

Ms. Susan Kaelber-Matlock Saginaw Bay District Office Michigan Department of Environmental Quality 401 Ketchum Street, Suite B Bay City, Michigan 48708

Subject:

Annual Progress Report – October 2010 through November 2011 RACER Trust Saginaw Malleable Iron Plant Property and the Green Point Landfill Property Saginaw, Michigan

Dear Ms. Kaelber-Matlock:

This progress report presents a summary of the work activities conducted during the period of October 2010 through November 2011 for the above-referenced Site, and a summary of the work activities anticipated for the next 12 month period. A December 15, 2011, submittal date for this report was established by the MDEQ in an email exchange with Ms. Susan Kaelber-Matlock dated October 12, 2011.

Key Correspondence

The key deliverables submitted to the MDEQ, EPA, or City of Saginaw are as follows:

- The annual progress report for October 2009 through September 2010 was submitted to you on October 15, 2010. The annual report was submitted in letter format by ARCADIS on behalf of the Motors Liquidation Company (MLC).
- A letter dated September 12, 2011, was submitted to you by CRA on behalf of RACER that presented a proposed program to recover LNAPL in the former Quench Pit Area. As part of this program, the existing LNAPL recovery building and skimmer pumps would be moved to the Quench Pit area.
- A letter dated November 18, 2011, was submitted by RACER to the City of Saginaw, providing additional detail regarding bulk-heading of site sewers to eliminate inputs to the City sewer system from the site. The letter reiterated the request to terminate the site discharge permit and the Consent Order with the City.
- A letter dated November 22, 2011, was submitted to Peter Ramanauskas of the US Environmental Protection Agency (EPA), by CRA on behalf of RACER, as

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ENVIRONMENT

Date: December 15, 2011

Contact: Lisa Coffey

Phone: 315.671.9164

Email: lisa.coffey@ arcadis-us.com

Our ref: B0050096/B0064434 #2.04

Notification/Certification of Cleanup under CFR 761.61(a) for the remaining concrete slab.

 An email dated November 28, 2011, was sent by Allen Debus of EPA with comments on the November 22, 2011, Notification/Certification of Cleanup.

Meetings

- A meeting was held on June 14, 2011, in Bay City, Michigan between you and representatives of the RACER Trust (Grant Trigger and David Favero), and RACER's consultants, CRA (Mike Tomka) and ARCADIS (Lisa Coffey). The role of the new TRUST and planned site activities were discussed.
- A project meeting was held on September 8, 2011, between you, an additional representative of the MDEQ (Leonard Lipinski), Saginaw Redevelopment Association (Tom Miller), RACER Trust (Grant Trigger and Dave Favero), and RACER's consultants, CRA (Mike Tomka), and ARCADIS (Lisa Coffey [by phone]).

Site Activities

- Additional sampling of the concrete slab was completed to delineate polychlorinated biphenyl (PCB) hot spots.
- The monitoring wells located in the light non-aqueous phase liquid (LNAPL) recovery area south of the former plant location were monitored on the following dates during 2011: January 3rd, March 18th, April 12th, May 9th, June 9th, August 23rd, and October 14th. No measureable thicknesses of LNAPL were observed in any of the wells on the monitored dates.
- During August 2011, a bulkhead was installed in the 42-inch sewer (near FEE 14.6). Following inspections conducted with a City of Saginaw representative, the existing bulkhead in the 24-inch sewer (near FA 19.5) was replaced the week of October 24, 2011. The purpose of these actions was to complete isolation of the site from the City of Saginaw sewer system.
- Groundwater samples were collected between September 21 and 28, 2011 from five wells located in the river berm area. Six additional wells that are included in the annual monitoring program were dry and could not be sampled. Summary data tables are included in Appendix A. The data are consistent with previous data collected from these locations. Arsenic was detected above the GSI criterion, but within acceptable concentrations established through the site mixing zone.

- Thirteen of the fourteen wells included in the annual Green Point Landfill groundwater monitoring program were sampled on September 21 through September 28, 2011. The remaining well was dry and could not be sampled. Summary data tables are included in Appendix B. Mercury was detected at the X-9 monitoring well cluster at concentrations above the GSI criterion, but below the analytical reporting limit (J qualified). Barium was detected above the GSI criterion at the MW-117 monitoring well cluster. Lower barium concentrations, below the GSI criterion, were detected at monitoring wells located adjacent to the Saginaw River. The data are consistent with previous data for the site.
- One well located in the south-west portion of the Green Point Landfill property (TWW-1) was sampled on September 21, 2011. This well is included in the annual monitoring program due to the discharge of volatile organic compounds to the subsurface from the neighboring property to the west.
- A Green Point Landfill Cap inspection was completed on September 19, 2012. No issues were found requiring action.
- Sewer discharge monitoring was completed on a quarterly basis in accordance with a discharge permit with the City of Saginaw, until the bulkhead was installed.
- On October 27, 2011, the building previously located south of the plant building and used to house the LNAPL recovery equipment for the LNAPL recovery area south of the plant was moved to the area of active LNAPL recovery in the Quench Pit Area.

Anticipated Site Activities

Although there continues to be some uncertainty associated with the scope of the activities to be completed during the next calendar year, the following activities are planned for completion during the period from December 2011 through November 2012:

- Operation of the newly installed LNAPL recovery system in the Quench Pit area and modification/expansion of the system as needed based on collected data.
- Removal of portions of the concrete slab that contain elevated concentrations of PCBs.
- The need for a soil cover over the slab will continue to be evaluated.
- Monitoring wells on the SMI property that are not needed for ongoing monitoring programs will be abandoned. A proposal identifying the wells to be abandoned will be submitted for your approval.

Ms. Susan Kaelber-Matlock December 15, 2011

- A deed restriction for the slab area will be developed, and the previously developed deed restrictions will be modified as needed based on current site conditions (task is in progress), and filed.
- The planned construction and written content of permanent markers will be revisited and discussed with the MDEQ. Permanent markers will be installed.
- Completion of the annual groundwater monitoring programs in the vicinity of the Green Point Landfill and along the Saginaw River berm, as described in the RAP. Note that six of the monitoring wells included in the sampling program along the Saginaw River Berm have been dry during the past two monitoring events, suggesting a lowering of the water table in the vicinity of the berm in response to plant demolition. If the wells are observed to be dry during the 2012 monitoring event, a request will be made to the MDEQ to remove them from the monitoring program.
- A letter report providing full analytical data packages and sampling logs for the September 2011 groundwater sampling events will be submitted to the MDEQ to transmit supplemental information not contained in this summary report.
- Completion of an inspection of the Green Point Landfill.

Please contact me if you have any questions regarding the enclosed.

Sincerely,

ARCADIS

Tisa (

Lisa R. Coffey Principal Geologist

Attachments: Figures Appendix A Appendix B

Copies: John Fordell Leone, Department of Attorney General Grant Trigger, RACER David Favero, RACER Mike Tomka, CRA



Figures



STATE OF MICHIGAN PROPERTY (PREVIOUSLY RUBIN SCHULTZ PROPERTY)

CITY: SYRACUSE, NY DIV/GROUP: ENV/IM-DV DB: G. STOWELL, P. LISTER PM: W. MCCUNE TM: L. COFFEY TR: K. POTTER LYR:ON=";OFF="REF G:ENVCAD/SYRACUSE/ACT/80050096/0001/00002/DWG/50096B01.DWG LAYOUT: 1 SAVED: 11/18/2011 4:51 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 11/18/2011 4:52 PM BY: LISTER, PAUL

NOTES:

- THIS PHOTOGRAMMETRIC BASE MAP FOR THE GM SAGINAW MALLEABLE IRON PLANT AND DELPHI SAGINAW STEERING SYSTEMS PLANT 2 PROPERTIES WAS PREPARED BY LOCKWOOD MAPPING, INC. OF ROCHESTER, NEW YORK. AERIAL PHOTOGRAPHY WAS CONDUCTED ON 11/11/94. ORIGINAL LOCKWOOD MAP WAS AT A SCALE OF 1"=100' AND WAS INTERPRETED FOR TWO-FOOT CONTOURS.
- BASE MAP HAS BEEN MODIFIED TO INCORPORATE BUFFER BASIN, SEDIMENTATION BASINS, WETLANDS MITIGATION AREA, AND GREEN POINT LANDFILL (GPL) FINAL COVER FROM THE FINAL ENGINEERING DESIGN REPORT PREPARED BY BBL FOR THE GPL, DATED JANUARY 1998.
- VERTICAL DATUM REFERENCED TO NGVD OF 1929, HORIZONTAL DATUM REFERENCED TO MICHIGAN SPC-NAD 1983.
- 4. PROPERTY BOUNDARY FOR GPL DIGITIZED FROM SPICER GROUP DRAWING NO. A-21854-1, DATED 3/27/98.
- 5. BASE MAP INFORMATION SOUTH OF MAIN GPL PROPERTY LINE FROM AIR-LAND SURVEYS, INC. PHOTO DATE 11/90, MAPPING DATE 10/91.

		ARCADIS 1
() X−5A,B,C ⊕ RG1	ABANDONED MONITORING WELL ABANDONED MONITORING WELL CLUSTER RIVER GAUGE	SAGINAW MALLEABLE IRON PLANT PROPERTY, GREEN POINT LANDFILL, AND DRUM REMEDIATION AREA SAGINAW, MICHIGAN
©RW-1 (€) X-6	RECOVERY WELL	UKAPTIL SLALE
■ TP-1	STAFF GAUGE PIEZOMETER	0 <u> </u>
●MW-2A,B,CAUG	MONITORING WELL CLUSTER	
⊘ MW-125WT	SWAMPY AREA	
(<u>u</u>	FENCE LINE	
620	GROUND SURFACE ELEVATION CONTOUR (10 FT INTERVAL)	
	GREEN POINT LANDFILL PROPERTY LINE (APPROX.)	LNAPL AND/OR GROUNDWATER ELEVATION MEASUREMENT LOCATION
	LEGEND: SAGINAW MALLEABLE IRON PLANT PROPERTY LINE (APPROX.)	RAP (7/31/08) MONITORING PROGRAM SAMPLING AND GROUNDWATER ELEVATION



STATE OF MICHIGAN PROPERTY (PREVIOUSLY RUBIN SCHULTZ PROPERTY)

CITY: SYRACUSE, NY DIV/GROUP: ENV/IM-DV DB: G. STOWELL, P. LISTER PM: W. MCCUNE TM: L. COFFEY TR: K. POTTER LYR:ON="OFF="REF G: ENVCAD/SYRACUSE/ACT/B0050096/0001/00002/DWG/50096W01.DWG LAYOUT: 2 SAVED: 11/22/2011 1:37 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 11/22/2011 1:37 PM BY: LISTER, PAUL

NOTES:

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- BASE MAP HAS BEEN MODIFIED TO INCORPORATE BUFFER BASIN, SEDIMENTATION BASINS, WETLANDS MITIGATION AREA, AND GREEN POINT LANDFILL (GPL) FINAL COVER FROM THE FINAL ENGINEERING DESIGN REPORT PREPARED BY BBL FOR THE GPL, DATED JANUARY 1998.
- VERTICAL DATUM REFERENCED TO NGVD OF 1929, HORIZONTAL DATUM REFERENCED TO MICHIGAN SPC-NAD 1983.
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- 5. BASE MAP INFORMATION SOUTH OF MAIN GPL PROPERTY LINE FROM AIR-LAND SURVEYS, INC. PHOTO DATE 11/90, MAPPING DATE 10/91.
- 6. CONTOURS HAVE BEEN INFERRED IN THE AREA OF THE LANDFILL BASED ON HISTORICAL DATA.
- \ast ELEVATIONS AT MW-117 AND MW-118 WERE NOT USED FOR CONTOURING.

	LEGEND: SAGINAW MALLEABLE IRON PLANT PROPERTY LINE (APPROX.) GREEN POINT LANDEUL PROPERTY LINE	RAP (7/31/08) MONITORING PROGRAM SAMPLING AND GROUNDWATER ELEVATION MEASUREMENT LOCATION
	(APPROX.) UNPAVED ROAD	LNAPL AND/OR GROUNDWATER ELEVATION MEASUREMENT LOCATION
620	GROUND SURFACE ELEVATION CONTOUR (10 FT INTERVAL)	
N N 3 N N N	FENCE LINE	
	SWAMPY AREA	
⊘ MW−125WT	MONITORING WELL	
⊚ MW−2A,B,CAUG	MONITORING WELL CLUSTER	
SG5	STAFF GAUGE	0 300' 600'
● TP-1	PIEZOMETER	GRAPHIC SCALE
©RW-1	RECOVERY WELL	
(⊙) X−6	ABANDONED MONITORING WELL	
() X-5A,B,C	ABANDONED MONITORING WELL CLUSTER	SAGINAW MALLEABLE IRON PLANT PROPERTY, GREEN POINT LANDFILL, AND DRUM REMEDIATION AREA
⊕- RG1	RIVER GAUGE	SAGINAW, MICHIGAN
580.23	GROUNDWATER ELEVATION (FEET AMSL)	
582 ———	GROUNDWATER ELEVATION CONTOUR LINE (FEET AMSL), DASHED WHERE INFERRED	SITE-WIDE WATER TABLE ELEVATION
	GROUNDWATER FLOW DIRECTION	CONTOUR MAP - SEPTEMBER 20, 2011
		ARCADIS ^{FIGURE} 2

Appendix A

Saginaw Malleable Iron Plant Property, Saginaw, Michigan

2011 River Berm Groundwater Sampling Data Tables

- Table A-1
 Monitoring Well Construction Summary
- Table A-2
 Site-Wide Water Level Measurements, September 20, 2011
- Table A-3 Laboratory Analytical Plan
- Table A-4 Field Parameters
- Table A-5 PCBs in Groundwater
- Table A-6 TAL Inorganic Constituents in Groundwater
- Table A-7
 Indicator Parameters in Groundwater
- Table A-8
 Notes for Groundwater Analytical Data Tables

Table A-1. Monitoring Well Construction Summary, 2011 Annual Report, RACER Trust, Saginaw Malleable Iron Plant, Saginaw, Michigan

Well ID	Screen Interval (ft) ¹	Screened Unit/Zone	Well Construction	Date Installed	TIC ² Elevation (ft) ³
MW-107WT	4-9	Water table	2" PVC	12/23/1994	590.65
MW-107S1	12.5-17.5	Upper sand	2" PVC	5/3/1995	590.74
MW-108WT	2.5-7.5	Water table	2" PVC	12/21/1994	590.53
MW-108S2	22-27	Upper sand	2" PVC	12/21/1994	590.26
MW-110WTR	3-8	Water table	2" PVC	11/9/2001	591.52
MW-111WT	5.5-10.5	Water table	2" PVC	1/6/1995	590.95
MW-114WT	3.5-8.56	Water table	2" PVC	7/24/2007	591.12
MW-114S2	22.5-27.5	Upper sand	2" PVC	7/23/2007	591.2
MW-149WT	7-17	Water table	2" PVC	9/21/1995	592.27
MW-185WT	3-8	Water table	2" PVC	11/8/2001	588.67
MW-186WT	8-18	Water table	2" PVC	NA	NA

Notes:

¹ Depths are in feet below ground surface (bgs). Note that the screened intervals of the MW-128 and X-1 well clusters have been adjusted due to the addition of riser to the wells during landfill capping.

 2 TIC = Top of inner casing.

³ Elevations are in feet above mean sea level (AMSL).

NA = not applicable/not available.

Table A-2. Site-Wide Water Level Measurements, September 20, 2011, 2011 Annual Report, RACER Trust, Saginaw Malleable Iron Plant,

Saginaw, Michigan

Location	Reference Elevation (feet, AMSL)	Depth to Water (feet)	Groundwater Elevation (feet, AMSL)	Site Area GPL vs SMI
Sampled Monitoring Wells (Green Point Landfill)			
MW-117WT*	582.37	2.43	579.94	GPL
MW-117S1*	583.7	2.69	581.01	GPL
MW-118WT*	582.98	3.41	579.57	GPL
MW-118S1*	583.28	2.39	580.89	GPL
MW-183WT	588.77	10.58	578.19	GPL
X-4AR	NA	7.25	NA	GPL
X-4CAUGR	NA	7.60	NA	GPL
X-4D	NA F00.05	3.64	NA	GPL
X-9AR	586.95	8.95	578	GPL
	586.62	9.21	577.03	GPL
	500.02 ΝΔ	9.39	577.05 NA	GPL
X-10BR	592.67	4.73	581.04	GPL
TWW-1	587.31	6.31	581	GPL
Sampled Monitoring Wells	Saginaw Malleable Iron	Plant Area)	001	0. 1
MW-107WT	590.65	10.34	580 31	SMI
MW-107S1	590.74	12.67	578.07	SMI
MW-108WT	590.53	drv	drv	SMI
MW-108S1	590.24	12.19	578.05	SMI
MW-110WTR	591.52	13.97	577.55	SMI
MW-111WT	590.95	12.06	578.89	SMI
MW-114WT	591.12	10.71	580.41	SMI
MW-114S2	591.2	12.43	578.77	SMI
MW-149WT	592.27	14.09	578.18	SMI
MW-185WT	588.67	10.36	578.31	SMI
MW-186WT	NA	10.82	NA	SMI
Nearby Monitoring Wells				
B-3R	609.51	13.51	596	SMI
B-3BAUG	596.54	13.96	582.58	SMI
B-5BAUG	594.17	13.51	580.66	SMI
B-5CAUG	594.23	13.22	581.01	SMI
B-5R	594.54	7.99	586.55	SMI
B-7R	591.76	12.20	579.56	SMI
MW-103S1	595.75	12.74	583.01	SMI
MVV-103S2	596.34	15.61	580.73	SMI
MW-105S1	591.21	14.98	576.23	SIMI
MW-105S2	503.07	12.01	581.05	SMI
MW-105WT	593.35	8.21	585 14	SMI
MW-108S2	590.26	12.30	577.96	SMI
MW-108S3	589.98	8.36	581.62	SMI
MW-108S4	590.11	8.54	581.57	SMI
MW-108WT	590.53	dry	dry	SMI
MW-111S1	591.14	12.56	578.58	SMI
MW-111S2	591.5	12.75	578.75	SMI
MW-111S3	591.35	9.97	581.38	SMI
MVV-111S4	591.66	9.94	581.72	SMI
MVV-114S1	591.13	11.12	580.01	SMI
IVIVV-11453	591.02	9.28 NA NE	581.74	SIVI
M/M-122/M/T	584.07		NA NA	GPI
MW-122S1	58/ 07	Δ 7Λ	580.23	GPL
MW-122S2	585 13	4 61	580.52	GPI
MW-123WT	584 53	NA-NF	NA	GPI
MW-124WT	585.94	4.74	581.2	GPL
MW-124S1	586.41	5.07	581.34	GPL
MW-125WT	586.98	5.73	581.25	GPL
MW-128S1	594.99	NA - WASPS	NA	GPL
MW-128WT	594.96	NA - WASPS	NA	GPL
MW-129WT	587.38	NA - NF	NA	GPL
MW-131WT	592.56	7.48	585.08	SMI
MW-131S1	592.75	11.41	581.34	SMI
MW-131S2	592.39	11.08	581.31	SMI

See Notes on Page 2.

Table A-2. Site-Wide Water Level Measurements, September 20, 2011, 2011 Annual Report, RACER Trust, Saginaw Malleable Iron Plant,

Saginaw, Michigan

Location	Reference Elevation (feet, AMSL)	Depth to Water (feet)	Groundwater Elevation (feet, AMSL)	Site Area GPL vs SMI
Nearby Monitoring Wells (Cont.)			
MW-134WT	594.02	7.28	586.74	SMI
MW-137WT	595.91	6.06	589.85	SMI
MW-138WT	602.39	5.96	596.43	SMI
MW-140WT	595.9	10.88	585.02	SMI
MW-140S1	595.33	14.41	580.92	SMI
MW-143WT	596.52	NA	NA	SMI
MW-144WT	593.25	7.97	585.28	SMI
MW-147WT	592.07	3.90	588.17	SMI
MW-158WT	591.78	NA-NF	NA	SMI
MW-160WT	591.53	NA-NF	NA	SMI
MW-168WT	592.11	NA-NF	NA	SMI
MW-169WT	591.82	NA-NF	NA	SMI
MW-172WT	591.51	NA-NF	NA	SMI
MW-178WT	590.35	3.78	586.57	SMI
MW-180WT	590.67	NA-NF	NA	SMI
MW-2A	584.56	NA-NF	NA	GPL
MW-2B	584.56	NA-NF	NA	GPL
MW-2CAUG	585.15	NA-NF	NA	GPL
QPTW-01	591.95	4.30	587.65	SMI
QPTW-02	592.35	3.26	589.09	SMI
QPTW-03	592.13	NA-NF	NA	SMI
QPTW-04	592	5.22	586.78	SMI
QPTW-05	592.13	4.87	587.26	SMI
QPTW-10	592.15	NA-NF	NA	SMI
QPTW-13	592.36	NA-NF	NA	SMI
RG1	NA	NA-NF	NA	SMI
RW-1	NA	NA-NF	NA	SMI
RW-2	588.09	NA-NF	NA	SMI
RW-3	588.4	NA-NF	NA	SMI
SG1	NA	NA-NF	NA	SMI
TP-2	592.12	NA-NF	NA	SMI
1 VV-241	NA	5.84	NA	GPL
1W-242	NA	6.65	NA	GPL
X-10AR2	594.67	7.76	586.91	GPL
X-15AR	584.61	NA-NF	NA	GPL
X-15BR	585.13	NA-NF	NA 500.40	GPL
X-16A	587.44	4.95	582.49	GPL
X-10B	587.2	4.16	583.04	GPL
X-1A	597.72	12.25	585.47	GPL
X-1B	597.69	13.35	584.34	GPL
X-10K2	598.41	12.41	586	GPL
X-2A	593.12	5.57	587.55	GPL

Notes:

SMI = Saginaw Malleable Iron.

GPL = Green Point Landfill.

Elevations are shown in feet above mean sea level (AMSL) relative to the NGVD datum of 1929.

Monitoring wells in the MW-128 and X-1 well clusters were extended during landfill capping activities. Reference elevations shown above are from August 2000 when the wells were resurveyed.

NA = not available.

NF- not found.

* = Gauged at time of sampling due to very tall/dense vegetation (phragmites).

Table A-3. Laboratory Analytical Plan, 2011 Annual Report, Saginaw Malleable Iron Plant, Saginaw, Michigan

Monitoring Well ID	Summary from RAP (2008)	Ultra Low Flow Location ¹	Phosphorus	Total Arsenic	Total Manganese	Total Thallium	svocs	Total PCBs	Dissolved PCBs	TDS
MW-107WT ²	Ammonia nitrogen, phosphorus, DO, total arsenic, total manganese, and total thallium	Х	Х	Х	Х	Х				
MW-107S1	Ammonia nitrogen									
MW-108WT ²	TCL SVOCs, DO, ammonia, phosphorus, and total manganese	Х	Х		Х		Х			
MW-108S2	Ammonia nitrogen									
MW-110WTR ²	PCBs (total and dissolved,) ammonia nitrogen, phosphorus, DO, TDS, total manganese, and thallium	Х	Х		Х	Х		Х	Х	Х
MW-111WT ²	PCBs (total and dissolved), DO, ammonia, phosphorus, total thallium, and total manganese	Х	Х		Х	Х		Х	Х	
MW-114WT ²	PCBs (total and dissolved), ammonia, phosphorus, DO total thallium, and total manganese	Х	Х		Х	Х		Х	Х	
MW-114S2	Ammonia nitrogen									
MW-149WT	Ammonia, phosphorus, total arsenic, and total thallium	Х	Х	Х		Х				
MW-185WT ²	PCBs (total and dissolved), ammonia, phosphorus, DO, total manganese, and total thallium.	Х	Х		Х	Х		Х	Х	
MW-186WT	PCBs (total and dissolved), ammonia, phosphorus, DO total thallium, and total manganese	Х	Х		Х	Х		Х	Х	

Notes:

¹Ultra Low Flow sampling refers to the use of a purge and sampling rate of approximately 1 liter per hour, implemented to minimize sample turbidity. ²Monitoring well was dry, and a sample could not be collected.

Table A-4. Field Parameters, 2011 Annual Report, RACER Trust Saginaw Malleable Iron Plant, Saginaw, Michigan

Well ID	Date Sampled	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	рН (SU)	Temperature (⁰C)	Turbidity (NTUs)
MW-107S1	09/30/10	1.258	0.4	-104.2	7.54	22.9	0.35
MW-107S1	09/21/11	1.26	0.90	-111.7	7.11	14.93	0.6
MW-107WT	DRY 2010 and 2011	NA	NA	NA	NA	NA	NA
MW-108S2	09/28/10	1.142	0.12	-116.6	7.52	13.87	0.4
MW-108S2	09/21/11	0.808	0.63	-96.9	7.51	13.87	3.8
MW-108WT	DRY 2010 and 2011	NA	NA	NA	NA	NA	NA
MW-110WTR	DRY 2010 and 2011	NA	NA	NA	NA	NA	NA
MW-111WT	DRY 2010 and 2011	NA	NA	NA	NA	NA	NA
MW-114S2	09/29/10	0.69	0.10	-118.5	8.40	16.43	1.0
MW-114S2	09/22/11	0.929	1.83	-109.6	7.20	16.3	1.1
MW-114WT	DRY 2010 and 2011	NA	NA	NA	NA	NA	NA
MW-149WT	09/30/10	1.395	0.53	-133.4	6.91	12.79	1.6
MW-149WT	09/28/11	1.441	0.43	-136.6	6.77	13.79	1.7
MW-185WT	DRY 2010 and 2011	NA	NA	NA	NA	NA	NA
MW-186WT	09/29/10	0.53	0.39	-130.1	7.88	14.52	0.6
MW-186WT	09/28/11	0.94	1.68	-136	8.04	14.18	0.5

Notes:

°C = Celsius.

mg/L = milligrams per liter.

mV = millivolts.

NTUS = Nephelometric Turbidity Units. SU = Standard Units.

mS/cm = milliSiemens per centimeter.

NA = not applicable/not available.

Table A-5. PCBs in Groundwater, 2011 Annual Report, Saginaw Malleable Iron Plant, Saginaw, Michigan

Location ID:	MDEQ (2011)		MW-186WT	MW-186WT
Date Collected:	GSI	Units	09/30/10	09/23/11
PCBs				
Aroclor-1016		ug/L	ND(0.10)	ND(0.095)
Aroclor-1221		ug/L	ND(0.10)	ND(0.095)
Aroclor-1232		ug/L	ND(0.10)	ND(0.095)
Aroclor-1242		ug/L	ND(0.10)	ND(0.095)
Aroclor-1248		ug/L	ND(0.10)	ND(0.095)
Aroclor-1254		ug/L	ND(0.10)	ND(0.095)
Aroclor-1260		ug/L	ND(0.10)	ND(0.095)
Total PCBs	0.2(M)	ug/L	ND(0.10)	ND(0.095)
PCBs-Dissolved				
Aroclor-1016 (Dissolved)		ug/L	ND(0.1)	ND(0.095)
Aroclor-1221 (Dissolved)		ug/L	ND(0.1)	ND(0.095)
Aroclor-1232 (Dissolved)		ug/L	ND(0.1)	ND(0.095)
Aroclor-1242 (Dissolved)		ug/L	ND(0.1)	ND(0.095)
Aroclor-1248 (Dissolved)		ug/L	ND(0.1)	ND(0.095)
Aroclor-1254 (Dissolved)		ug/L	ND(0.1)	ND(0.095)
Aroclor-1260 (Dissolved)		ug/L	ND(0.1)	ND(0.095)
Total PCBs (Dissolved)	0.2(M)	ug/L	ND(0.1)	ND(0.095)

Table A-6. TAL Inorganic Constituents in Groundwater, 2011 Annual Report, Saginaw Malleable Iron Plant, Saginaw, Michigan

Location ID: Date Collected:	MDEQ (2011) GSI	Units	MW-149WT 09/30/10	MW-149WT 09/28/11	MW-186WT 09/30/10	MW-186WT 09/23/11
Inorganics						
Arsenic	0.01	mg/L	0.126 [0.122]	0.190 [0.180]	NA	NA
Manganese	4.767(G,X)	mg/L	NA	NA	0.252	0.450
Thallium	0.0037(X)	mg/L	ND(0.00100) [ND(0.00100)]	0.000840 [0.000170]	ND(0.00100)	ND(0.00100)

Table A-7. Indicator Parameters in Groundwater, 2011 Annual Report, Saginaw Malleable Iron Plant, Saginaw, Michigan

	MDEQ											
Location ID:	(2011)		MW-107S1	MW-107S1	MW-108S2	MW-108S2	MW-114S2	MW-114S2	MW-149WT	MW-149WT	MW-186WT	MW-186WT
Date Collected:	GSI	Units	09/30/10	09/21/11	09/29/10	09/21/11	09/29/10	09/22/11	09/30/10	09/28/11	09/30/10	09/23/11
Miscellaneous												
Ammonia Nitrogen	(CC)	mg/L	1.2	1.4	4.6	4.9	2.3 [2.2]	3.0 [3.0]	3.6	4.7	1.5	2.1
Dheenhamie (Tatel)			NIA	NIA	NIA	NIA	NIA	NIA	2 2 [1 8]	16[16]	03	0.36

Table A-8. Notes For Groundwater Analytical Data Tables, 2011 Annual Report, RACER Trust, Saginaw Malleable Iron Plant, Saginaw, Michigan

General Notes:

Samples were collected by ARCADIS, and submitted to STL Laboratories in North Canton, Ohio for analysis.

Duplicate results are presented in brackets.

Groundwater concentrations are presented in milligrams per liter (mg/L), except where noted.

Total PCBs reported as the sum of PCB Aroclors.

* Monitoring well data compared to Groundwater/Surface water Interface (GSI) criteria for locations adjacent to the Saginaw

River (MW-183WT, X-4A, X-4CAUGR, X-9AR, X-9BR, X-9CAUG, X-9D).

The estimated unionized ammonia (NH₃) concentrations calculated for the monitoring wells located adjacent to the Saginaw River

are based on the MDEQ default value of 7.2% of total ammonia nitrogen for warm water surface water.

Shaded cells represent constituent concentrations that exceed Groundwater/Surface Water (GSI) Michigan Part 201 Criteria updated March 25, 2011. Bolded values represent a detection.

Data Qualifiers:

ND = Not detected. The value in parentheses represents the associated detection limit.

NA = Not analyzed for this constituent.

- B = Inorganics: the detected analyte is and estimated value between the instrument detection limit and the reporting limit.
- B = Organics: the compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- BJ = The detected analyte is an estimated concentration between the IDL and the RL.
- U = The constituent was analyzed for but not detected. The associated value is the constituent quantitation limit.
- UJ = The constituent was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual result.
- D = Concentration is based on a diluted sample analysis.
- J = The compound/constituent was positively identified; however, the associated numerical value is an estimated concentration only.
- R = Indicates that the previously reported detection limit or sample result has been rejected due to a major deficiency in the data generation procedure. The data shall not be used for any qualitative or quantitative purposes.

MDEQ Criteria Qualifiers:

- ID = Inadequate data to develop criterion.
- NA = Criterion or value is not available or, as is the case for Csat, not applicable
- NLV = Hazardous substance is *not likely to volatilize* under most conditions.
 - (A) Criterion is the state of Michigan drinking water standard established pursuant to Section 5 of 1976 pa 399, mcl 325.1005.
 - (B) Background, as defined in R 299.5701(b), may be substituted if higher than the calculated cleanup criterion.
 - (C) Value presented is a screening level based on the chemical-specific generic soil saturation concentration since the calculated risk-based criterion is greater than Csat. Concentrations greater than Csat are acceptable cleanup criteria for this pathway where a site-specific demonstration indicates that free-phase material containing a hazardous substance is not present.
 - (D) Calculated criterion exceeds 100 percent, hence it is reduced to 100 percent or 1.0E+9 parts per billion (ppb).
 - (E) Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). A notice of aesthetic impact may be employed as an institutional control mechanism if groundwater concentrations exceed the aesthetic drinking water criterion, but do not exceed the applicable health-based drinking water value provided in the following table:

Hazardous Substance	Chemical Abstract Service Number	Residential Health-Based Drinking Water Value (ug/L)	Industrial-Commercial Health-Based Drinking Water Value (ug/L)
Aluminum	7429905	300	4,100
tertiary Amyl methyl ether	994058	910	2,600
Copper	7440508	1,400	4,000
Diethyl ether	60297	3,700	10,000
Ethylbenzene	100414	700	700
Iron	7439896	2,000	5,600
Manganese	7439965	860	2,500
Methyl-tert-butyl ether (MTBE)	1634044	240	690
Toluene	108883	1,000	1,000
1,2,4-Trimethylbenzene	95636	1,000	2,900
1,3,5-Trimethylbenzene	108678	1,000	2,900
Xylenes	1330207	10,000	10,000

(F) Criterion is based on adverse impacts to plant life and phytotoxicity, the calculated FCV, the wildlife value (WV), and the surface water human non-drinking water value (HNDV). The soil GSI protection criteria for these hazardous substances are the greater of the 20 times the GSI criterion or the GSI soil-water partition values using the GSI criteria developed with the procedure described in this footnote. See table found in the March 25, 2011 footnotes for Part 201 Criteria and Part 213 Risk-Based Screening Levels.

Table A-8. Notes For Groundwater Analytical Data Tables, 2011 Annual Report, RACER Trust, Saginaw Malleable Iron Plant, Saginaw, Michigan

MDEQ Criteria Qualifiers (continued):

- (G) Groundwater surface water interface (GSI) criterion depends on the pH or water hardness, or both, of the receiving surface water. The final chronic value (FCV) for the protection of aquatic life shall be calculated based on the pH or hardness of the receiving surface water. Where water hardness exceeds 400 mg CaCO3/L, use 400 mg CaCO3/L for the FCV calculation. The FCV formula provides values in units of ug/L or ppb. The generic GSI criterion is the lesser of the calculated FCV, the wildlife value (WV), and the surface water human non-drinking water value (HNDV). The soil GSI protection criteria for these hazardous substances are the greater of the 20 times the GSI criterion or the GSI soil-water partition values using the GSI criteria developed with the procedure described in this footnote.
- (H) Valence-specific chromium data (Cr III and Cr VI) shall be compared to the corresponding valence-specific cleanup criteria. If both Cr III and Cr VI are present in groundwater, the total concentration of both cannot exceed the drinking water criterion of 100 ug/l. If analytical data are provided for total chromium only, they shall be compared to the cleanup criteria for Cr VI. Cr III soil cleanup criterion for protection of drinking water can only be used at sites where groundwater is prevented from being used as a public water supply, currently and in the future, through an approved land or resource use restriction.
- (I) Hazardous substance may exhibit the characteristic of ignitability as defined in 40 C.F.R. §261.21 (revised as of July 1, 2001),
- (J) Hazardous substance may be present in several isomer forms. Isomer-specific concentrations shall be added together for comparison to criteria. (K) Hazardous substance may be flammable or explosive, or both.
- (c) Criteria for lead are derived using a biologically based model, as allowed for under Section 20120a(10) of the NREPA, and are not calculated using the algorithms and assumptions specified in pathway-specific rules. The generic residential drinking water criterion of 4 ug/L is linked to the generic residential so direct contact criterion of 400 mg/kg. A higher concentration in the drinking water, up to the state action level of 15 ug/L, may be allowed as a site-specific remedy and still allow for drinking water use, under Section 20120a(2) of the NREPA if soil concentrations are appropriately lower than 400 mg/kg. If a site-specific criterion is approved based on this subdivision, a notice shall be filed on the deed for all property where the groundwater concentrations will exceed 4 ug/L to provide notice of the potential for unacceptable risk if soil or groundwater concentrations increase. Acceptable combinations of site-specific soil and drinking water concentrations are presented in the following table:

sceeptable combinations of Lead in Diffiking Water and Sol						
Drinking Water Concentration (ug/L)	Soil Concentration (mg/kg)					
5	386-395					
6	376-385					
7	376-385					
8	366-375					
9	356-365					
10	346-355					
11	336-345					
12	336-345					
13	326-335					
14	316-325					
15	306-315					

Acceptable Combinations of Lead in Drinking Water and Soil

- (M) Calculated criterion is below the analytical target detection limit, therefore, the criterion defaults to the target detection limit
- (P) Amenable cyanide methods or method OIA-1677 shall be used to quantify cyanide concentrations for compliance with all groundwater criteria. Total cyanide methods or method OIA-1677 shall be used to quantify cyanide concentrations for compliance with soil criteria. Industrialcommercial direct contact criteria may not be protective of the potential for release of hydrogen cyanide gas. Additional land or resource use restrictions may be necessary to protect for the acute inhalation concerns associated with hydrogen cyanide gas.
- (Q) Criteria for carcinogenic polycyclic aromatic hydrocarbons were developed using relative potential potencies to benzo(a)pyrene.
- (R) Hazardous substance may exhibit the characteristic of reactivity as defined in 40 C.F.R. §261.23 (revised as of July 1, 2001)
- (S) Criterion defaults to the hazardous substance-specific water solubility limit.
- (W) Concentrations of trihalomethanes in groundwater shall be added together to determine compliance with the Michigan drinking water standard of 80 ug/L. Concentrations of trihalomethanes in soil shall be added together to determine compliance with the drinking water protection criterion of 1,600 ug/kg.
- (X) The GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source. For a groundwater discharge to the Great Lakes and their connecting waters or discharge in close proximity to a water supply intake in inland surface waters, the generic GSI criterion shall be the surface water human drinking water value (HDV) listed in the table found in the March 25, 2011 footnotes for Part 201 Criteria and Part 213 Risk-Based Screening Levels, except for those HDV indicated with an asterisk. For HDV with an asterisk, the generic GSI criterion shall be the March 25, 2011 footnotes for Part 201 Criteria and Part 213 Risk-Based Screening Levels, except for those HDV, the WV, and the calculated FCV. See formulas in footnote (G) found in the March 25, 2011 footnotes for Part 201 Criteria and Part 213 Risk-Based Screening Levels. Soil protection criteria based on the HDV shall be as listed in the table in this footnote, except for those values with an asterisk. Soil GSI protection criteria based on the HDV shall be as listed in the table in the table in this footnote, except for those values with an asterisk. Soil GSI protection criteria for compounds with an asterisk shall be the greater of 20 times the GSI criterion or the GSI soil-water partition values using the GSI criteria developed with the procedure described in this footnote.
- {AA} = Comparison to these criteria may take into account an evaluation of whether the hazardous substances are adsorbed to particulates rather than dissolved in water and whether filtered groundwater samples were used to evaluate groundwater.
- {CC} = Groundwater: The generic GSI criteria are based on the toxicity of unionized ammonia (NH3); the criteria are 29 ug/L and 53 ug/L for cold water and warm water surface water, respectively. As a result, the GSI criterion shall be compared to the percent of the total ammonia concentration in the groundwater that will become NH3 in the surface water. This percent NH3 is a function of the pH and temperature of the receiving surface water and can be estimated using the following table, taken from Emerson, et al., (Journal of the Fisheries Research Board of Canada, Volume 32(12):2382, 1975).
- {EE} = Use the applicable generic GSI criteria as required by Section 20120a(15) of the NREPA found in the March 25, 2011 footnotes for Part 201 Criteria and Part 213 Risk-Based Screening Levels.

Appendix B

Green Point Landfill, Saginaw, Michigan

2011 Green Point Landfill Groundwater Sampling Data Tables

- Table B-1
 Monitoring Well Construction Summary
- Table B-2
 Site-Wide Water Level Measurements, September 27, 2011
- Table B-3Laboratory Analytical Plan
- Table B-4Field Parameters
- Table B-5
 Volatile Organic Compounds in Groundwater
- Table B-6
 Inorganic Constituents and Indicator Parameters in Groundwater
- Table B-7
 Notes for Groundwater Analytical Data Tables

Table B-1. Monitoring Well Construction Summary, 2011 Annual Report, RACER Trust, Green Point Landfill, Saginaw, Michigan

Well ID	Screen Interval (ft) ¹	Screened Unit/Zone	Well Construction	Date Installed	TIC ² Elevation (ft) ³
MW-117WT	3-13	Water table	2" PVC	5/3/1995	582.37
MW-117S1	24.2 - 29.2	Lower Sand	2" PVC	5/3/1995	583.7
MW-118WT	1.6 - 11.6	Water table	2" PVC	5/2/1995	582.98
MW-118S1	23.5 - 28.5	Lower Sand	2" PVC	5/2/1995	583.28
MW-183WT	6-46	Water table	2" PVC	7/24/2000	588.77
X-4AR	NA-8.3	Water table	2" PVC	NA	NA
X-4CAUGR	14-19	Upper Sand	2" PVC	7/24/2007	NA
X-4D	40-45	Lower Sand	2" PVC	7/23/2007	NA
X-9AR	3-13	Water table	2" PVC	6/2/1980	586.95
X-9BR	26-31	Upper Sand	2" PVC	6/2/1980	586.85
X-9CAUG	20-25	Upper Sand	2" PVC	6/2/1980	586.62
X-9D	42.5-47.5	Lower Sand	2" PVC	7/23/2007	NA
X-10BR	26.3-31.3	Lower Sand	2" PVC	11/6/2001	592.67
TWW-1	1.5-6.5	Water table	2" PVC	1/22/1997	587.31

Notes:

¹ Depths are in feet below ground surface (bgs). Note that the screened intervals of the MW-128 and X-1 well clusters have been adjusted due to the addition of riser to the wells during landfill capping.

 2 TIC = Top of inner casing.

³ Elevations are in feet above mean sea level (AMSL). NA = not applicable/not available.

Table B-2. Site-Wide Water Level Measurements, September 20, 2011, 2011 Annual Report, RACER Trust, Green Point Landfill, Saginaw, Michigan

Location	Reference Elevation (feet, AMSL)	Depth to Water (feet)	Groundwater Elevation (feet, AMSL)	Site Area GPL vs SMI
Sampled Monitoring Wells (C	Green Point Landfill)			
MW-117WT*	582.37	2.43	579.94	GPL
MW-117S1*	583.7	2.69	581.01	GPL
MW-118WT*	582.98	3.41	579.57	GPL
MW-118S1*	583.28	2.39	580.89	GPL
MW-183WT	588.77	10.58	578.19	GPL
X-4AR	NA	7.25	NA	GPL
X-4CAUGR	NA	7.60	NA	GPL
X-4D	INA ERC OF	3.64	NA 579	GPL
X-9AR	586.85	0.90	577.64	GPL
	586.62	9.21	577.03	GPL
X-90A00		4 73	NΔ	GPL
X-10BR	592.67	11.63	581.04	GPI
TWW-1	587.31	6.31	581	GPL
Sampled Monitoring Wells (S	Saginaw Malleable Iron	Plant Area)		0.1
MW-107WT	590.65	10.34	580.31	SMI
MW-107S1	590.74	12.67	578.07	SMI
MW-108WT	590 53	drv	drv	SMI
MW-108S1	590.24	12.19	578.05	SMI
MW-110WTR	591.52	13.97	577.55	SMI
MW-111WT	590.95	12.06	578.89	SMI
MW-114WT	591.12	10.71	580.41	SMI
MW-114S2	591.2	12.43	578.77	SMI
MW-149WT	592.27	14.09	578.18	SMI
MW-185WT	588.67	10.36	578.31	SMI
MW-186WT	NA	10.82	NA	SMI
Nearby Monitoring Wells				
B-3R	609.51	13.51	596	SMI
B-3BAUG	596.54	13.96	582.58	SMI
B-5BAUG	594.17	13.51	580.66	SMI
B-5CAUG	594.23	13.22	581.01	SMI
B-5R	594.54	7.99	586.55	SMI
B-7R	591.76	12.20	579.56	SMI
MW-103S1	595.75	12.74	583.01	SMI
MW-103S2	596.34	15.61	580.73	SMI
MW-103WT	591.21	14.98	576.23	SMI
MW-105S1	593.67	12.61	581.06	SMI
MW-105S2	593.27	12.22	581.05	SMI
NIV-105VV1	593.35	8.21	585.14	SIMI
MW-10852	590.20	9.36	581.62	SIVII
MW-10854	590.11	8.54	581.57	SMI
MW-108WT	590.53	drv	drv	SMI
MW-111S1	591.14	12.56	578.58	SMI
MW-111S2	591.5	12.75	578.75	SMI
MW-111S3	591.35	9.97	581.38	SMI
MW-111S4	591.66	9.94	581.72	SMI
MW-114S1	<u>591.1</u> 3	11.12	580.01	SMI
MW-114S3	591.02	9.28	581.74	SMI
MW-114S4	591.14	NA-NF	NA	SMI
MW-122WT	584.97	NA	NA	GPL
MW-122S1	584.97	4.74	580.23	GPL
MW-122S2	585.13	4.61	580.52	GPL
MVV-123W1	584.53	NA-NF	NA	GPL
IVIVV-124VV I	585.94	4./4	581.2	GPL
	586.00	5.07	501.34	GPL
1/1/2000 I	504.00		201.25 NA	GPL
MW/-12831	504.99	NA - WASPS		
MW-129WT	587 38	NA - WASPS		GPL
MW-131WT	507.50	7 48	585.08	SMI
MW-131S1	592.75	11 41	581.34	SMI
MW-131S2	592.39	11.08	581.31	SMI

See Notes on Page 2.

Table B-2. Site-Wide Water Level Measurements, September 20, 2011, 2011 Annual Report, RACER Trust, Green Point Landfill, Saginaw, Michigan

Location	Reference Elevation (feet, AMSL)	Depth to Water (feet)	Groundwater Elevation (feet, AMSL)	Site Area GPL vs SMI
Nearby Monitoring Wells (Cont.)			
MW-134WT	594.02	7.28	586.74	SMI
MW-137WT	595.91	6.06	589.85	SMI
MW-138WT	602.39	5.96	596.43	SMI
MW-140WT	595.9	10.88	585.02	SMI
MW-140S1	595.33	14.41	580.92	SMI
MW-143WT	596.52	NA	NA	SMI
MW-144WT	593.25	7.97	585.28	SMI
MW-147WT	592.07	3.90	588.17	SMI
MW-158WT	591.78	NA-NF	NA	SMI
MW-160WT	591.53	NA-NF	NA	SMI
MW-168WT	592.11	NA-NF	NA	SMI
MW-169WT	591.82	NA-NF	NA	SMI
MW-172WT	591.51	NA-NF	NA	SMI
MW-178WT	590.35	3.78	586.57	SMI
MW-180WT	590.67	NA-NF	NA	SMI
MW-2A	584.56	NA-NF	NA	GPL
MW-2B	584.56	NA-NF	NA	GPL
MW-2CAUG	585.15	NA-NF	NA	GPL
QPTW-01	591.95	4.30	587.65	SMI
QPTW-02	592.35	3.26	589.09	SMI
QPTW-03	592.13	NA-NF	NA	SMI
QPTW-04	592	5.22	586.78	SMI
QPTW-05	592.13	4.87	587.26	SMI
QPTW-10	592.15	NA-NF	NA	SMI
QPTW-13	592.36	NA-NF	NA	SMI
RG1	NA	NA-NF	NA	SMI
RW-1	NA	NA-NF	NA	SMI
RW-2	588.09	NA-NF	NA	SMI
RW-3	588.4	NA-NF	NA	SMI
SG1	NA	NA-NF	NA	SMI
TP-2	592.12	NA-NF	NA	SMI
TW-241	NA	5.84	NA	GPL
TW-242	NA	6.65	NA	GPL
X-10AR2	594.67	7.76	586.91	GPL
X-15AR	584.61	NA-NF	NA	GPL
X-15BR	585.13	NA-NF	NA	GPL
X-16A	587.44	4.95	582.49	GPL
X-16B	587.2	4.16	583.04	GPL
X-1A	597.72	12.25	585.47	GPL
X-1B	597.69	13.35	584.34	GPL
X-1CR2	598.41	12.41	586	GPL
X-2A	593.12	5.57	587.55	GPL

Notes:

SMI = Saginaw Malleable Iron Plant.

GPL = Green Point Landfill.

Elevations are shown in feet above mean sea level (AMSL) relative to the NGVD datum of 1929.

Monitoring wells in the MW-128 and X-1 well clusters were extended during landfill capping activities. Reference elevations shown above are from August 2000 when the wells were resurveyed.

NA = not available.

NF- not found.

* = Gauged at time of sampling due to very tall/dense vegetation (phragmites).

Table B-3. Laboratory Analytical Plan, 2011 Annual Report, RACER Trust, Green Point Landfill, Saginaw, Michigan

Well	Standard GPL Sampling List ¹	TCL VOCs	Ultra Low Flow ² Total TAL Metals
MW-117S1	Х		
MW-117WT	Х		
MW-118S1	Х		
MW-118WT	Х		
MW-183WT	Х		Х
X-10BR	Х		
X-4AR ³	X ³		X ³
X-4CAUGR	Х		Х
X-4D	Х		Х
X-9AR	Х		Х
X-9BR	Х		Х
X-9CAUG	Х		Х
X-9D	Х		Х
TWW-1		Х	

Notes:

¹TAL Dissolved Metals plus cyanide, and Indicator Parameters (pH, sulfide, chloride, total dissolved solids, nitrate, nitrite, and ammonia nitrogen). ²Ultra Low Flow sampling refers to the use of a purge and sampling rate of approximately 1 liter per hour, implemented to minimize sample turbidity. ³Monitoring well was dry, and a sample could not be collected.

Table B-4. Field Parameters, 2011 Annual Report, RACER Trust, Green Point Landfill, Saginaw, Michigan

	Date	Conductivity	Dissolved Oxygen	Oxidation Reduction Potential	На	Temperature	Turbidity
Well ID	Sampled	(mS/cm)	(mg/L)	(mV)	(SU)	(°C)	(NTUs)
MW-117S1	10/01/10	1.243	0.21	-82.5	8.14	13.15	1.3
MW-117S1	09/27/11	1.7	1.26	-82.3	6.89	15.7	0.8
MW-117WT	10/01/10	8.45	0.11	-90	8.45	16.51	0.9
MW-117WT	09/27/11	9.535	0.68	-103	6.60	13.39	1.1
MW-118S1	09/27/11	1.81	1.19	-91.9	7.02	17.6	0.3
MW-118WT	09/30/10	3.435	0.22	-104.2	7.27	14.89	1.8
MW-118WT	09/27/11	3.261	0.71	-92.8	6.43	17.13	0.3
MW-183WT	09/28/10	0.633	0.33	-119.6	7.45	13.01	3.5
MW-183WT	09/28/11	0.814	0.26	-128.1	7.73	13.82	1.2
TWW-1	09/29/10	3.924	1.15	-54.7	6.99	15.08	9.1
TWW-1	09/21/11	2.89	3.11	-7.1	6.87	18.42	1.2
X-4AR	DRY 2010 and 2011	NA	NA	NA	NA	NA	NA
X-4CAUGR	09/28/10	1.03	0.34	-79.8	7.11	12.29	1.1
X-4CAUGR	09/26/11	0.971	1.17	-97.1	6.96	17.25	1.2
X-4D	09/28/10	4.58	0.53	-146.7	7.41	13.45	1.3
X-4D	09/26/11	4.897	1.67	-105.7	7.62	15.94	0.0
X-9AR	09/29/10	0.815	0.24	-81.5	7.45	11.44	0.9
X-9AR	09/23/11	1.142	0.38	-114.8	7.09	11.63	0.0
X-9BR	09/28/10	1.215	0.10	-93.4	7.09	14.53	0.8
X-9BR	09/23/11	1.41	0.20	-113.8	7.13	11.29	0.0
X-9CAUG	09/28/10	0.995	0.29	-72.3	6.97	12.45	0.1
X-9CAUG	09/23/11	1.07	0.45	-116.9	7.03	12.79	0.0
X-9D	09/28/10	3.257	0.41	-93.2	7.31	12.54	0.1
X-9D	09/23/11	4.27	0.56	-113.8	7.44	11.73	0.0
X-10BR	09/29/10	2.446	0.20	-101.2	6.69	14.17	1.4
X-10BR	09/22/11	1.692	0.79	-88.1	6.87	13.25	4.8

Notes:

°C = Celsius.
mg/L = milligrams per liter.
mV = millivolts.
NTUs = Nephelometric Turbidity Units.
SU = Standard Units.
mS/cm = milliSiemens per centimeter.
NA = not applicable/not available.
Note that MW-188S1 was sampled on October 10, 2010 but the sampling log was not found.

Table B-5. Volatile Organic Compounds in Groundwater, 2011 Annual Report, RACER Trust, Green Point Landfill, Saginaw, Michigan

Location ID: Date Collected:	MDEQ (2011) GSI	Units	TWW-1 09/29/10	TWW-1 09/21/11
Volatile Organics				
1 1 1-Trichloroethane	89	ua/l	ND(71)	ND(77) [ND(77)]
1 1 2 2-Tetrachloroethane	78(X)	ug/L	ND(71)	ND(77) [ND(77)]
1 1 2-trichloro-1 2 2-trifluoroethane	32	ug/L	ND(71)	ND(77) [ND(77)]
1 1 2-Trichloroethane	330(X)	ua/l	ND(71)	ND(77) [ND(77)]
1 1-Dichloroethane	740	ug/L	ND(71)	ND(77) [ND(77)]
1 1-Dichloroethene	130	ua/l	ND(71)	ND(77) [ND(77)]
1 2 4-Trichlorobenzene	99(X)	ug/L	ND(360)	ND(77) [ND(77)]
1.2-Dibromo-3-chloropropane		ua/l	ND(71)	ND(150) [ND(150)]
1.2-Dibromoethane	5.7(X)	ua/L	ND(71)	ND(77) [ND(77)]
1.2-Dichlorobenzene	13	ua/L	ND(71)	ND(77) [ND(77)]
1.2-Dichloroethane	360(X)	ua/L	ND(71)	ND(77) [ND(77)]
1.2-Dichloropropane	230(X)	ua/L	ND(71)	ND(77) [ND(77)]
1.3-Dichlorobenzene	28	ua/L	ND(71)	ND(77) [ND(77)]
1.4-Dichlorobenzene	17	ua/L	ND(71)	ND(77) [ND(77)]
2-Butanone	2.200	ua/L	ND(1.800)	ND(770) [ND(770)]
2-Hexanone	ID	ua/L	ND(3.600)	ND(770) [ND(770)]
4-Methyl-2-pentanone	ID	ua/L	ND(3.600)	ND(770) [ND(770)]
Acetone	1.700	ua/L	ND(1.800)	ND(770) [ND(770)]
Benzene	200(X)	ua/L	ND(71)	ND(77) [ND(77)]
Bromodichloromethane	ID	ua/L	ND(71)	ND(77) [ND(77)]
Bromoform	ID	ua/L	ND(71)	ND(77) [ND(77)]
Bromomethane	35	ua/L	ND(71)	ND(77) [ND(77)]
Carbon Disulfide	ID	ua/L	ND(360)	ND(77) [ND(77)]
Carbon Tetrachloride	45(X)	ug/L	ND(71)	ND(77) [ND(77)]
Chlorobenzene	25	ug/L	ND(71)	ND(77) [ND(77)]
Chloroethane	1,100(X)	ug/L	ND(71)	ND(77) [ND(77)]
Chloroform	350	ug/L	ND(71)	ND(77) [ND(77)]
Chloromethane	ID	ug/L	ND(71)	ND(77) [ND(77)]
cis-1,2-Dichloroethene	620	ug/L	230	1,800 [1,800]
cis-1,3-Dichloropropene		ug/L	ND(71)	ND(77) [ND(77)]
Cyclohexane		ug/L	ND(71)	ND(77) [ND(77)]
Dibromochloromethane	ID	ug/L	ND(71)	ND(77) [ND(77)]
Dichlorodifluoromethane	ID	ug/L	ND(71)	ND(77) [ND(77)]
Ethylbenzene	18	ug/L	ND(71)	ND(77) [ND(77)]
Isopropylbenzene	28	ug/L	ND(360)	ND(77) [ND(77)]
Methyl acetate		ug/L	ND(710)	ND(770) [ND(770)]
Methyl cyclohexane		ug/L	ND(71)	ND(77) [ND(77)]
Methyl tert-butyl ether	7,100(X)	ug/L	ND(360)	ND(380) [ND(380)]
Methylene Chloride	1,500(X)	ug/L	ND(360)	ND(77) [ND(77)]
Styrene	80(X)	ug/L	ND(71)	ND(77) [ND(77)]
Tetrachloroethene	60(X)	ug/L	ND(71)	ND(77) [ND(77)]
Toluene	270	ug/L	ND(71)	ND(77) [ND(77)]
trans-1,2-Dichloroethene	1,500(X)	ug/L	ND(71)	19 [18]
trans-1,3-Dichloropropene		ug/L	ND(71)	ND(77) [ND(77)]
Trichloroethene	200(X)	ug/L	ND(71)	ND(77) [ND(77)]
Trichlorofluoromethane	NA	ug/L	ND(71)	ND(77) [ND(77)]
Vinyl Chloride	13(X)	ug/L	1,700	500 [540]
Total Xylenes	41	ug/L	ND(140)	ND(150) [ND(150)]

Table B-6. TAL Inorganic Constituents in Groundwater, 2011 Annual Report, RACER Trust, Green Point Landfill, Saginaw, Michigan

Location ID: Date Collected:	MDEQ (2011) GSI	Units	MW-117S1 10/01/10	MW-117S1 09/27/11	MW-117WT 10/01/10	MW-117WT 09/27/11	MW-118S1 10/01/10	MW-118S1 09/27/11	MW-118WT 09/30/10	MW-118WT 09/27/11	MW-183WT 09/28/10
Inorganics											
Arsenic	0.01	mg/L	NA	ND(0.00500) [0.00690]							
Barium	1.308(G)	mg/L	NA	0.0382 BJ [0.0377 BJ]							
Iron	NA	mg/L	NA	3.85 [3.63]							
Manganese	4.767(G,X)	mg/L	NA	0.252 [0.248]							
Mercury	0.0000013	mg/L	NA	ND(0.000200) [ND(0.000200)]							
Selenium	0.005	mg/L	NA	ND(0.00500) [ND(0.00500)]							
Sodium	NA	mg/L	NA	84.5 [86.8]							
Inorganics-Dissolved											
Arsenic (Dissolved)	0.01	mg/L	ND(0.005)	0.0016	ND(0.005)	0.0025	ND(0.005)	0.00058	ND(0.005)	0.0011	ND(0.005) [ND(0.005)]
Barium (Dissolved)	1.308(G)	mg/L	1.8 J	2	2.91 J	3.3	0.759 J	0.81	0.571 J	0.6	0.0368 BJ [0.037 BJ]
Cyanide (Dissolved)	0.0052	mg/L	ND(0.01)	NA	ND(0.01)	NA	ND(0.01)	NA	ND(0.01)	NA	ND(0.01) [ND(0.01)]
Iron (Dissolved)	NA	mg/L	8.98	9.5	119	130	6.57	6.7	16.9	16	3.06 [3.02]
Manganese (Dissolved)	4.767(G,X)	mg/L	0.307 J	0.33	4.36 J	4.7	0.395 J	0.41	0.448 J	0.47	0.243 [0.238]
Mercury (Dissolved)	0.0000013	mg/L	ND(0.0002)	ND(0.0002) [ND(0.0002)]							
Selenium (Dissolved)	0.005	mg/L	ND(0.005)	ND(0.005) [ND(0.005)]							
Sodium (Dissolved)	NA	mg/L	119	120	604	560	129	130	216	200	87.4 [85.6]

Location ID: Date Collected:	MDEQ (2011) GSI	Units	MW-183WT 09/28/11	X-4CAUGR 09/28/10	X-4CAUGR 09/26/11	X-4D 09/28/10	X-4D 09/26/11	X-9AR 09/29/10	X-9AR 09/23/11	X-9BR 09/28/10	X-9BR 09/23/11
Inorganics											
Arsenic	0.01	mg/L	0.00190 [0.00200]	ND(0.00500)	0.000740	ND(0.00500)	0.00110	ND(0.00500)	0.000400	ND(0.00500)	0.000650
Barium	1.308(G)	mg/L	0.0360 [0.0380]	0.132 J	0.140	0.0997 BJ	0.100	0.113 J	0.200	0.175 J	0.180
Iron	NA	mg/L	2.60 [2.60]	4.93	5.40	1.03	1.40	6.32	6.60	3.97	3.70
Manganese	4.767(G,X)	mg/L	0.240 [0.260]	0.559	0.620	0.265	0.190	0.380	0.770	0.893	0.960
Mercury	0.0000013	mg/L	ND(0.000200) [ND(0.000200)]	ND(0.000200)	ND(0.000200)	ND(0.000200)	ND(0.000200)	ND(0.000200)	0.000150 J	ND(0.000200)	0.000140 J
Selenium	0.005	mg/L	ND(0.00500) [ND(0.00500)]	ND(0.00500)	ND(0.00500)	ND(0.00500)	ND(0.00500)	ND(0.00500)	ND(0.00500)	ND(0.00500)	ND(0.00500)
Sodium	NA	mg/L	87.0 [93.0]	54.0	44.0	699	720	55.6	95.0	151	140
Inorganics-Dissolved											
Arsenic (Dissolved)	0.01	mg/L	0.002	ND(0.005)	0.00045	ND(0.005)	0.00094	ND(0.005)	ND(0.002)	ND(0.005)	0.00063
Barium (Dissolved)	1.308(G)	mg/L	0.039	0.129 J	0.13	0.0989 BJ	0.099	0.116 J	0.2	0.164 J	0.18
Cyanide (Dissolved)	0.0052	mg/L	NA	ND(0.01)	NA	ND(0.01)	NA	ND(0.01)	NA	ND(0.01)	NA
Iron (Dissolved)	NA	mg/L	2.6	5.18	5	0.979	1.3	6.58	6.6	4.06	3.7
Manganese (Dissolved)	4.767(G,X)	mg/L	0.25	0.571	0.59	0.275	0.18	0.388	0.75	0.848	0.96
Mercury (Dissolved)	0.0000013	mg/L	ND(0.0002)	ND(0.0002)	ND(0.0002)	ND(0.0002)	ND(0.0002)	ND(0.0002)	0.00014 J	ND(0.0002)	ND(0.0002)
Selenium (Dissolved)	0.005	mg/L	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Sodium (Dissolved)	NA	mg/L	94	52.3	41	708	700	56.4	91	145	140

Table B-6. TAL Inorganic Constituents in Groundwater, 2011 Annual Report, RACER Trust, Green Point Landfill, Saginaw, Michigan

Location ID:	MDEQ (2011)	Unite	X-9CAUG	X-9CAUG	X-9D	X-9D	X-10BR	X-10BR
Inorganics	001	Units	03/20/10	03/23/11	03/20/10	03/23/11	03/23/10	03/22/11
Arsenic	0.01	ma/L	ND(0.00500)	0.00150	ND(0.00500)	0.000640	NA	NA
Barium	1.308(G)	mg/L	0.193 J	0.110	0.0930 BJ	0.100	NA	NA
Iron	NA	mg/L	5.42	6.00	2.93	3.10	NA	NA
Manganese	4.767(G,X)	mg/L	0.760	0.350	0.132	0.130	NA	NA
Mercury	0.0000013	mg/L	ND(0.000200)	ND(0.000200)	ND(0.000200)	ND(0.000200)	NA	NA
Selenium	0.005	mg/L	ND(0.00500)	ND(0.00500)	ND(0.00500)	ND(0.00500)	NA	NA
Sodium	NA	mg/L	100	54.0	685	690	NA	NA
Inorganics-Dissolved								
Arsenic (Dissolved)	0.01	mg/L	ND(0.005)	0.0017	ND(0.005)	0.00063	0.0285	0.03
Barium (Dissolved)	1.308(G)	mg/L	0.194 J	0.12	0.0903 BJ	0.095	0.581 J	0.63
Cyanide (Dissolved)	0.0052	mg/L	ND(0.01)	NA	ND(0.01)	NA	ND(0.01)	NA
Iron (Dissolved)	NA	mg/L	5.79	6	2.67	2.9	31.7	35
Manganese (Dissolved)	4.767(G,X)	mg/L	0.801	0.35	0.125	0.12	0.751	0.75
Mercury (Dissolved)	0.0000013	mg/L	ND(0.0002)	0.00015 J	ND(0.0002)	ND(0.0002)	ND(0.0002)	ND(0.0002)
Selenium (Dissolved)	0.005	mg/L	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Sodium (Dissolved)	NA	mg/L	101	55	679	650	187	190

Table B-7. Indicator Parameters in Groundwater, 2011 Annual Report, RACER Trust, Green Point Landfill, Saginaw, Michigan

Location ID: Date Collected:	MDEQ (2011) GSI	Units	MW-117S1 10/01/10	MW-117S1 09/27/11	MW-117WT 10/01/10	MW-117WT 09/27/11	MW-118S1 10/01/10	MW-118S1 09/27/11	MW-118WT 09/30/10	MW-118WT 09/27/11	MW-183WT 09/28/10	MW-183WT 09/28/11	X-4CAUGR 09/28/10	X-4CAUGR 09/26/11
Miscellaneous														
Ammonia Nitrogen	(CC)	mg/L	6.5	8.4	64	71	6.7	7.9	34	38	0.8 J [0.8 J]	0.53 [0.55]	1.9 J	1.8
Chloride	(FF)	mg/L	319	270	5,210	4,300	362	290	932	730	76.6 [77.4]	63 [63]	123	99
Cyanide (total)	0.0052	mg/L	NA	ND(0.010)	NA	ND(0.010)	NA	ND(0.010)	NA	ND(0.010)	NA	ND(0.010) [ND(0.010)]	NA	ND(0.010)
Nitrate (as N)	ID	mg/L	ND(0.1)	ND(0.10)	ND(0.1)	ND(0.10)	ND(0.1)	ND(0.10)	ND(0.1)	ND(0.10)	ND(0.1) [ND(0.1)]	ND(0.10) [ND(0.10)]	ND(0.1)	ND(0.10)
Nitrite (as N)	NA	mg/L	ND(0.1)	ND(0.10)	ND(5 G)	ND(2.5)	ND(0.1)	ND(0.10)	ND(1 G)	ND(1.0)	ND(0.1) [ND(0.1)]	ND(0.10) [ND(0.10)]	ND(0.1)	ND(0.10)
рН	6.5 to 9.0	SU	7	7.14	6.5	6.57	7	7.19	6.8	6.94	7.4 [7.4]	7.52 [7.47]	7	7.24
Sulfate	NA	mg/L	ND(1)	ND(1.0)	ND(1)	0.38	ND(1)	ND(1.0)	10	5.2	ND(1) [ND(1)]	11 [11]	0.21 B	ND(1.0)
Total Dissolved Solids (TDS)	(EE)	mg/L	940	970	7,900	9,800	970	1,000	2,000	2,300	360 [370]	410 [430]	570	570

Location ID: Date Collected:	MDEQ (2011) GSI	Units	X-4D 09/28/10	X-4D 09/26/11	X-9AR 09/29/10	X-9AR 09/23/11	X-9BR 09/28/10	X-9BR 09/23/11	X-9CAUG 09/28/10	X-9CAUG 09/23/11	X-9D 09/28/10	X-9D 09/23/11	X-10BR 09/29/10	X-10BR 09/22/11
Miscellaneous														
Ammonia Nitrogen	(CC)	mg/L	6.8 J	9.7	0.6	4.3	2.9 J	6.7	4.4 J	0.55	7.4 J	8.6	4.8	6.0
Chloride	(FF)	mg/L	1,470	1,400	52.1	180	269	250	200	41	1,520	1,400	595	540
Cyanide (total)	0.0052	mg/L	NA	ND(0.010)	NA	ND(0.010)	NA	ND(0.010)	NA	ND(0.010)	NA	ND(0.010)	NA	ND(0.010)
Nitrate (as N)	ID	mg/L	0.13	ND(0.10)	ND(0.1)	ND(0.10)	ND(0.1)	ND(0.10)	0.034 B	ND(0.10)	ND(0.1)	ND(0.10)	ND(0.1)	ND(0.050)
Nitrite (as N)	NA	mg/L	ND(1 G)	ND(2.0)	ND(0.1)	ND(0.10)	ND(0.1)	ND(0.10)	ND(0.1)	ND(0.10)	ND(1 G)	ND(1.0)	ND(0.1)	ND(0.10)
рН	6.5 to 9.0	SU	7.4	7.47	7	7.45	7	7.50	7	7.52	7.3	7.73	6.7	6.85
Sulfate	NA	mg/L	122	150	0.31 B	ND(1.0)	ND(1)	ND(1.0)	0.26 B	0.31	220	220	ND(1)	0.36
Total Dissolved Solids (TDS)	(EE)	mg/L	2,500	2,800	700	750	880	900	750	690	2,400	2,700	1,400	1,500

Table B-8. Notes For Groundwater Analytical Data Tables, 2011 Annual Report, RACER Trust, Green Point Landfill, Saginaw, Michigan

General Notes:

Samples were collected by ARCADIS, and submitted to STL Laboratories in North Canton, Ohio for analysis.

- Duplicate results are presented in brackets.
- Groundwater concentrations are presented in milligrams per liter (mg/L), except where noted.
- Total PCBs reported as the sum of PCB Aroclors.
- * Monitoring well data compared to Groundwater/Surface water Interface (GSI) criteria for locations adjacent to the Saginaw
- River (MW-183WT, X-4A, X-4CAUGR, X-9AR, X-9BR, X-9CAUG, X-9D).
- The estimated unionized ammonia (NH₃) concentrations calculated for the monitoring wells located adjacent to the Saginaw River
- are based on the MDEQ default value of 7.2% of total ammonia nitrogen for warm water surface water.

Shaded cells represent constituent concentrations that exceed Groundwater/Surface Water (GSI) Michigan Part 201 Criteria updated March 25, 2011. Bolded values represent a detection.

Data Qualifiers:

ND = Not detected. The value in parentheses represents the associated detection limit.

NA = Not analyzed for this constituent.

- B = Inorganics: the detected analyte is and estimated value between the instrument detection limit and the reporting limit.
- B = Organics: the compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- BJ = The detected analyte is an estimated concentration between the IDL and the RL.
- U = The constituent was analyzed for but not detected. The associated value is the constituent quantitation limit.
- UJ = The constituent was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual result.
- D = Concentration is based on a diluted sample analysis.
- J = The compound/constituent was positively identified; however, the associated numerical value is an estimated concentration only.
- R = Indicates that the previously reported detection limit or sample result has been rejected due to a major deficiency in the data generation procedure. The data shall not be used for any qualitative or quantitative purposes.

MDEQ Criteria Qualifiers:

ID = Inadequate data to develop criterion.

- NA = Criterion or value is not available or, as is the case for Csat, not applicable.
- NLV = Hazardous substance is not likely to volatilize under most conditions.
 - (A) Criterion is the state of Michigan drinking water standard established pursuant to Section 5 of 1976 pa 399, mcl 325.1005.
 - (B) Background, as defined in R 299.5701(b), may be substituted if higher than the calculated cleanup criterion.
 - (C) Value presented is a screening level based on the chemical-specific generic soil saturation concentration since the calculated risk-based criterion is greater than Csat. Concentrations greater than Csat are acceptable cleanup criteria for this pathway where a site-specific demonstration indicates that free-phase material containing a hazardous substance is not present.
 - (D) Calculated criterion exceeds 100 percent, hence it is reduced to 100 percent or 1.0E+9 parts per billion (ppb).
 - (E) Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). A notice of aesthetic impact may be employed as an institutional control mechanism if groundwater concentrations exceed the aesthetic drinking water criterion, but do not exceed the applicable health-based drinking water value provided in the following table:

Usersideus Substance	Chemical Abstract Service	Residential Health-Based	Industrial-Commercial Health-Based Drinking
Hazardous Substance	Number	Drinking water value (ug/L)	water value (ug/L)
Aluminum	7429905	300	4,100
tertiary Amyl methyl ether	994058	910	2,600
Copper	7440508	1,400	4,000
Diethyl ether	60297	3,700	10,000
Ethylbenzene	100414	700	700
Iron	7439896	2,000	5,600
Manganese	7439965	860	2,500
Methyl-tert-butyl ether (MTBE)	1634044	240	690
Toluene	108883	1,000	1,000
1,2,4-Trimethylbenzene	95636	1,000	2,900
1,3,5-Trimethylbenzene	108678	1,000	2,900
Xylenes	1330207	10,000	10,000

(F) Criterion is based on adverse impacts to plant life and phytotoxicity, the calculated FCV, the wildlife value (WV), and the surface water human non-drinking water value (HNDV). The soil GSI protection criteria for these hazardous substances are the greater of the 20 times the GSI criterion or the GSI soil-water partition values using the GSI criteria developed with the procedure described in this footnote. See table found in the March 25, 2011 footnotes for Part 201 Criteria and Part 213 Risk-Based Screening Levels.

(G) Groundwater surface water interface (GSI) criterion depends on the pH or water hardness, or both, of the receiving surface water. The final chronic value (FCV) for the protection of aquatic life shall be calculated based on the pH or hardness of the receiving surface water. Where water hardness exceeds 400 mg CaCO3/L, use 400 mg CaCO3/L for the FCV calculation. The FCV formula provides values in units of ug/L or ppb. The generic GSI criterion is the lesser of the calculated FCV, the wildlife value (WV), and the surface water human non-drinking water value (HNDV). The soil GSI protection criteria for these hazardous substances are the greater of the 20 times the GSI criterion or the GSI soil-water partition values using the GSI criteria developed with the procedure described in this footnote.

(H) Valence-specific chromium data (Cr III and Cr VI) shall be compared to the corresponding valence-specific cleanup criteria. If both Cr III and Cr VI are present in groundwater, the total concentration of both cannot exceed the drinking water criterion of 100 ug/l. If analytical data are provided for total chromium only, they shall be compared to the cleanup criteria for Cr VI. Cr III soil cleanup criterion for protection of drinking water can only be used at sites where groundwater is prevented from being used as a public water supply, currently and in the future, through an approved land or resource use restriction.

Table B-8. Notes For Groundwater Analytical Data Tables, 2011 Annual Report, RACER Trust, Green Point Landfill, Saginaw, Michigan

MDEQ Criteria Qualifiers (continued):

- (I) Hazardous substance may exhibit the characteristic of ignitability as defined in 40 C.F.R. §261.21 (revised as of July 1, 2001),
- (J) Hazardous substance may be present in several isomer forms. Isomer-specific concentrations shall be added together for comparison to criteria.
- (K) Hazardous substance may be flammable or explosive, or both.
- (L) Criteria for lead are derived using a biologically based model, as allowed for under Section 20120a(10) of the NREPA, and are not calculated using the algorithms and assumptions specified in pathway-specific rules. The generic residential drinking water criterion of 4 ug/L is linked to the generic residential soil direct contact criterion of 400 mg/kg. A higher concentration in the drinking water, up to the state action level of 15 ug/L, may be allowed as a site-specific remedy and still allow for drinking water use, under Section 20120a(2) of the NREPA if soil concentrations are appropriately lower than 400 mg/kg. If a site-specific criterion is approved based on this subdivision, a notice shall be filed on the deed for all property where the groundwater concentrations will exceed 4 ug/L to provide notice of the potential for unacceptable risk if soil or groundwater concentrations increase. Acceptable combinations of site-specific soil and drinking water concentrations are presented in the following table:

Acceptable	Combinations	of Lead in	Drinking	Water and S	ioil
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Drinking Water Concentration (ug/L)	Soil Concentration (mg/kg)		
5	386-395		
6	376-385		
7	376-385		
8	366-375		
9	356-365		
10	346-355		
11	336-345		
12	336-345		
13	326-335		
14	316-325		
15	306-315		

(M) Calculated criterion is below the analytical target detection limit, therefore, the criterion defaults to the target detection limit.

- (P) Amenable cyanide methods or method OIA-1677 shall be used to quantify cyanide concentrations for compliance with all groundwater criteria. Total cyanide methods or method OIA-1677 shall be used to quantify cyanide concentrations for compliance with soil criteria. Industrialcommercial direct contact criteria may not be protective of the potential for release of hydrogen cyanide gas. Additional land or resource use restrictions may be necessary to protect for the acute inhalation concerns associated with hydrogen cyanide gas.
- (Q) Criteria for carcinogenic polycyclic aromatic hydrocarbons were developed using relative potential potencies to benzo(a)pyrene.
- (R) Hazardous substance may exhibit the characteristic of reactivity as defined in 40 C.F.R. §261.23 (revised as of July 1, 2001)
- (S) Criterion defaults to the hazardous substance-specific water solubility limit.
- (W) Concentrations of trihalomethanes in groundwater shall be added together to determine compliance with the Michigan drinking water standard of 80 ug/L. Concentrations of trihalomethanes in soil shall be added together to determine compliance with the drinking water protection criterion of 1,600 ug/kg.
- (X) The GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source. For a groundwater discharge to the Great Lakes and their connecting waters or discharge in close proximity to a water supply intake in inland surface waters, the generic GSI criterion shall be the surface water human drinking water value (HDV) listed in the table found in the March 25, 2011 footnotes for Part 201 Criteria and Part 213 Risk-Based Screening Levels, except for those HDV indicated with an asterisk. For HDV with an asterisk, the generic GSI criterion shall be the lowest of the HDV, the WV, and the calculated FCV. See formulas in footnote (G) found in the March 25, 2011 footnotes for Part 201 Criteria and Part 213 Risk-Based Screening Levels. Soil protection criteria based on the HDV shall be as listed in the table in this footnote, except for those values with an asterisk. Soil GSI protection criteria based on the HDV shall be as listed in the table in this footnote, except for those values with an asterisk. Soil GSI protection criteria for compounds with an asterisk shall be the greater of 20 times the GSI criterion or the GSI soil-water partition values using the GSI criteria developed with the procedure described in this footnote.
- {AA} = Comparison to these criteria may take into account an evaluation of whether the hazardous substances are adsorbed to particulates rather than dissolved in water and whether filtered groundwater samples were used to evaluate groundwater.
- {CC} = Groundwater: The generic GSI criteria are based on the toxicity of unionized ammonia (NH3); the criteria are 29 ug/L and 53 ug/L for cold water and warm water surface water, respectively. As a result, the GSI criterion shall be compared to the percent of the total ammonia concentration in the groundwater that will become NH3 in the surface water. This percent NH3 is a function of the pH and temperature of the receiving surface water and can be estimated using the following table, taken from Emerson, et al., (Journal of the Fisheries Research Board of Canada, Volume 32(12):2382, 1975).
- {EE} = Use the applicable generic GSI criteria as required by Section 20120a(15) of the NREPA found in the March 25, 2011 footnotes for Part 201 Criteria and Part 213 Risk-Based Screening Levels. partition values using the GSI criteria developed with the procedure described in this footnote.
- {FF} = The chloride GSI criterion shall be 125 mg/l when the discharge is to surface waters of the state designated as public water supply sources or 50 mg/l when the discharge is to the Great Lakes or connecting waters. Chloride GSI criteria shall not apply for surface waters of the state that are not designated as a public water supply source, however, the total dissolved solids criterion is applicable.