21	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-
Hexachlorobenzene	mg/L	-	-	0.001	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-
Naphthalene	mg/L	-	-	1.5	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-
Nitrobenzene	mg/L	-	-	0.0096	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-	-	-	-
Phenanthrene	mg/L	-	-	0.15	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-
Phenol	mg/L	-	-	13	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-
Metals														
Aluminum	mg/kg	-	1000000	-	-	-	-	-	-	-	27500	20300	27600	28500
Antimony	mg/kg	94	49000	-	-	-	-	-	-	-	2.8 U	2.8 U	2.8 U	2.8 U
Arsenic	mg/kg	4.6	2000	-	-	-	-	-	-	-	**6.8[a]**	**7.9[a]**	**7.1[a]**	**7.3[a]**
Barium	mg/kg	-	1000000	-	-	-	-	-	-	-	86.4	134	114	125
Beryllium	mg/kg	-	1000000	-	-	-	-	-	-	-	0.89 U	1.1	0.89 U	0.89 U
Boron	mg/kg	100	1000000	-	-	-	-	-	-	-	44.6 U	44.6 U	44.6 U	44.6 U
Cadmium	mg/kg	-	230000	-	-	-	-	-	-	-	1.8	3.8	2.2	2.8
Chromium	mg/kg	3.3	140000	-	-	-	-	-	-	-	**43.2[a]**	**65.9[a]**	**60.8[a]**	**63.4[a]**
Chromium VI (hexavalent)	mg/kg	3.3	140000	-	-	-	-	-	-	-	2.8 U	2.8 U	2.8 U	2.8 U
Copper	mg/kg	-	1000000	-	-	-	-	-	-	-	55.7	137	96.4	128
Iron	mg/kg	-	1000000	-	-	-	-	-	-	-	12200	20600	17100	18500
Lead	mg/kg	-	-	-	-	-	-	-	-	-	124	506	312	335
Manganese	mg/kg	-	180000	-	-	-	-	-	-	-	959	2430	1790	1890
Mercury	mg/kg	0.05	47	-	-	-	-	-	-	-	0.45 U	0.45 U	0.45 U	0.45 U
Nickel	mg/kg	-	1000000	-	-	-	-	-	-	-	10	15.6	14.7	13.8
Selenium	mg/kg	0.4	78000	-	-	-	-	-	-	-	**1.8[a]**	**1.8[a]**	**1.2[a]**	**2.5[a]**
Silver	mg/kg	0.1	200000	-	-	-	-	-	-	-	2.2 U	2.2 U	2.2 U	2.2 U
Thallium	mg/kg	4.2	15000	-	-	-	-	-	-	-	0.45 U	0.45 U	0.45 U	0.45
Vanadium	mg/kg	190	1000000	-	-	-	-	-	-	-	14.6	14.8	15.4	18.2
Zinc	mg/kg	-	1000000	-	-	-	-	-	-	-	383	1100	613	711

APPENDIX A-2

2002/2005 PRIMARY SETTLING BASIN SEDIMENT ANALYTICAL RESULTS SUMMARY
NODULAR FACILITY
SAGINAW, MICHIGAN

Sample Location:					*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*
Sample ID:					*A5E240225-3*	*A5E240225-4*	*A5E240225-5*	*A5E240225-6*	*A5E240225-7*	*A5E240225-8*	*A5E240213-1*	*A5E240213-2*	*A5E240213-3*	*A5E240213-4*
lab_sample_id					*A5E240225-3*	*A5E240225-4*	*A5E240225-5*	*A5E240225-6*	*A5E240225-7*	*A5E240225-8*	*A5E240213-1*	*A5E240213-2*	*A5E240213-3*	*A5E240213-4*
Sample Date:					*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/20/2005*	*5/20/2005*	*5/20/2005*	*5/20/2005*
Parameters:	*Units*	*Res/Non_Res/GW Prot_GW SW Interface Prot* a	*Res/Non_Res/GW Prot_GW Contact Prot* b	*Res/Non_Res/Non Res Drinking Water* c										
Metals - TCLP														
Aluminum	mg/L	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Antimony	mg/L	-	-	0.006	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	-	-	0.01	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	-	-	2	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/L	-	-	0.004	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	-	-	0.5	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	-	-	0.005	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	-	-	0.1	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	-	-	1	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	-	-	0.3	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	-	-	0.004	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	-	-	0.002	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	-	-	0.1	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	-	-	0.098	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	-	-	0.002	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	-	-	0.062	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	-	-	5	-	-	-	-	-	-	-	-	-	-
Metals - SPLP														
Aluminum	mg/L	-	-	0.05	0.05 U	0.05 U	0.0615[c]	0.05 U	0.05 U	0.05 U	-	-	-	-
Antimony	mg/L	-	-	0.006	0.002 U	0.0243[c]	0.0103[c]	0.0028	0.0023	0.002 U	-	-	-	-
Arsenic	mg/L	-	-	0.01	0.002 U	0.0068	0.0021	0.0029	0.0025	0.002 U	-	-	-	-
Barium	mg/L	-	-	2	0.0027	0.0032	0.0105	0.0076	0.0111	0.0027	-	-	-	-
Beryllium	mg/L	-	-	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	-	-	-	-
Boron	mg/L	-	-	0.5	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	-	-	-	-
Cadmium	mg/L	-	-	0.005	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	-	-	-	-
Chromium	mg/L	-	-	0.1	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-	-	-	-
Copper	mg/L	-	-	1	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	-	-	0.3	0.0433	0.0782	0.184	1.03[c]	0.362[c]	0.0521	-	-	-	-
Lead	mg/L	-	-	0.004	0.001 U	0.001 U	0.0207[c]	0.001 U	0.001 U	0.001 U	-	-	-	-
Manganese	mg/L	-	-	0.05	0.0652[c]	0.0564[c]	0.291[c]	0.569[c]	0.366[c]	0.0523[c]	-	-	-	-
Mercury	mg/L	-	-	0.002	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	-	-	0.1	0.002 U	0.002 U	0.0022	0.0031	0.0027	0.002 U	-	-	-	-
Selenium	mg/L	-	-	0.05	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-	-	-	-
Silver	mg/L	-	-	0.098	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	-	-	-	-
Thallium	mg/L	-	-	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	-	-	-	-
Vanadium	mg/L	-	-	0.062	0.005 U	0.007	0.005 U	0.005 U	0.005 U	0.005 U	-	-	-	-
Zinc	mg/L	-	-	5	0.01 U	0.01 U	0.0142	0.01 U	0.01 U	0.01 U	-	-	-	-

APPENDIX A-2

2002/2005 PRIMARY SETTLING BASIN SEDIMENT ANALYTICAL RESULTS SUMMARY
NODULAR FACILITY
SAGINAW, MICHIGAN

Sample Location:					*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*	*Lagoon Sludge*
Sample ID:					*A5E240225-3*	*A5E240225-4*	*A5E240225-5*	*A5E240225-6*	*A5E240225-7*	*A5E240225-8*	*A5E240213-1*	*A5E240213-2*	*A5E240213-3*	*A5E240213-4*
lab_sample_id					*A5E240225-3*	*A5E240225-4*	*A5E240225-5*	*A5E240225-6*	*A5E240225-7*	*A5E240225-8*	*A5E240213-1*	*A5E240213-2*	*A5E240213-3*	*A5E240213-4*
Sample Date:					*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/19/2005*	*5/20/2005*	*5/20/2005*	*5/20/2005*	*5/20/2005*
Parameters:	***Units***	*Res/Non_Res/GW Prot_GW SW Interface Prot* a	*Res/Non_Res/GW Prot_GW Contact Prot* b	*Res/Non_Res/Non Res Drinking Water* c										
Polychlorinated Biphenyls														
Aroclor-1016 (PCB-1016)	mg/kg	-	-	-	-	-	-	-	-	-	1.8 U	1.8 U	1.8 U	1.8 U
Aroclor-1221 (PCB-1221)	mg/kg	-	-	-	-	-	-	-	-	-	1.8 U	1.8 U	1.8 U	1.8 U
Aroclor-1232 (PCB-1232)	mg/kg	-	-	-	-	-	-	-	-	-	1.8 U	1.8 U	1.8 U	1.8 U
Aroclor-1242 (PCB-1242)	mg/kg	-	-	-	-	-	-	-	-	-	1.8 U	1.8 U	1.8 U	1.8 U
Aroclor-1248 (PCB-1248)	mg/kg	-	-	-	-	-	-	-	-	-	1.8 U	1.8 U	1.8 U	1.8 U
Aroclor-1254 (PCB-1254)	mg/kg	-	-	-	-	-	-	-	-	-	1.8 U	1.8 U	1.8 U	1.8 U
Aroclor-1260 (PCB-1260)	mg/kg	-	-	-	-	-	-	-	-	-	1.8 U	1.8 U	1.8 U	1.8 U
Total PCBs	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous														
Chloride	mg/L	-	-	250	-	-	-	-	-	-	-	-	-	-
Fluoride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry														
Ammonia-N	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Biochemical oxygen demand (BOD)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical oxygen demand (COD)	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	2.4	60000	-	-	-	-	-	-	-	28[a]	22[a]	16[a]	31[a]
Percent solids	%	-	-	-	-	-	-	-	-	-	17.9	26.5	22.5	21.3
pH	s.u.	-	-	-	-	-	-	-	-	-	8	-	-	-
pH, lab	s.u.	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	mg/L	-	-	240	-	-	-	-	-	-	-	-	-	-
Specific gravity	sg	-	-	-	-	-	-	-	-	-	-	-	-	-
Total solids	%	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry - TCLP														
Chloride	mg/L	-	-	250	-	-	-	-	-	-	-	-	-	-
Fluoride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry - SPLP														
Chloride	mg/L	-	-	250	-	-	-	-	-	-	-	-	-	-
Fluoride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/L	-	-	3.8	0.1 U	0.1 U	0.22	0.21	0.12	0.1 U	-	-	-	-

Notes:

D Compounds at secondary dilution factor.
J Estimated concentration.
U Not present at or above the associated value.
- Not analyzed.
Exceeds Criteria.

APPENDIX B

CLASSIFIED SAND DATA

APPENDIX B-1

DOCC CLASSIFIED SAND ANALYTICAL RESULTS SUMMARY

CLASSIFIED SAND

Compositional Analysis

Parameter mg/kg	10/13/88[1]			10\90[2]	1991[3]	11\16\92[4]				10/8/93[5]			
	1	2	3			1	2	3	4	1	2	3	4
Antimony	< 6			< 20	< 1.1								
Arsenic	1.4	1	0.84	0.8	0.71	0.8	0.74	0.79	1.1	0.8	1	1	1
Barium	47	31	65	49	60	120	100	67	65	41	100	95	38
Berylliium	< 0.5			< 0.5	< 0.52								
Cadmium	< 0.5	0.52	0.73	< 0.5	< 0.52	0.04	0.05	0.04	0.04	0.025	0.1	0.06	< 0.025
Chloride	430			80	41								
Chromium	54	52	75	57	83	130	100	69	64	45	91	110	37
Cobalt	< 2			< 5	< 5.2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Copper	15	16	8.2	15	14	11	9	9	7	6	12	19	5
Cyanide	4.2			< 2.6	< 2.6	1.6	2.2	< 0.5	1.7	1.1	2	1.4	1.3
Flouride	290			< 21	53								
Lead	< 11	< 10	< 10	< 10	< 21	7	9	6	6	4.3	9.5	13	9.3
Lithium	< 5.3			< 5	< 5.2	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Mercury	< 0.096	< 0.1	< 0.1	< 0.1	< 0.1	< 0.25	< 0.25	< 0.25	< 0.25	0.25	< 0.25	< 0.25	< 0.25
Molybdenum						< 5	< 5	< 5	< 5				
Nickel	12			< 4	6	8	5	8	6	4	500	7	5
Phenols	< 1.3			< 2.6	< 2.6								
Selenuim	< 0.84	< 0.83	< 0.83	< 0.6	< 0.63	0.3	0.3	< 0.2	< 0.2	0.2	0.3	0.3	< 0.2
Silver	< 1	< 1	< 1	< 1	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Solids (%)	95	96	96	96	95.3	95	96	95	95	86	98	96	93
Zinc	380	560	540	410	440	240	360	380	290	240	420	370	440
BOD				13	< 52					240			
Calcium				15000	25000	51000	37000	23000	27000	17000	33000	3600	7000
Corrosivity(pH)				8.9	9.7					8.7	8.8	8.2	7.5
Magnesium				690	980	1500	1200	1100	930	660	1100	1200	520
Manganese				1300	3000	4800	3800	2200	2400	1500	300	3800	640
Nitrate				0.94	1.6								
Nitrite				< 0.21									
Nitrogen				260	210								
Phosphorous				64	72	< 2.5	< 2.5	< 2.5	< 2.5	6.4	6.3	3.3	< 2.5
Potassium				230	410	500	400	300	300	220	500	400	200
Sodium				150	240	280	250	200	200	200	290	260	100
Iron										6000	9000	10000	8100
Aluminum										2200	4800	5200	1700
Ammonia					< 26								

(1) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes from Michigan Public Act 641 Disposal Designations." February 1989. Verified with laboratory data.
(2) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designation," October 1990. No record of sampling date. No laboratory data.
(3) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes," January 1992. No record of sampling date. No laboratory data.
(4) Results taken from laboratory data of samples 11/16/92
(5) Results taken from laboratory data of samples 10/8/93.

TABLE 14.1

CLASSIFIED SAND
ASTM Leaching Test

Parameter mg/L	11/28/83[1]	2/4/85[2]			2/4/85[3]	6/24/86[4]		2/23/87[5]	10/20/87[6]	10/8/93[7]			
		Pile 1	Pile 2	Pile 3	Surface Sample	New	Existing			1	2	3	4
Arsenic	0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001		0.002	0.003				
Barium	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.02		0.12	0.02				
Cadmium	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		< 0.005	< 0.004				
Chromium	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.005	0.01	< 0.05	< 0.05	< 0.05	< 0.05
Cyanide	< 0.02	< 0.02	< 0.02	< 0.02	< 0.025	< 0.02		< 0.2	< 0.1				
Copper	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02		< 0.02	< 0.01				
Fluoride	8.9	1.28	0.6	0.58	9.8	0.5	0.58	0.7	0.32	< 0.05	< 0.05	< 0.05	< 0.05
Lead	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		< 0.005	< 0.005				
Mercury	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002		< 0.0002	< 0.0002				
Selenium	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002		< 0.002	< 0.003				
Silver	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02		< 0.02	0.01				
Zinc	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		< 0.01	< 0.005				
pH	9.8	8.4	8.3	8.3	9.2	9.8	9	9.9	9.5				
Phenols	< 0.025	< 0.01	< 0.01	0.016	< 0.01	< 0.01		0.15	0.012				
Ammonia										0.2	0.2	0.1	0.1
BOD										< 3	< 3	< 3	< 3
Nitrate										< 1	1.1	< 1	< 1
TOC		2	1.8	7.6	2	6.6		7.4	12				
COD		< 20	< 20	< 20	< 20	< 20		< 20	110				

(1) Results taken from "Waste Characterization Study for Foundry Process Solid Wastes," January 1984. Revised February 1984. No laboratory data.
(2) Results taken from "Request for Classification of Foundry Process Materials," June 1985. No laboratory data. And from "Waste Characterization Study of Foundry Process Solid Wastes," January 1986. Verified with laboratory data.
(3) Results taken from "Waste Characterization Study of Foundry Process Solid Wastes," January 1986. Verified with laboratory data.
(4) Results taken from "Annual Retest of Waste materials for GM-CFD Saginaw Nodular Iron," August 1986. Verified with laboratory data
(5) Reusits taken from "Summary Report: Sampling and Analysis of Foundry Process Solid Wastes," July 1987. Verified with laboratory data.
(6) Results taken from "Summary Report: Sampling and Analysis of Foundry Process Solid Wastes," January 1988. No laboratory data available.
(7) Results taken from laboratory data of samples collected 10/8/95.

CLASSIFIED SAND
TCLP ANALYSIS

Parameter mg/L	10\90[1]	1991[2]			11\16\92[3]				10/8/95[4]							
		1	2	3	1	2	3	4	1	2	3	4	5	6	7	8
Arsenic	< 0.003	< 0.006	< 0.006	< 0.006					< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Barium	0.28	0.32	0.28	0.32	< 1	< 1	< 1	< 1	0.17	0.18	0.17	0.16	0.2	0.23	0.18	0.2
Cadmium	0.005	< 0.0006	< 0.0006	< 0.0006	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Copper	0.03	0.022	0.034	< 0.022	< 0.2	< 0.2	< 0.2	< 0.2								
Chromium	0.05	0.13	0.098	0.084	< 0.2	< 0.2	< 0.2	< 0.2	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.2
Lead	< 0.1	< 0.006	< 0.006	0.006	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mercury	< 0.0002	< 0.0004	< 0.0004	< 0.0004												
Selenium	< 0.003	< 0.006	< 0.006	< 0.006	< 0.04	< 0.04	< 0.04	< 0.04	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Silver	< 0.02	< 0.002	< 0.002	< 0.002												
Zinc	11	13	14	14	5.1	8	9.7	9.7	0.21	0.21	0.32	0.36	0.35	0.14	0.23	0.05
Fluoride	0.16	0.26														
Phenol	0.23	< 0.05														
Phosphorous	< 0.1	< 0.1														
Formaldehyde	< 0.25	0.41			0.13	0.17	0.07	0.2	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02			
Benzene	< 0.1	< 0.001														
Toluene	< 0.1	< 0.001														
Xylene	< 0.1	, 0.003														
Manganese									0.07	0.11	0.17	0.16	0.14	0.04	0.05	< 0.01
Iron									2.5	4.6	4.7	4.5	4.7	2	2.3	0.4

(1) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designations," October 1990. No record of sampling date. No laboratory data.
(2) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes," January 1992. No record of sampling date. No laboratory data.
(3) Results taken from laboratory data of samples collected 11/16/92.
(4) Results taken from laboratory data of samples collected 10/8/93.

TABLE 14.3

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CLASSIFIED SAND

EP Toxicity Test

Parameter mg/L	11/28/83[1]	2/4/85[2] Composite	6/24/86[3]	2/23/87[4]	10/20/87[5]	10/12/88[6] 1	10/12/88[6] 2	10/12/88[6] 3	1991[7] 1	1991[7] 2	1991[7] 3
Arsenic	0.001	< 0.001	0.001	< 0.001	< 0.003	< 0.004	< 0.004	< 0.004	< 0.006	< 0.006	< 0.006
Barium	< 0.2	< 0.2	0.4	< 0.2	0.07	0.035	0.04	0.081	0.088	0.059	0.055
Cadmium	< 0.01	< 0.01	< 0.01	< 0.01	< 0.004	< 0.005	< 0.005	< 0.005	< 0.0006	< 0.0006	< 0.0006
Copper	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	0.038	< 0.02
Chromium	< 0.05	< 0.05	0.06	0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cyanide	< 0.02	< 0.02	< 0.02								
Lead	< 0.1	< 0.1	0.3	< 0.1	< 0.06	< 0.1	0.3	< 0.1	< 0.006	< 0.006	< 0.006
Mercury	< 0.0002	< 0.0002	< 0.002	< 0.0002	< 0.0002	< 0.001	< 0.001	0.002	< 0.0004	< 0.0004	< 0.0004
Selenium	< 0.001	< 0.001	< 0.002	< 0.002	< 0.003	< 0.02	< 0.02	< 0.02	< 0.006	< 0.006	< 0.006
Silver	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.002	< 0.002	< 0.002
Zinc	14.2	9.8	8.6	< 0.01	5.3	6.9	5.9	8.4	13	13	15
pH	5.1			9.3	7.5	9	8.9	8			

(1) Results taken from "Waste Characterization Study for Foundry Process Solid Wastes," January 1984. Revised February 1984. No laboratory data.
(2) Results taken from "Request for Classification of Foundry Process Materials," June 1985. No laboratory data. And January 1986, Verified with laboratory data.
(3) Results taken from "Annual Retest of Waste Materials for GM-CFD Saginaw Nodular Iron," August 1986. Verified with laboratory data.
(4) Results taken from "Summary Report: Sampling and Analysis of Foundry Process Solid Wastes," July 1987. Verified with laboratory data.
(5) Results taken from "Summary Report: Sampling and Analysis of Foundry Process Solid Wastes," January 1988. No laboratory data available.
(6) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designation," February 1989. Verified with Laboratory data.
(7) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes," January 1992. No record of sampling date. No laboratory data.

TABLE 14.4

CLASSIFIED SAND

VOCs/BNEs/Formaldehyde

Parameter	10/30/88[1]	10\90[2]	1991[3]	11\16\92[4]				10/8/93[5]			
ug/kg				1	2	3	4	1	2	3	4
Methylene Chloride	< 1	3.7	2	45	55	39	83	< 5	< 5	< 5	< 5
Chloroform	< 0.5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,1-TCA	< 2	1.4	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Benzene	< 1	< 1	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Toluene	< 1	< 1	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Xylene			< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Carbon Tetrachloride			< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene			< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
mg/kg											
B(2-E)P	< 2	< 0.07	< 0.35								
Butyl Benzyl P	< 0.5										
Di-n-Butyl P	< 0.5										
Dieth P	< 0.5										
Dimeth P	< 0.5										
Di-n-octyl P	< 3										
Phenols								0.28	0.2	0.2	0.3
mg/kg											
Formaldehyde	< 5	< 6.2	4.824					7.8	1.9	2	2.4
mg/kg											
Triphenol Phosphate		< 0.2	ND								
Tricersol Phosphate		< 1.3	ND								

(1) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designations." February 1989. Verified with laboratory data.
(2) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designation," October 1990. No record of sampling date. No laboratory data.
(3) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes." January 1992. No record of sampling date. No laboratory data.
(4) Results taken from laboratory data of samples collected 11/16/92.
(5) Results taken from laboratory data of samples collected 10/8/93.

TABLE 14.5

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CLASSIFIED SAND
TOTAL PCBs

Parameter mg/L	11/28/83[1]	2/3/85[2]	6/24/86[3]	2/23/87[4]	10/20/87[5]	10/12/88[6]	10/90[7]	1991[8]	11\16\92[9]				10/8/93[10]			
									1	2	3	4	1	2	3	4
Total PCB			0.17													
PCB Constituant																
A1242	< 0.1	0.1	0.17	< 0.08	< 0.02	< 0.1	< 0.08	< 0.08	< 0.033	< 0.033	< 0.033	< 0.033	< 0.016	< 0.016	< 0.016	< 0.016
A1016			< 0.08	< 0.08	< 0.02	< 0.1	< 0.08	< 0.08	< 0.033	< 0.033	< 0.033	< 0.033	< 0.016	< 0.016	< 0.016	< 0.016
A1221			< 0.08	< 0.08	< 0.02	< 0.1	< 0.08	< 0.08	< 0.033	< 0.033	< 0.033	< 0.033	< 0.016	< 0.016	< 0.016	< 0.016
A1232			< 0.08	< 0.08	< 0.02	< 0.1	< 0.08	< 0.08	< 0.033	< 0.033	< 0.033	< 0.033	< 0.016	< 0.016	< 0.016	< 0.016
A1248			< 0.08	< 0.08	< 0.02	< 0.1	< 0.08	< 0.08	< 0.033	< 0.033	< 0.033	< 0.033	< 0.016	< 0.016	< 0.016	< 0.016
A1254			< 0.16	< 0.16	< 0.02	< 0.1	< 0.17	< 0.17	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033
A1260			< 0.16	< 0.16	< 0.02	< 0.1	< 0.17	< 0.17	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033

(1) Result taken from "Waste Characterization Study of Foundry Process Solid Wastes," January 1984. Revised February 1984. No laboratory data.
(2) Results taken from "Request for Classification of Foundry Process Materials," June 1985. No laboratory data.
(3) Results taken from "Annual Retest of Waste Materials for GM-CFD Saginaw Nodular Iron," August 1986. Verified with laboratory data.
(4) Results taken from "Summary Report: Sampling and Analysis of Foundry Process Solid Wastes," July 1987. Verifed with laboratory data.
(5) Results taken from "Summary Report: Sampling and Analysis of Foundry Process Solid Wastes," January 1988. No laboratory data available.
(6) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designation," February 1989. Verified with laboratory data.
(7) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designation," October 1990. No record of sampling date. No laboratory data.
(8) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes." January 1992. No record of sampling date. No laboratory data.
(9) Results taken from laboratory data of samples collected 11/16/3.
(10) Results taken from laboratory data of samples collected 10/8/93.

TABLE 14.6

CLASSIFIED SAND

Asbestos

Parameter	10\13\88[1]	10\90[2]	1991[3]	11\16\92[4]				10/8/93[5]			
				1	2	3	4	1	2	3	4
Asbestos				0	0	0	0	< 1	< 1	< 1	< 1
Chrysotile	0	0									
Amosite	0	0									
Croc	0										

(1) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designation," February 1989. Verfied with laboratory data.

(2) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designation," October 1990. No record of sampling date. No laboratory data.

(3) Results taken from "General Motors Corporation Saginaw Grey Iron Foundry Annual Sampling of Solid Wastes," January 1992. No record of sampling date. No laboratory data.

(4) Results taken from laboratory data of samples collected 11/16/92.

(5) Results taken from laboratory data of samples collected 10/8/93.

TABLE 14.7

NODULAR IRON METALS RECLAMATION PILE

ASTM Leaching Test

Parameter mg/L	2/4/85[1]
Arsenic	0.014
Barium	< 0.02
Cadmium	< 0.01
Chromium	< 0.05
Copper	< 0.02
Cyanide	< 0.02
Flouride	0.74
Lead	< 0.005
Mercury	< 0.0002
Phenols	4.9
Selenium	0.002
Silver	< 0.02
TOC	34
COD	95
Zinc	< 0.01
pH	10.7

(1) Results taken from "Waste Characterization Study of Foundry Process Solid Wastes," January 1986. Verified with laboratory data.

TABLE 14.8

APPENDIX B-2

2002/2005 CLASSIFIED SAND ANALYTICAL RESULTS SUMMARY

APPENDIX B-2

2002/2005 CLASSIFIED SAND ANALYTICAL RESULTS SUMMARY
NODULAR FACILITY
SAGINAW, MICHIGAN

Sample Location:					*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*
Sample ID:					*1*	*8*	*8*	*1*	*8*	*8*	*1*	*8*	*8*	*1*	*8*	*8*
lab_sample_id					*3023109*	*3023110*	*3023111*	*3023158*	*3023159*	*3023160*	*3023188*	*3023189*	*3023190*	*3023218*	*3023219*	*3023220*
Sample Date:					*7/15/2002*	*7/15/2002*	*7/15/2002*	*7/16/2002*	*7/16/2002*	*7/16/2002*	*7/17/2002*	*7/17/2002*	*7/17/2002*	*7/18/2002*	*7/18/2002*	*7/18/2002*
Parameters:	*Units*	*Res/Non_Res/GW Prot_GW SW Interface Prot* a	*Res/Non_Res/GW Prot_GW Contact Prot* b	*Res/Non_Res/NonRes Drinking Water* c												
Volatile Organic Compounds																
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	44	27000	-	2.6 U	-	-	2.6 U	-	-	2.6 U	-	-	2.6 U	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	-	2700	-	2.6 U	-	-	2.6 U	-	-	2.6 U	-	-	2.6 U	-	-
Benzene	mg/kg	4	220	-	0.051 U	-	-	0.2	-	-	0.051 U	-	-	0.094	-	-
Chloromethane (Methyl chloride)	mg/kg	-	1100	-	0.26 U	-	-	0.26 U	-	-	0.26 U	-	-	0.26 U	-	-
Ethylbenzene	mg/kg	0.36	140	-	0.051 U	-	-	0.051 U	-	-	0.051 U	-	-	0.051 U	-	-
Styrene	mg/kg	2.1	270	-	0.051 U	-	-	0.051 U	-	-	0.051 U	-	-	0.051 U	-	-
Toluene	mg/kg	5.4	250	-	0.1 U	-	-	0.15	-	-	0.1 U	-	-	0.1 U	-	-
Trichloroethene	mg/kg	4	440	-	0.051 U	-	-	0.051 U	-	-	0.051 U	-	-	0.051 U	-	-
Xylenes (total)	mg/kg	0.82	150	-	0.151 U	-	-	0.25	-	-	0.151 U	-	-	0.151 U	-	-
Volatile Organic Compounds - SPLP																
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	-	-	38	-	0.05 U	0.05 U	-	0.05 U	0.05 U	-	0.05 U	0.05 U	-	0.05 U	0.05 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	-	-	5.2	-	0.05 U	0.05 U	-	0.05 U	0.05 U	-	0.05 U	0.05 U	-	0.05 U	0.05 U
Benzene	mg/L	-	-	0.005	-	0.001 U	0.001 U	-	0.001 U	0.001 U	-	0.001 U	0.001 U	-	0.001 U	0.001 U
Chloromethane (Methyl chloride)	mg/L	-	-	1.1	-	0.001 U	0.001 U	-	0.001 U	0.001 U	-	0.001 U	0.001 U	-	0.001 U	0.001 U
Ethylbenzene	mg/L	-	-	0.074	-	0.001 U	0.001 U	-	0.001 U	0.001 U	-	0.001 U	0.001 U	-	0.001 U	0.001 U
Styrene	mg/L	-	-	0.1	-	0.001 U	0.001 U	-	0.001 U	0.001 U	-	0.001 U	0.001 U	-	0.001 U	0.001 U
Toluene	mg/L	-	-	0.79	-	0.0021	0.0037	-	0.0017	0.001 U	-	0.001 U	0.001 U	-	0.001 U	0.001 U
Trichloroethene	mg/L	-	-	0.005	-	0.001 U	0.001 U	-	0.001 U	0.001 U	-	0.001 U	0.001 U	-	0.001 U	0.001 U
Xylenes (total)	mg/L	-	-	0.28	-	0.003 U	0.003 U	-	0.003 U	0.003 U	-	0.003 U	0.003 U	-	0.003 U	0.003 U
Semi-volatile Organic Compounds																
2,4-Dimethylphenol	mg/kg	7.6	10000	-	0.17 U	-	-	0.17 U	-	-	0.17 U	-	-	0.17 U	-	-
2-Methylphenol	mg/kg	1	16000	-	0.17 U	-	-	0.282	-	-	0.17 U	-	-	0.479	-	-
3&4-Methylphenol	mg/kg	1	16000	-	-	-	-	-	-	-	-	-	-	-	-	-
3,4-Dichlorophenol	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-
4-Chloro-3-methylphenol	mg/kg	0.28	3000	-	0.17 U	-	-	0.17 U	-	-	0.17 U	-	-	0.17 U	-	-
Acenaphthene	mg/kg	8.7	970	-	0.17 U	-	-	0.17 U	-	-	0.17 U	-	-	0.17 U	-	-
Aniline	mg/kg	0.33	2800	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	mg/kg	-	41	-	0.17 U	-	-	0.17 U	-	-	0.17 U	-	-	0.17 U	-	-
Benzyl chloride	mg/kg	-	72	-	0.17 U	-	-	0.17 U	-	-	0.17 U	-	-	0.17 U	-	-
Fluoranthene	mg/kg	5.5	730	-	0.17 U	-	-	0.17 U	-	-	0.17 U	-	-	0.17 U	-	-
Hexachlorobenzene	mg/kg	0.35	8.2	-	0.17 U	-	-	0.17 U	-	-	0.17 U	-	-	0.17 U	-	-
Naphthalene	mg/kg	0.73	2100	-	0.17 U	-	-	0.423	-	-	0.17 U	-	-	0.524	-	-
Nitrobenzene	mg/kg	3.6	220	-	0.17 U	-	-	0.17 U	-	-	0.17 U	-	-	0.17 U	-	-
Phenanthrene	mg/kg	2.1	1100	-	0.17 U	-	-	0.202	-	-	0.17 U	-	-	0.254	-	-
Phenol	mg/kg	9	12000	-	0.25	-	-	0.813	-	-	0.172	-	-	1.23	-	-

APPENDIX B-2

2002/2005 CLASSIFIED SAND ANALYTICAL RESULTS SUMMARY
NODULAR FACILITY
SAGINAW, MICHIGAN

Sample Location:					*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*
Sample ID:					*1*	*8*	*8*	*1*	*8*	*8*	*1*	*8*	*8*	*1*	*8*	*8*
lab_sample_id					*3023109*	*3023110*	*3023111*	*3023158*	*3023159*	*3023160*	*3023188*	*3023189*	*3023190*	*3023218*	*3023219*	*3023220*
Sample Date:					*7/15/2002*	*7/15/2002*	*7/15/2002*	*7/16/2002*	*7/16/2002*	*7/16/2002*	*7/17/2002*	*7/17/2002*	*7/17/2002*	*7/18/2002*	*7/18/2002*	*7/18/2002*
Parameters:	*Units*	*Res/Non_Res/GW Prot_GW SW Interface Prot* a	*Res/Non_Res/GW Prot_GW Contact Prot* b	*Res/Non_Res/NonRes Drinking Water* c												
Volatile Organic Compounds																
Semi-volatile Organic Compounds - SPLP																
2,4-Dimethylphenol	mg/L	-	-	1	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U
2-Methylphenol	mg/L	-	-	1	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U
3,4-Dichlorophenol	mg/L	-	-	-	-	0.01 U	0.01 U	-	0.01 U	0.01 U	-	0.01 U	0.01 U	-	0.01 U	0.01 U
4-Chloro-3-methylphenol	mg/L	-	-	0.42	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U
Acenaphthene	mg/L	-	-	3.8	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U
Anthracene	mg/L	-	-	0.043	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U
Benzyl chloride	mg/L	-	-	0.032	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U
Fluoranthene	mg/L	-	-	0.21	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U
Hexachlorobenzene	mg/L	-	-	0.001	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U
Naphthalene	mg/L	-	-	1.5	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U
Nitrobenzene	mg/L	-	-	0.0096	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U
Phenanthrene	mg/L	-	-	0.15	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U
Phenol	mg/L	-	-	13	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U	-	0.005 U	0.005 U
Metals																
Aluminum	mg/kg	-	1000000	-	700	-	-	970	-	-	970	-	-	1400	-	-
Antimony	mg/kg	94	49000	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	4.6	2000	-	0.71	-	-	0.79	-	-	0.82	-	-	0.74	-	-
Barium	mg/kg	-	1000000	-	4.6	-	-	13	-	-	5.9	-	-	17	-	-
Beryllium	mg/kg	-	1000000	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/kg	100	1000000	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/kg	-	230000	-	0.08	-	-	0.2	-	-	0.096	-	-	0.11	-	-
Chromium	mg/kg	3.3	140000	-	**6.1[a]**	-	-	**9.7[a]**	-	-	**23[a]**	-	-	**18[a]**	-	-
Chromium VI (hexavalent)	mg/kg	3.3	140000	-	0.02 U	-	-	0.02 U	-	-	0.02 U	-	-	0.02 U	-	-
Copper	mg/kg	-	1000000	-	28	-	-	14	-	-	23	-	-	13	-	-
Iron	mg/kg	-	1000000	-	3100	-	-	4000	-	-	9000	-	-	5900	-	-
Lead	mg/kg	-	-	-	2.2	-	-	18	-	-	3.9	-	-	9.3	-	-
Manganese	mg/kg	-	180000	-	52	-	-	120	-	-	120	-	-	190	-	-
Mercury	mg/kg	0.05	47	-	0.02 U	-	-	0.02 U	-	-	0.02 U	-	-	0.02 U	-	-
Nickel	mg/kg	-	1000000	-	2.2	-	-	3.5	-	-	6.9	-	-	5.2	-	-
Selenium	mg/kg	0.4	78000	-	0.2 U	-	-	0.2 U	-	-	0.2 U	-	-	0.2 U	-	-
Silver	mg/kg	0.1	200000	-	0.5 U	-	-	0.5 U	-	-	0.5 U	-	-	0.5 U	-	-
Thallium	mg/kg	4.2	15000	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/kg	190	1000000	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/kg	-	1000000	-	18	-	-	110	-	-	25	-	-	68	-	-

APPENDIX B-2

2002/2005 CLASSIFIED SAND ANALYTICAL RESULTS SUMMARY
NODULAR FACILITY
SAGINAW, MICHIGAN

Sample Location:					*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*
Sample ID:					*1*	*8*	*8*	*1*	*8*	*8*	*1*	*8*	*8*	*1*	*8*	*8*
lab_sample_id					*3023109*	*3023110*	*3023111*	*3023158*	*3023159*	*3023160*	*3023188*	*3023189*	*3023190*	*3023218*	*3023219*	*3023220*
Sample Date:					*7/15/2002*	*7/15/2002*	*7/15/2002*	*7/16/2002*	*7/16/2002*	*7/16/2002*	*7/17/2002*	*7/17/2002*	*7/17/2002*	*7/18/2002*	*7/18/2002*	*7/18/2002*
Parameters:	*Units*	*Res/Non_Res/GW Prot_GW SW Interface Prot* a	*Res/Non_Res/GW Prot_GW Contact Prot* b	*Res/Non_Res/NonRes Drinking Water* c												
Volatile Organic Compounds																
Metals - TCLP																
Aluminum	mg/L	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	mg/L	-	-	0.006	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/L	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	-	-	0.005	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	-	-	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	-	-	0.098	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	-	-	0.062	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-
Metals - SPLP																
Aluminum	mg/L	-	-	0.05	-	0.1 U	**0.15[c]**	-	**0.24[c]**	0.1 U	-	**0.19[c]**	**0.19[c]**	-	0.1 U	0.1 U
Antimony	mg/L	-	-	0.006	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	-	-	0.01	-	0.001 U	0.001 U	-	0.001 U	0.001 U	-	0.001 U	0.001 U	-	0.001 U	0.001 U
Barium	mg/L	-	-	2	-	0.24	0.2	-	0.17	0.22	-	0.15	0.17	-	0.15	0.16
Beryllium	mg/L	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	-	-	0.005	-	0.0002 U	0.0002 U	-	0.0002 U	0.0002 U	-	0.0002 U	0.0002 U	-	0.0002 U	0.0002 U
Chromium	mg/L	-	-	0.1	-	0.002 U	0.002 U	-	0.002 U	0.002 U	-	0.002 U	0.002 U	-	0.002 U	0.002 U
Copper	mg/L	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	-	-	0.3	-	0.2 U	**0.72[c]**	-	0.2 U	0.2 U	-	0.2 U	0.2 U	-	0.2 U	0.2 U
Lead	mg/L	-	-	0.004	-	0.002 U	0.002 U	-	0.002 U	0.002 U	-	0.002 U	0.002 U	-	0.002 U	0.002 U
Manganese	mg/L	-	-	0.05	-	**0.14[c]**	0.0035	-	0.002 U	0.002 U	-	0.0039	0.002 U	-	0.0029	0.0061
Mercury	mg/L	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	-	-	0.1	-	0.0022	0.002 U	-	0.002 U	0.002 U	-	0.002 U	0.002 U	-	0.002 U	0.002 U
Selenium	mg/L	-	-	0.05	-	0.004 U	0.004 U	-	0.004 U	0.004 U	-	0.004 U	0.004 U	-	0.004 U	0.004 U
Silver	mg/L	-	-	0.098	-	0.00049	0.0004 U	-	0.0004 U	0.0004 U	-	0.0004 U	0.0004 U	-	0.0004 U	0.0004 U
Thallium	mg/L	-	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	-	-	0.062	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	-	-	5	-	0.093	0.0083	-	0.039	0.006 U	-	0.006 U	0.006 U	-	0.0066	0.0071

APPENDIX B-2

2002/2005 CLASSIFIED SAND ANALYTICAL RESULTS SUMMARY
NODULAR FACILITY
SAGINAW, MICHIGAN

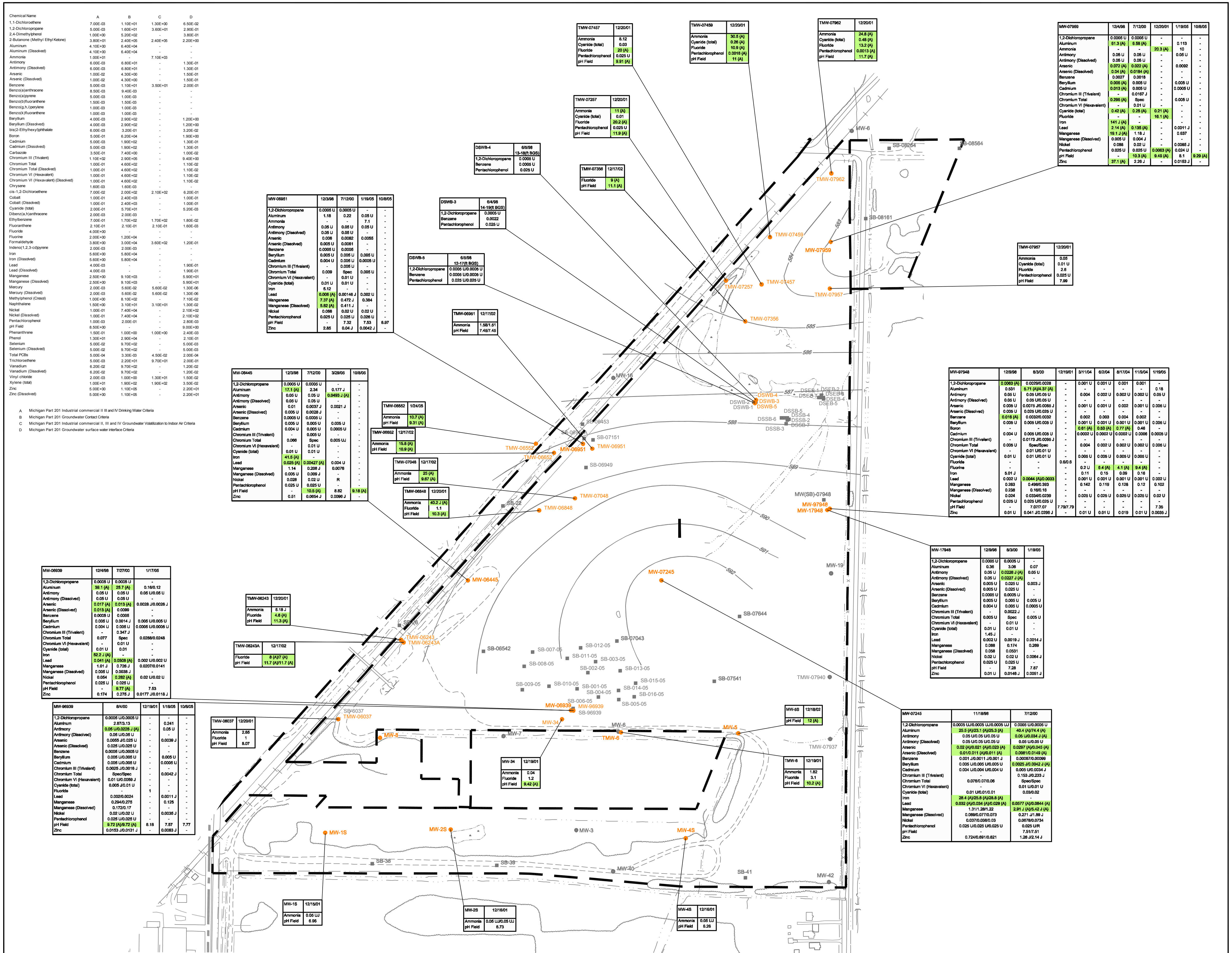
Sample Location:					*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*	*Classified Sand*
Sample ID:					*1*	*8*	*8*	*1*	*8*	*8*	*1*	*8*	*8*	*1*	*8*	*8*
lab_sample_id					*3023109*	*3023110*	*3023111*	*3023158*	*3023159*	*3023160*	*3023188*	*3023189*	*3023190*	*3023218*	*3023219*	*3023220*
Sample Date:					*7/15/2002*	*7/15/2002*	*7/15/2002*	*7/16/2002*	*7/16/2002*	*7/16/2002*	*7/17/2002*	*7/17/2002*	*7/17/2002*	*7/18/2002*	*7/18/2002*	*7/18/2002*
Parameters:	*Units*	*Res/Non_Res/GW Prot_GW SW Interface Prot* a	*Res/Non_Res/GW Prot_GW Contact Prot* b	*Res/Non_Res/Non Res Drinking Water* c												
Volatile Organic Compounds																
Polychlorinated Biphenyls																
Aroclor-1016 (PCB-1016)	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-
Aroclor-1221 (PCB-1221)	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-
Aroclor-1232 (PCB-1232)	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-
Aroclor-1242 (PCB-1242)	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-
Aroclor-1248 (PCB-1248)	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-
Aroclor-1254 (PCB-1254)	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-
Aroclor-1260 (PCB-1260)	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-
Total PCBs	mg/kg	-	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-	0.33 U	-	-
Polynuclear Aromatic Hydrocarbons																
Acenaphthene	mg/kg	8.7	970	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	mg/kg	-	41	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg	5.5	730	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	0.73	2100	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg	2.1	1100	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																
Formaldehyde	mg/kg	2.4	60000	-	2.01 U	-	-	2.09	-	-	9[a]	-	-	3.34[a]	-	-
Percent solids	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	s.u.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total solids	%	-	-	-	100	-	-	99.3	-	-	99.9	-	-	99.9	-	-
General Chemistry - SPLP																
Chloride	mg/L	-	-	250	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/L	-	-	3.8	-	0.135	0.1 U	-	0.1 U	0.1 U	-	0.1 U	0.101	-	0.1 U	0.1 U

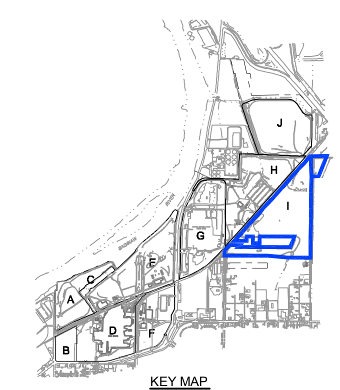
Notes:

U Not present at or above the associated value.
- Not analyzed.
Exceeds Criteria.

APPENDIX C

RFI GROUNDWATER DATA





LEGEND

A — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER

585 — GROUNDWATER ELEVATION FT. AMSL (JANUARY 2005)

MONITORING WELL LOCATION - RFI

SAMPLE LOCATION - NO REPORTED DATA

SAMPLE LOCATION

SAMPLE DATE

RESULT (mg/L)

PARAMETER

TMW-07356	12/17/02
Fluoride	9 {A}
pH Field	11.1 {A}

NOTES:

1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. DATABOX ANALYTE LIST DEVELOPED BASED ON A MINIMUM OF ONE EXCEEDNACE OF SCREENING CRITERIA PER INVESTIGATIVE UNIT PER MATRIX (i.e. SOIL OR GROUNDWATER). TOTAL PCBs ARE PRESENTED FOR ALL LOCATIONS SAMPLED. IU SPECIFIC ANALYTES NOT ANALYZED FOR AT A GIVEN LOCATION ARE OMITTED FROM THE CORRESPONDING DATABOX.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.
5. SPEC INDICATES THAT THE TOTAL CHROMIUM CONCENTRATION HAS BEEN SPECIATED, USING THE HEXAVALENT CHROMIUM RESULTS TO CALCULATE THE TRIVALENT CHROMIUM CONCENTRATION.

KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT I RFI PHASE 1C - GROUNDWATER

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	FEBRUARY 2007	
Scale: 1" = 200'	Project Nº: 17075-16	Report Nº: 027	Drawing Nº: figure 15.3

17075-16(027)GN-WA029 FEB 08/2007

Chemical Name	A	B	C	D
1,1-Dichloroethene	7.00E-03	1.10E+01	1.30E+00	6.50E-02
1,2-Dichloropropane	5.00E-03	1.60E+01	3.60E+01	2.90E-01
2,4-Dimethylphenol	1.00E+00	5.20E+02	-	3.80E-01
2-Butanone (Methyl Ethyl Ketone)	3.80E+01	2.40E+05	2.40E+05	2.20E+00
Aluminum	4.10E+00	6.40E+04	-	-
Aluminum (Dissolved)	4.10E+00	6.40E+04	-	-
Ammonia	1.00E+01	-	7.10E+03	-
Antimony	6.00E-03	6.80E+01	-	1.30E-01
Antimony (Dissolved)	6.00E-03	6.80E+01	-	1.30E-01
Arsenic	1.00E-02	4.30E+00	-	1.50E-01
Arsenic (Dissolved)	1.00E-02	4.30E+00	-	1.50E-01
Benzene	5.00E-03	1.10E+01	3.50E+01	2.00E-01
Benzo(a)anthracene	8.50E-03	9.40E-03	-	-
Benzo(a)pyrene	5.00E-03	1.00E-03	-	-
Benzo(b)fluoranthene	1.00E-03	1.50E-03	-	-
Benzo(g,h,i)perylene	1.00E-03	1.00E-03	-	-
Benzo(k)fluoranthene	1.00E-03	1.00E-03	-	-
Beryllium	4.00E-03	2.90E+02	-	1.20E+00
Beryllium (Dissolved)	4.00E-03	2.90E+02	-	1.20E+00
bis(2-Ethylhexyl)phthalate	6.00E-03	3.20E-01	-	3.20E-02
Boron	5.00E-01	6.20E+04	-	1.90E+00
Cadmium	5.00E-03	1.90E+02	-	1.30E-01
Cadmium (Dissolved)	5.00E-03	1.90E+02	-	1.30E-01
Carbazole	3.50E-01	7.40E+00	-	1.00E-02
Chromium III (Trivalent)	1.10E+02	2.90E+05	-	9.40E+00
Chromium Total	1.00E-01	4.60E+02	-	1.10E-02
Chromium Total (Dissolved)	1.00E-01	4.60E+02	-	1.10E-02
Chromium VI (Hexavalent)	1.00E-01	4.60E+02	-	1.10E-02
Chromium VI (Hexavalent) (Dissolved)	1.00E-01	4.60E+02	-	1.10E-02
Chrysene	1.60E-03	1.60E-03	-	-
cis-1,2-Dichloroethene	7.00E-02	2.00E+02	2.10E+02	6.20E-01
Cobalt	1.00E-01	2.40E+03	-	1.00E-01
Cobalt (Dissolved)	1.00E-01	2.40E+03	-	1.00E-01
Cyanide (total)	2.00E-01	5.70E+01	-	5.20E-03
Dibenz(a,h)anthracene	2.00E-03	2.00E-03	-	-
Ethylbenzene	7.00E-01	1.70E+02	1.70E+02	1.80E-02
Fluoranthene	2.10E-01	2.10E-01	2.10E-01	1.60E-03
Fluoride	4.00E+00	-	-	-
Fluorine	2.00E+00	1.20E+04	-	-
Formaldehyde	3.80E+00	3.00E+04	3.60E+02	1.20E-01
Indeno(1,2,3-cd)pyrene	2.00E-03	2.00E-03	-	-
Iron	5.60E+00	5.80E+04	-	-
Iron (Dissolved)	5.60E+00	5.80E+04	-	-
Lead	4.00E-03	-	-	1.90E-01
Lead (Dissolved)	4.00E-03	-	-	1.90E-01
Manganese	2.50E+00	9.10E+03	-	5.90E+01
Manganese (Dissolved)	2.50E+00	9.10E+03	-	5.90E+01
Mercury	2.00E-03	5.60E-02	5.60E-02	1.30E-06
Mercury (Dissolved)	2.00E-03	5.60E-02	5.60E-02	1.30E-06
Methylphenol (Cresol)	1.00E+00	8.10E+02	-	7.10E-02
Naphthalene	1.50E+00	3.10E+01	3.10E+01	1.30E-02
Nickel	1.00E-01	7.40E+04	-	2.10E+02
Nickel (Dissolved)	1.00E-01	7.40E+04	-	2.10E+02
Pentachlorophenol	1.00E-03	2.00E-01	-	2.80E-03
pH Field	8.50E+00	-	-	9.00E+00
Phenanthrene	1.50E-01	1.00E+00	1.00E+00	2.40E-03
Phenol	1.30E+01	2.90E+04	-	2.10E-01
Selenium	5.00E-02	9.70E+02	-	5.00E-03
Selenium (Dissolved)	5.00E-02	9.70E+02	-	5.00E-03
Total PCBs	5.00E-04	3.30E-03	4.50E-02	2.00E-04
Trichloroethene	5.00E-03	2.20E+01	9.70E+01	2.00E-01
Vanadium	6.20E-02	9.70E+02	-	1.20E-02
Vanadium (Dissolved)	6.20E-02	9.70E+02	-	1.20E-02
Vinyl chloride	2.00E-03	1.00E+00	1.30E+01	1.50E-02
Xylene (total)	1.00E+01	1.90E+02	1.90E+02	3.50E-02
Zinc	5.00E+00	1.10E+05	-	2.20E+01
Zinc (Dissolved)	5.00E+00	1.10E+05	-	2.20E+01

A Michigan Part 201 Industrial commercial II III and IV Drinking Water Criteria
B Michigan Part 201 Groundwater Contact Criteria
C Michigan Part 201 Industrial commercial II, III and IV Groundwater Volatilization to Indoor Air Criteria
D Michigan Part 201 Groundwater surface water interface Criteria

MW-15964	11/30/98	7/28/00	1/14/05
Aluminum	36.5 (A)	9.67 (A)	0.0722 J
Antimony	0.05 U	0.05 U	0.05 UJ
Arsenic	0.012 (A)	0.0069	0.005 U
Arsenic (Dissolved)	0.005 U	0.002 J	-
Beryllium	0.005 U	0.005 U	0.005 U
Chromium III (Trivalent)	-	0.0135 J	-
Chromium Total	0.062	Spec	0.005 U
Chromium VI (Hexavalent)	-	0.01 U	-
Iron	46.9 (A)	-	-
Iron (Dissolved)	0.022	-	-
Lead	0.014 (A)	0.0069 (A)	0.002 U
Manganese	0.864	0.336	0.0648
Nickel	0.06	0.0427	0.02 U
Nickel (Dissolved)	0.02 U	0.02 U	-
pH Field	-	7.98	7.94
Vanadium	0.078 (A)	0.0246	0.01 U

SW3-05	1/13/05
Aluminum	0.115 J/0.12 J
Antimony	0.06 UJ/0.06 UJ
Arsenic	0.0017 J/0.002 J
Beryllium	0.005 U/0.005 U
Chromium Total	0.005 U/0.005 U
Lead	0.0017 J/0.0015 J
Manganese	0.453/0.462
Nickel	0.02 U/0.02 U
pH Field	6.94/6.87
Vanadium	0.01 U/0.01 U

H2	11/17/98
Aluminum	0.301
Antimony	0.05 U
Arsenic	0.006
Arsenic (Dissolved)	0.006
Beryllium	0.005 U
Chromium Total	0.005 U
Iron	0.883
Iron (Dissolved)	0.051
Lead	0.053
Manganese	6.55
Nickel	0.02 U
Nickel (Dissolved)	0.02 U
Vanadium	0.01 U

H1	11/17/98
Aluminum	0.333/0.39
Antimony	0.05 U/0.05 U
Arsenic	0.006/0.007
Arsenic (Dissolved)	0.007/0.008
Beryllium	0.005 U/0.005 U
Chromium Total	0.005 U/0.005 U
Iron	0.896/0.896
Iron (Dissolved)	0.041/0.058
Lead	0.065/0.085
Manganese	6.91/6.73
Nickel	0.02 U/0.02 U
Nickel (Dissolved)	0.02 U/0.02 U
Vanadium	0.01 U/0.01 U

SW4-05	1/13/05
Aluminum	0.432 J
Antimony	0.05 UJ
Arsenic	0.0048 J
Beryllium	0.005 U
Chromium Total	0.005 U
Lead	0.0027
Manganese	1.7
Nickel	0.02 U
pH Field	6.8
Vanadium	0.0038 J

MW-15457	11/16/98	7/13/00	1/13/05	10/7/05
Aluminum	103 J (A)	17.3 (A)	0.05 U	-
Antimony	0.05 U	0.05 U	0.0412 J (A)	-
Arsenic	0.036 (A)	0.0098	0.005 U	-
Arsenic (Dissolved)	0.005 U	0.0019 J	-	-
Beryllium	0.005 (A)	0.005 U	0.005 U	-
Chromium III (Trivalent)	-	0.188 J	-	-
Chromium Total	0.394 J (A)	Spec	0.0061	-
Chromium VI (Hexavalent)	-	0.01 U	-	-
Iron	158 (A)	-	-	-
Iron (Dissolved)	0.522	-	-	-
Lead	0.115 J (A)	0.021 (A)	0.002 U	-
Manganese	3.36 (A)	0.618 J	0.229	-
Nickel	0.21 J (A)	0.0768	0.02 U	-
Nickel (Dissolved)	0.02 U	0.0358	-	-
pH Field	7.02	7.09	6.57	6.78
Vanadium	0.213 J (A)	0.0356	0.01 U	-

TMW-05457	12/17/02
Fluoride	0.5
pH Field	6.72

SW @ SECONDARY POND	1/29/04
pH Field	8.53

MW-17661	12/28/98	7/14/00	12/17/02	1/17/05	10/7/05
Aluminum	29.9 (A)	2.04	-	0.137	-
Antimony	0.05 U	0.05 U	-	0.05 U	-
Arsenic	0.014 (A)	0.0015 J	-	0.0026 J	-
Arsenic (Dissolved)	0.005 U	0.005 U	-	-	-
Beryllium	0.005 U	0.005 U	-	0.005 U	-
Chromium III (Trivalent)	-	0.25 J	-	-	-
Chromium Total	0.747 (A)	Spec	-	1.55 (A)	-
Chromium VI (Hexavalent)	-	0.01 U	-	-	-
Fluoride	-	-	1	-	-
Iron	44.4 (A)	-	-	-	-
Iron (Dissolved)	0.065	-	-	-	-
Lead	0.022 (A)	0.0021	-	0.002 U	-
Manganese	0.852	0.159	-	0.181	-
Nickel	0.301 (A)	0.093	-	0.548 (A)	-
Nickel (Dissolved)	0.111 (A)	0.0544	-	-	-
pH Field	-	7.28	7.3	7.34	6.95
Vanadium	0.062	0.0085 J	-	0.0054 J	-

MW-16357	11/17/98	7/18/00	1/14/05
Aluminum	1.51	5.86 (A)/5.39 (A)	0.05 U
Antimony	0.05 U	0.05 U/0.05 U	0.05 UJ
Arsenic	0.005 U	0.0062/0.0066	0.0042 J
Arsenic (Dissolved)	0.005 U	0.0029 J/0.0028 J	-
Beryllium	0.005 U	0.005 U/0.005 U	0.005 U
Chromium III (Trivalent)	-	0.0208 J/0.0199 J	-
Chromium Total	0.005 U	Spec/Spec	0.005 U
Chromium VI (Hexavalent)	-	0.01 U/0.01 U	-
Iron	7.71 (A)	-	-
Iron (Dissolved)	3.25 J	-	-
Lead	0.002 U	0.0094 (A)/0.0097 (A)	0.002 U
Manganese	0.241	0.248/0.232	0.143
Nickel	0.02 U	0.032/0.0217	0.02 U
Nickel (Dissolved)	0.02 U	0.02 U/0.02 U	-
pH Field	-	7.08/7.06	7.26
Vanadium	0.01 U	0.0173/0.0168	0.01 U

H3	11/16/98
Aluminum	0.098/0.089
Antimony	0.05 U/0.05 U
Arsenic	0.005 U/0.005 U
Arsenic (Dissolved)	0.005 U/0.005 U
Beryllium	0.005 U/0.005 U
Chromium Total	0.005 U/0.005 U
Iron	0.169/0.15
Iron (Dissolved)	0.044/0.043
Lead	0.002 U/0.002 U
Manganese	1.96/1.94
Nickel	0.02 U/0.02 U
Nickel (Dissolved)	0.02 U/0.02 U
Vanadium	0.01 U/0.01 U

H4	11/17/98
Aluminum	0.329
Antimony	0.05 U
Arsenic	0.006
Arsenic (Dissolved)	0.006
Beryllium	0.005 U
Chromium Total	0.005 U
Iron	0.957
Iron (Dissolved)	0.049
Lead	0.066
Manganese	6.77
Nickel	0.02 U
Nickel (Dissolved)	0.02 U
Vanadium	0.01 U

H5	11/18/98
Aluminum	0.133 J
Antimony	0.05 U
Arsenic	0.005 U
Arsenic (Dissolved)	0.005 U
Beryllium	0.005 U
Chromium Total	0.005 U
Iron	0.583 J
Iron (Dissolved)	0.094 J
Lead	0.002 U
Manganese	0.093
Nickel	0.02 U
Nickel (Dissolved)	0.02 U
Vanadium	0.01 U

TMW-06056A	12/19/02
Fluoride	10 (A)
pH Field	7.98

TMW-05454	12/17/01
Fluoride	21.7 (A)
pH Field	10.9 (A)

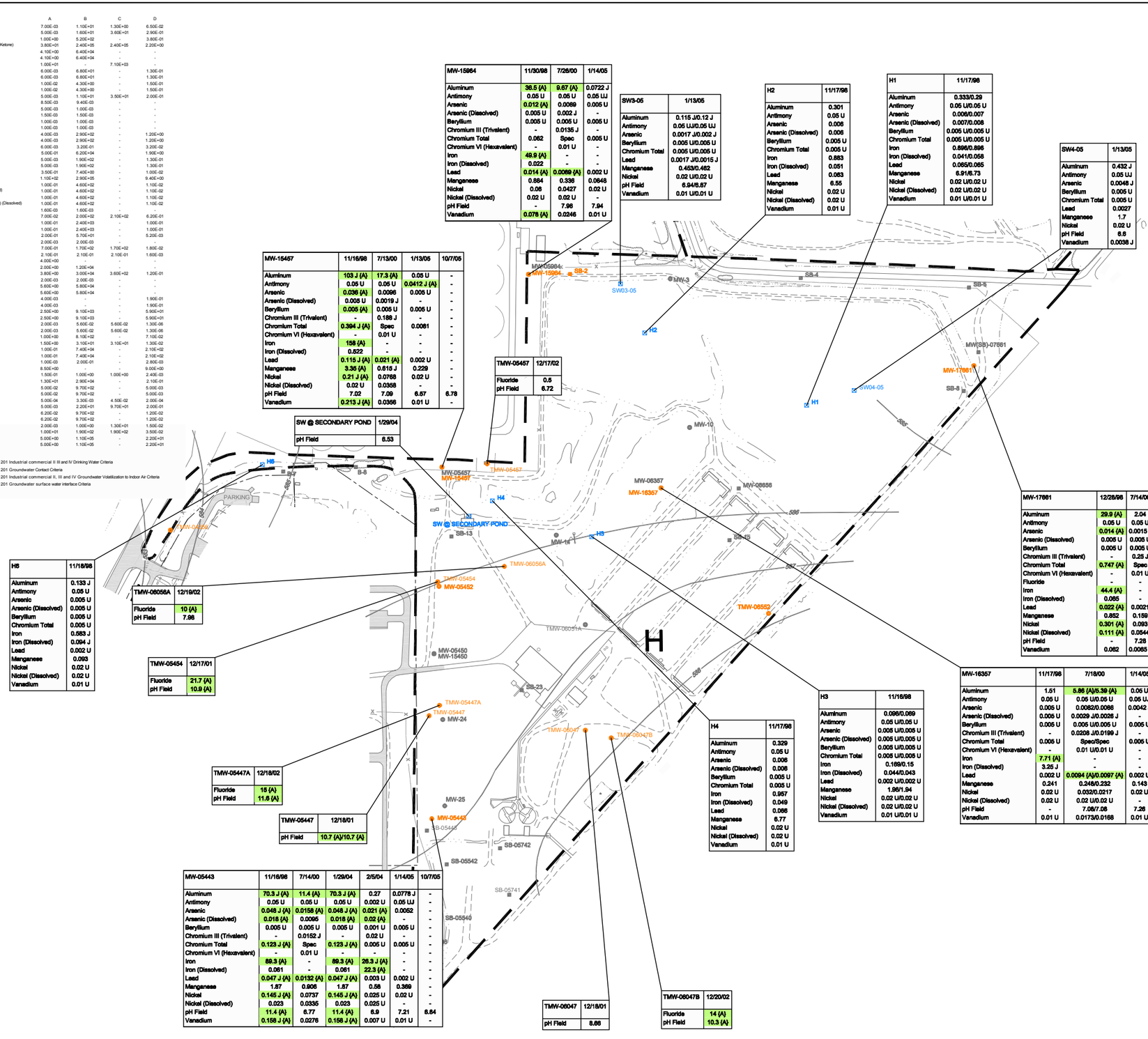
TMW-05447A	12/18/02
Fluoride	15 (A)
pH Field	11.8 (A)

TMW-05447	12/18/01
pH Field	10.7 (A)/10.7 (A)

MW-05443	11/16/98	7/14/00	1/29/04	2/5/04	1/14/05	10/7/05
Aluminum	70.3 J (A)	11.4 (A)	70.3 J (A)	0.27	0.0778 J	-
Antimony	0.05 U	0.05 U	0.05 U	0.002 U	0.05 UJ	-
Arsenic	0.048 J (A)	0.0158 (A)	0.048 J (A)	0.021 (A)	0.0052	-
Arsenic (Dissolved)	0.018 (A)	0.0095	0.018 (A)	0.02 (A)	-	-
Beryllium	0.005 U	0.005 U	0.005 U	0.001 U	0.005 U	-
Chromium III (Trivalent)	-	0.0152 J	-	0.02 U	-	-
Chromium Total	0.123 J (A)	Spec	0.123 J (A)	0.005 U	0.005 U	-
Chromium VI (Hexavalent)	-	0.01 U	-	-	-	-
Iron	89.3 (A)	-	89.3 (A)	26.3 J (A)	-	-
Iron (Dissolved)	0.061	-	0.061	22.3 (A)	-	-
Lead	0.047 J (A)	0.0132 (A)	0.047 J (A)	0.003 U	0.002 U	-
Manganese	1.87	0.906	1.87	0.58	0.369	-
Nickel	0.145 J (A)	0.0737	0.145 J (A)	0.025 U	0.02 U	-
Nickel (Dissolved)	0.023	0.0335	0.023	0.025 U	-	-
pH Field	11.4 (A)	6.77	11.4 (A)	8.9	7.21	6.84
Vanadium	0.158 J (A)	0.0276	0.158 J (A)	0.007 U	0.01 U	-

TMW-05047	12/18/01
pH Field	8.86

TMW-05047B	12/20/02
Fluoride	14 (A)
pH Field	10.3 (A)



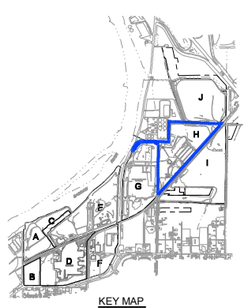
0 100 200ft

LEGEND

A — — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
585 GROUNDWATER ELEVATION FT. AMSL (JANUARY 2005)
MONITORING WELL LOCATION - RFI
SAMPLE LOCATION - NO REPORTED DATA
SURFACE WATER SAMPLE LOCATION

SAMPLE LOCATION
TMW-06552 | 1/24/05 — SAMPLE DATE
Ammonia | 10.7 (A) — RESULT (mg/L)
pH Field | 9.31 (A)
PARAMETER

NOTES:
1. TOTAL PCBs WERE SUMMED BY ADDING THE POSITIVE DETECTIONS PLUS HALF THE QUANTITATION LIMITS FOR NON-DETECT RESULTS OF AROCLORS DETECTED ELSEWHERE AT THE SITE. IF QUANTITATION LIMITS ARE NOT AVAILABLE, HALF THE REPORTING LIMITS ARE USED FOR NON-DETECTED VALUES.
2. SCREENING CRITERIA AND SAMPLE RESULTS ARE COMPARED TO TWO SIGNIFICANT DIGITS. RESULTS EQUAL TO SCREENING CRITERIA ARE NOT HIGHLIGHTED AS EXCEEDANCES.
3. DATABOX ANALYTE LIST DEVELOPED BASED ON A MINIMUM OF ONE EXCEEDNACE OF SCREENING CRITERIA PER INVESTIGATIVE UNIT PER MATRIX (i.e. SOIL OR GROUNDWATER). TOTAL PCBs ARE PRESENTED FOR ALL LOCATIONS SAMPLED. IU SPECIFIC ANALYTES NOT ANALYZED FOR AT A GIVEN LOCATION ARE OMITTED FROM THE CORRESPONDING DATABOX.
4. GROUNDWATER CONTOURS REPRESENT THE UPPER SATURATED ZONE.
5. SPEC INDICATES THAT THE TOTAL CHROMIUM CONCENTRATION HAS BEEN SPECIATED, USING THE HEXAVALENT CHROMIUM RESULTS TO CALCULATE THE TRIVALENT CHROMIUM CONCENTRATION.



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT H
RFI PHASE 1C - GROUNDWATER
AND SURFACE WATER

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	FEBRUARY 2007	
Scale: 1" = 200'	Project N°: 17075-16	Report N°: 027	Drawing N°: figure 14.2

17075-16(027)GN-WA026 FEB 08/2007

APPENDIX D

PROPOSED GRADING PLAN

Wilcox

5859 Sherman Rd
Saginaw, MI 48604
989-752-6500
Fax: 989-752-6600
www.wilcox.us

February 20, 2012
RACER TRUST NODULAR – SAGINAW

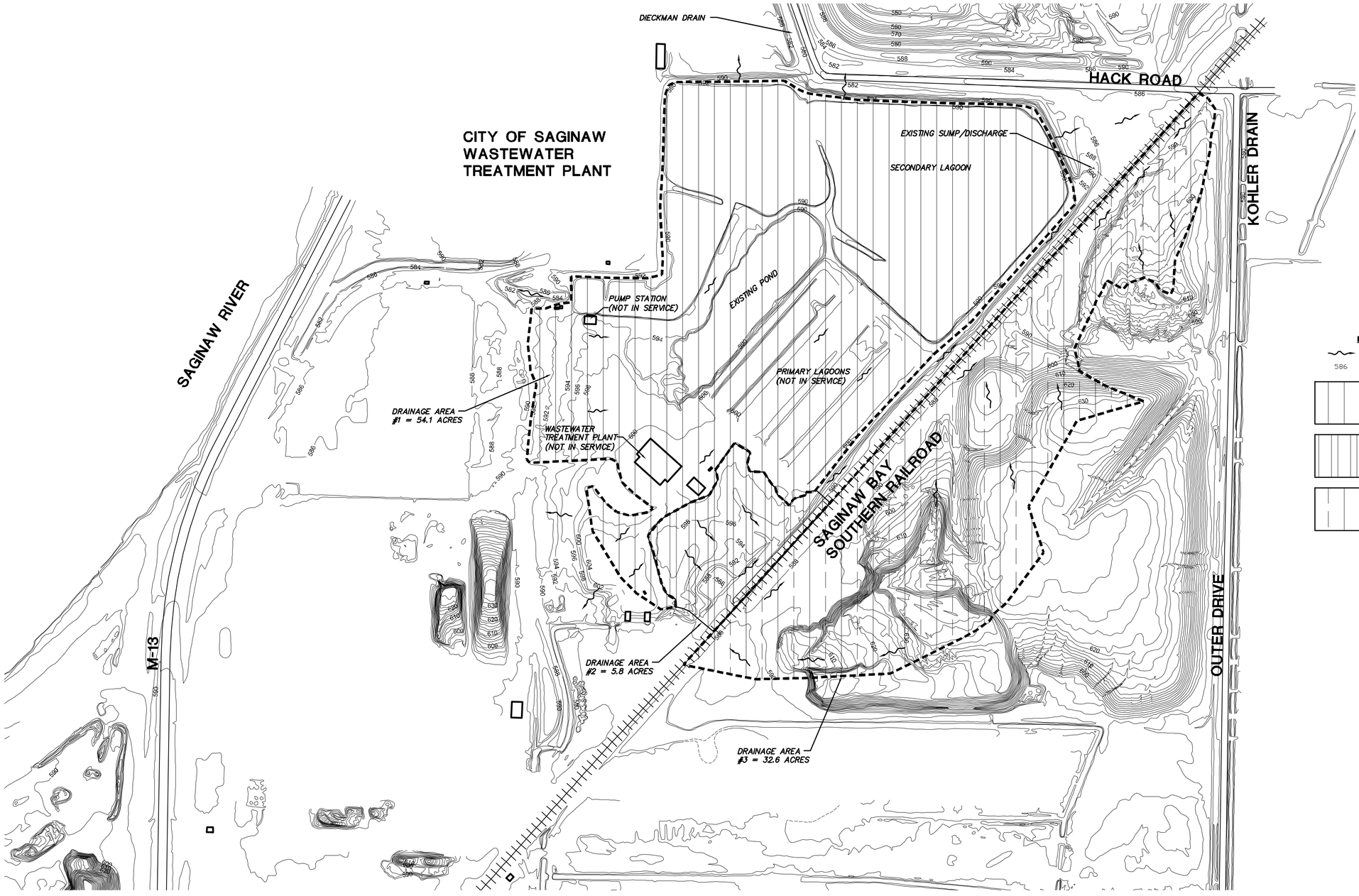
Potential Outfall 21: Drainage Area = 54.1 Acres
This drainage area is defined by surface runoff generated from Drainage Area 1, as shown in Fig 1 (Attached). Flow from Drainage Area 2 and 3 (Fig 1) will be redirected to separate Outfall. Outfall 21 connects to the Dieckman Drain.

Potential Outfall 22: Drainage Area = 54.1 Acres
This drainage area is defined by surface runoff generated from Drainage Area 1 as shown in Fig 1 (Attached). Discharge from the existing Secondary Lagoon will be directed into the existing drainage swale located between the City of Saginaw Treatment Plant and Nodular Iron, which then is directed to an existing 60" culvert beneath M-13, which is currently bulk-headed. Outfall 22 connects to the Saginaw River.

Potential Outfall 23: Drainage Area = 38.4 Acres
This drainage area is defined by surface runoff generated from Drainage Area 2 + 3, as shown in Fig 1 (Attached). Flow from Drainage Area 1 (Fig 1) will be redirected to separate Outfall. Outfall 23 connects to the Kohler Drain.

Combine all Drainage Areas into One Outfall = 92.5 acres
A possible alternative is to combine Drainage Areas 1, 2 and 3 together and redirect to the Kohler Drain (Outfall 23). This scenario produces one outfall and will not require mechanical pumping of storm water. An outlet control structure will be necessary at the Secondary Lagoon with storm sewer and/or ditching constructed to the Kohler Drain.

(24X9TB - 10-29-04)



NO SCALE

LEGEND

- EXISTING DRAINAGE FLOW DIRECTION
- 586 EXISTING CONTOUR ELEVATION
- DRAINAGE AREA 1
- DRAINAGE AREA 2
- DRAINAGE AREA 3

PREPARED UNDER THE SUPERVISION OF:

PROJECT LOG

CLIENT REVIEW	06/24/11
FILE: EX. DRAINAGE INFO.	
PROJECT MGR: SLW	
DESIGNED BY: SLW	
DRAWN BY: AJH	
CHECKED BY:	
SCALE: NO SCALE	
SHEET: OF	

RACER TRUST
401 S. OLD WOODWARD, SUITE 370
BIRMINGHAM, MI 48009
PH: 313-486-2908

RACER NODULAR
SAGINAW NODULAR IRON

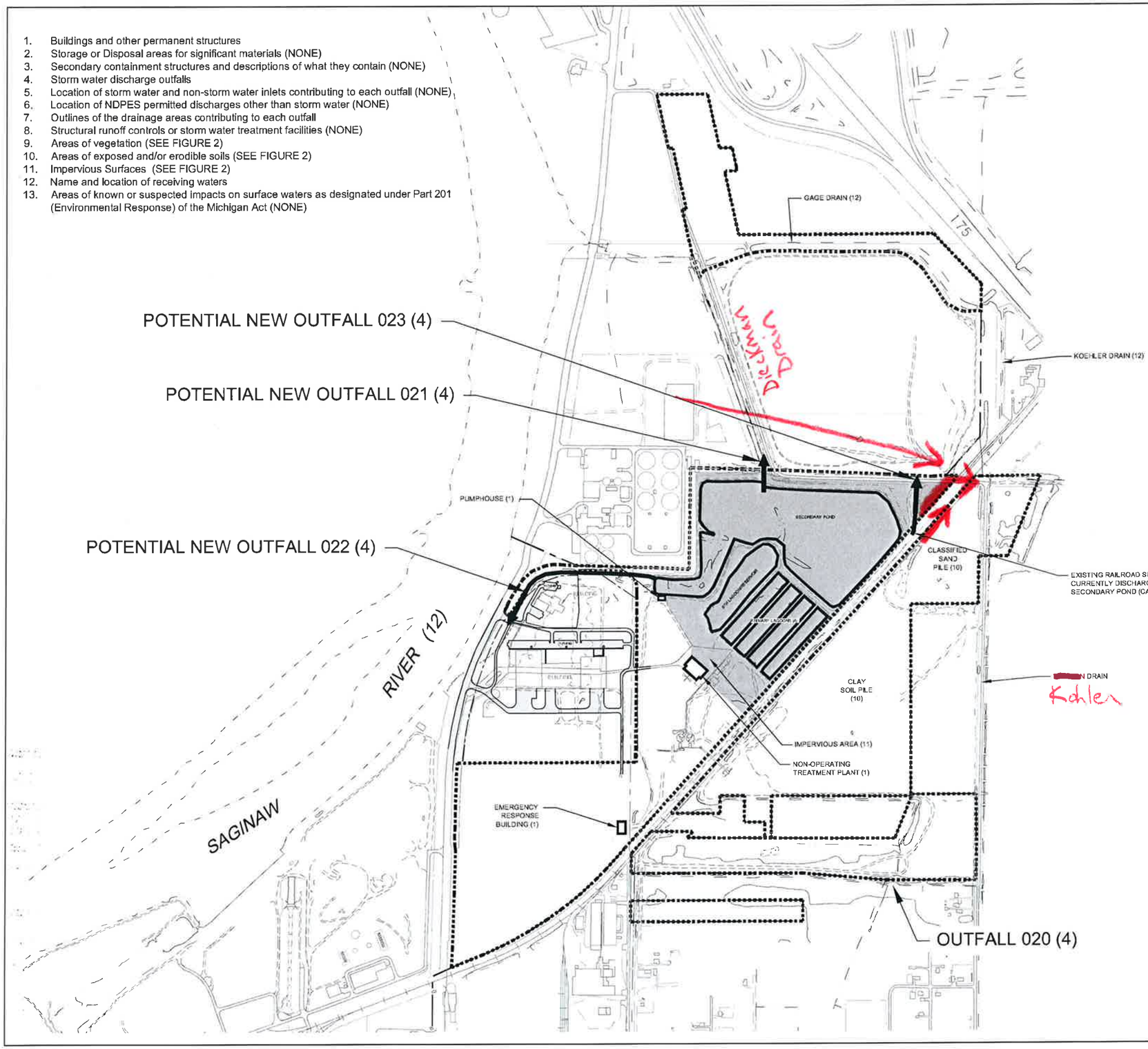
DRAINAGE TRIBUTARY MAP

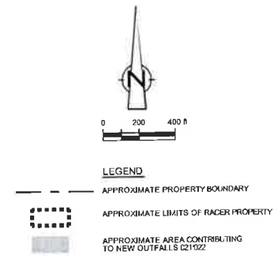
Wilcox Professional Services
AN ISO 9001:2000 CERTIFIED COMPANY
www.wilcox.us

FIG 1

10496.0002

1. Buildings and other permanent structures
2. Storage or Disposal areas for significant materials (NONE)
3. Secondary containment structures and descriptions of what they contain (NONE)
4. Storm water discharge outfalls
5. Location of storm water and non-storm water inlets contributing to each outfall (NONE)
6. Location of NDPES permitted discharges other than storm water (NONE)
7. Outlines of the drainage areas contributing to each outfall
8. Structural runoff controls or storm water treatment facilities (NONE)
9. Areas of vegetation (SEE FIGURE 2)
10. Areas of exposed and/or erodible soils (SEE FIGURE 2)
11. Impervious Surfaces (SEE FIGURE 2)
12. Name and location of receiving waters
13. Areas of known or suspected impacts on surface waters as designated under Part 201 (Environmental Response) of the Michigan Act (NONE)





NOTE: TOPO - SANBORN 1998

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

REVITALIZING AUTO COMMUNITIES ENVIRONMENTAL RESPONSE (RACER)
SAGINAW NODULAR INDUSTRIAL LAND
SAGINAW, MICHIGAN

SITE MAP
FOR SWPPP

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88

Project Manager:	Reviewed By:	Date:	
M.T.	J.E.P.	JANUARY 2012	
Scale: 1" = 500'	Project No.: 58502-T02	Report No.: 007	Drawing No.: 1

58502-T02(007)GN-WA031 JAN 25/2012