



January 4, 2017

Reference No. 058502

Mr. Nate Nemani
Corrective Action Project Manager
U.S. EPA, Region 5
Land and Chemicals Division
77 West Jackson Boulevard LU-9J
Chicago, IL 60604 3590

Dear Mr. Nemani:

**Re: 2016 CA 750 Environmental Indicator Annual Monitoring Results
EPA ID #MID 041 793 340
RACER Nodular Facility - Saginaw, Michigan**

This letter summarizes the CA 750 Environmental Indicators (EI) monitoring activities related to the Nodular Facility that is owned by RACER Properties, LLC, a wholly owned entity of Revitalizing Auto Communities Environmental Response Trust (RACER) in Saginaw, Michigan.

The annual CA 750 EI monitoring was completed on November 7th, 2016.

The additions proposed in the 2015 CA 750 EI Annual Monitoring Results recommendations dated February 10, 2016 were incorporated into the 2016 EI monitoring program. The removal of a parameter proposed in the 2015 CA 750 EI Annual Monitoring Results recommendations was not incorporated in to the 2016 EI monitoring program as no response was provided by United States EPA (U.S. EPA) on the recommendations.

In addition, GHD (formerly CRA) submitted a memorandum that discussed ammonia in groundwater at the Site on April 6, 2015 for your review and it was subsequently forwarded to MDEQ for review on April 8, 2015. This letter has been modified to incorporate the evaluation of the toxic fraction of ammonia (unionized ammonia) consistent with the evaluation included in the memorandum.

Figure 1 presents databoxes for all RACER EI locations, as well as additional monitoring well data collected in the area of the high pH and ammonia. The databoxes show all data up to and including the 2016 EI results. As indicated on Figure 1:

Groundwater/Surface Water/EI Wells (MW-03945, MW-04051, MW-04250R, MW-04257, and MW-04757)

- Unionized ammonia was calculated for each monitoring well utilizing the pH and temperature of each individual monitoring well and averaged with the Saginaw River pH and temperature. The calculated unionized ammonia results were compared to the warmwater unionized ammonia acute toxicity criterion of (420 micrograms per litre [$\mu\text{g/L}$]), which was the applicable criteria used in the mixing zone determination, dated January 12, 2010. The results were below applicable criteria and are summarized in Table 1.



- pH was reported above the lowest applicable screening criterion (the Non-Residential Drinking Water criterion of 8.5 S.U.) in one monitoring well, MW-04250R at 8.77 S.U.

Source Area Wells (MW-04836, MW-05036, MW-8, and MW-04040)

- Unionized ammonia was calculated for each monitoring well utilizing the pH and temperature of each individual monitoring well and averaged with the Saginaw River pH and temperature. The calculated unionized ammonia results were compared to the warmwater unionized ammonia acute toxicity criterion of (420 µg/L), which was the criteria used in the mixing zone determination, dated January 12, 2010. The results were below applicable criteria and are summarized in Table 1.
- pH was reported above the lowest applicable screening criterion (the Non-Residential Drinking Water criterion of 8.5 S.U.) in two monitoring wells, MW-8 at 10.74 S.U. and MW-05036 at 11.39 S.U.

In summary, the results of the 2016 EI monitoring results are generally consistent with the data evaluated in the RCRA CA725 & CA750 Environmental Indicators Supporting Documentation dated September 17, 2003.

Based on the results of the annual EI monitoring conducted in 2016, RACER proposes to remove the mercury analysis from MW-04250R since the last five annual rounds of sampling have been non-detect for mercury. The revised EI monitoring program for 2016 is summarized in Table 2.

Should you have any questions, please do not hesitate to call.

Yours truly,

GHD

A handwritten signature in blue ink, appearing to read 'Michael R. Tomka'.

Michael R. Tomka, P.E.

JEP/kf/33

Encl.

cc: Grant Trigger, RACER
Dave Favero, RACER

MW-04757	11/16/1998	7/18/2000	1/5/2003	1/25/2005	8/31/2006	9/12/2007	11/12/2008	12/2/2009	11/30/2010	11/1/2011	11/7/2012	7/16/2013	11/12/2013	11/14/2014	11/3/2015	11/7/2016
Ammonia	-	-	700	5.0 U	5 U	5 U	170	178	300	-	14000	1700 J/1100 J	200 U	220	300	280
Chromium	125 J	97.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium VI (hexavalent)	-	10 U	-	-	50 UJ	50 U	R	50 U	6 J	-	-	-	-	-	-	-
Cyanide (amenable)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	10 U	7	-	-	8 J	10 U	10	10 U	10 U	10 UJ	10 U	-	10 U	-	-	-
Un-ionized ammonia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-
Vanadium	54 J	36.3	-	10.0 U	10 U	10 U	10 U	-	-	-	-	-	-	-	-	5.5

MW-04257	1/29/2004	1/24/2005	9/12/2007	11/12/2008	12/3/2009	11/30/2010	11/2/2011	11/8/2012	7/16/2013	11/12/2013	11/14/2014	11/3/2015	11/8/2016
Ammonia	-	990	-	1170	1070	1200	820	340	-	630	350	620	380
Chromium	-	5.0 U	150	116 J	-	-	-	-	-	-	-	-	-
Chromium VI (hexavalent)	-	-	50 U	R	-	-	-	-	-	-	-	-	-
Cyanide (amenable)	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	6.90	7.25/6.79	7.27	7.13/7.15	6.97/6.64	7.2/6.84	7.0/6.88	6.79/6.97 J	7.22	7.30/7.35	7.32 J	6.96 J	7.06
Un-ionized ammonia	-	-	-	-	-	-	-	-	-	-	-	5	1.8
Vanadium	-	10.0 U	10 U	10 U	10.0 U	-	-	-	-	-	-	-	-

MW-04051	1/29/2004	1/21/2005	10/8/2005	9/14/2007	11/5/2008	12/3/2009	11/23/2010	11/1/2011	11/8/2012	7/16/2013	11/12/2013	11/14/2014	11/3/2015	11/8/2016
Ammonia	-	3450	-	6330	5170	5600	5300/5700	5800	4600	4400	5800	530	-	-
Chromium	-	5.0 U	-	5 U	-	-	-	-	-	-	-	-	-	-
Chromium VI (hexavalent)	-	-	50 UJ	50 UJ	8 J	200 U	9.7 J/4.7 J	100 U	-	-	-	-	-	-
Cyanide (amenable)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	-	-	4 J	10 U	R	10 U	10 UJ/10 UJ	10 U	10 U	10 U	10 U	-	-	-
Mercury	-	-	0.0007 J	0.001 U	R	0.0005 UJ	0.0005 UJ/0.0005 UJ	0.20 U	-	-	-	-	-	-
pH	7.48	6.53/6.91	6.69	7.30	6.76/6.98 J	6.83/6.05	6.72/7.6 J	6.58/6.8/6.8 J	6.88/6.89 J	6.85	7.03/6.94	7.13 J	6.60 J	6.71
Un-ionized ammonia	-	-	-	-	-	-	-	-	-	-	-	-	19	1.3
Vanadium	-	10.0 U	-	10 U	10 U	10.0 U	-	-	-	-	-	-	-	-

MW-03945	1/29/2004	1/21/2005	10/8/2005	9/14/2007	11/5/2008	12/3/2009	11/23/2010	11/1/2011	11/8/2012	7/16/2013	11/12/2013	11/14/2014	11/3/2015	11/8/2016
Ammonia	-	7700/7700	-	8880	7690/8040	7000/7200	6700	8800	9100	5100	7300	7600	7400	-
Chromium	-	5.0 U/5.0 U	-	5 U	-	-	-	-	-	-	-	-	-	-
Chromium VI (hexavalent)	-	-	50 UJ	50 UJ	8 J/8 J	200 U/200 U	3.4 J	200 U	-	-	-	-	-	-
Cyanide (amenable)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	-	-	6 J	2 J	R/R	10 U/10 U	10 UJ	10 U	10 U	10 U	10 U	-	-	-
Mercury	-	-	0.0008 J	0.001 U	R/R	0.0005 UJ/0.0005 UJ	0.0005 UJ	0.20 U	-	-	-	-	-	-
pH	7.31	6.32/6.82/6.87	6.57	7.22	6.69/6.87 J	6.69/6.64/6.59 J	6.69/6.9/6.9 J	6.57/6.7 J	6.70/6.63	6.68	6.93/6.7	7.01 J	6.63 J	6.56
Un-ionized ammonia	-	10.0 U/10.0 U	-	10 U	10 U	10.0 U/10.0 U	-	-	-	-	-	20	11.3	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MW-04250R	9/28/2005	10/7/2005	8/31/2006	9/13/2007	11/5/2008	12/17/2008	12/3/2009	11/23/2010	11/1/2011	11/8/2012	7/16/2013	11/12/2013	11/14/2014	11/3/2015	11/7/2016
Ammonia	-	-	2.2 J/2.2 J	5 U	5 U/5 U	4080	4330	9100	11/1/2011	4800/6800	-	5000/5200	2700 J/1600 J	2200/2400	2700/2900
Chromium	5.5	-	20 J/20 J	50 U	50 UJ/50 UJ	-	-	50 UJ	40 U	20 UJ	20 U/20 U	-	-	-	-
Chromium VI (hexavalent)	-	-	-	-	-	-	-	10 UJ	10 UJ	10 U/10 U	10 U/10 U	-	10 U/10 U	-	-
Cyanide (amenable)	-	-	-	-	-	-	-	10 U	10 U	10 U/10 U	10 U/10 U	-	10 U/10 U	-	-
Cyanide (total)	-	-	30 J/140 J	10 U	10 U/10 U	-	-	10 U	10 U	10 U/10 U	10 U/10 U	-	10 U/10 U	-	-
Mercury	-	-	0.004/10.004/43	0.0062	0.00477/0.00462	-	-	0.0027 J	0.00065 UJ	0.0024 J	0.20 U/0.20 U	0.20 U/0.20 U	0.20 U/0.20 U	0.20 U/0.20 U	0.20 U/0.20 U
pH	11.01 J	10.48	11.16/11.12	10.90	10.76/10.85 J	10.98	10.67/10.72 J	9.9 J/10.05	9.3 J/9.43	9.55 J/9.95/9.49 J	10.83	9.7/9.68 J/9.68 J	9.98 J/10.0 J	9.26 J/9.31 J	8.77
Un-ionized ammonia	-	-	-	-	-	-	-	-	-	-	-	-	-	122	60.3
Vanadium	13.7	-	6.8 J/6.1 J	10 U	10 U/10 U	-	10.0 U	-	-	-	-	-	-	-	-

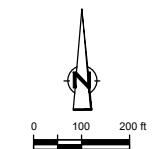
MW-04040	12/19/2002	2/5/2004	11/12/2014	11/3/2015	11/7/2016
Ammonia	480	600	610	460	710
Un-ionized ammonia	-	-	-	7	4.6

MW-04836	8/2/2000	12/14/2001	12/1/2002	1/29/2004	1/18/2005	10/7/2005	7/16/2013	11/13/2013	11/12/2014	11/3/2015	11/7/2016
Ammonia	2030	50	-	-	11000	35000	33000	51000	18000	-	-
pH	7.74	7.37	11.19	7.70	7.45	7.32	7.72	7.45/7.31 J	7.39 J	6.82 J	7.33
Un-ionized ammonia	-	-	-	-	-	-	-	-	161	47.8	-

MW-04835	12/17/2001	12/19/2002	1/29/2004	11/13/2013
Ammonia	-	-	900	-
pH	8.05	6.91	8.44	7.29/7.20 J

MW-8	3/7/1988	8/7/2000	12/14/2001	12/19/2002	1/14/2005	10/7/2005	7/15/2013	11/13/2013	11/12/2014	11/3/2015	11/7/2016
Ammonia	17000	19100	55700	33000	30300	-	17000	10000	10000	12000	3600
pH	10.2	10.98	11.06	11.19	11.01	10.13	11.35	10.7/10.7 J	10.3 J	9.81 J	10.74/10.6 J
Un-ionized ammonia	-	-	-	-	-	-	-	-	-	685	265.1

MW-05036	12/3/1998	8/2/2000	12/14/2001	1/29/2004	1/18/2005	10/7/2005	7/16/2013	11/13/2013	11/12/2014	11/3/2015	11/7/2016
Ammonia	6.76	10.49	2400	10.80	9.94	9.49	12.25	11.4 J/12.12	4900	4900	12000
pH	-	-	-	-	-	-	-	-	11.2 J	10.8 J	11.2 J/11.39
Un-ionized ammonia	-	-	-	-	-	-	-	-	-	647	82.0



LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- MONITORING WELL LOCATION
- (582.12) GROUNDWATER ELEVATION - NOVEMBER 2015
- 586 UPPER WATER BEARING ZONE GROUNDWATER CONTOUR - FT. AMSL (NAVD 88) - NOVEMBER 2015
- 420 UN-IONIZED AMMONIA CONTOUR

SAMPLE LOCATION

MW-04757	12/12/2005	9/12/2007
Mercury	-	-
Chromium Total	5.0 U	4.3 J
Chromium VI (hexavalent)	10.0 U	5.5 J
Vanadium	-	-
pH	9.00	1.150
Ammonia	-	3 J
Cyanide (total)	-	7.44
pH	-	-

RESULT (ug/L) EXCEPT pH WHICH IS IN S.U.

PARAMETER

EXCEEDS CRITERIA

MICHIGAN PART 201 CRITERIA

fraction	Parameter	Lowest Criteria (ug/L or s.u. for pH)	
METAL	Chromium (total)	100	A
METAL	Chromium (VI)	11	B
METAL	Mercury	0.0013	B
METAL	Vanadium	12	B
WET	Cyanide (total)	5.2	B
WET	Cyanide (amenable)	5.2	B
WET	pH	6.5 - 8.5	A
WET	Un-ionized Ammonia	420	B

Chromium (total) use Chromium III (Trivalent) criteria.
A: Non-Residential Drinking Water Criteria
B: GSI Criteria

- NOTES:**
- SEE TABLE 1 FOR HOW UNIONIZED AMMONIA WAS CALCULATED.
 - NOTE THAT THE GSI CRITERIA DEVELOPED FOR TOTAL CHROMIUM WAS DEVELOPED FROM THE FINAL CHRONIC VALUE CALCULATION FOR TRIVALENT CHROMIUM AS SPECIFIED IN THE MDEQ GUIDANCE. TOTAL CHROMIUM RESULTS WERE COMPARED TO TRIVALENT CHROMIUM CRITERIA SINCE EXTENSIVE SITE DATA SUPPORTS THAT THE MAJORITY OF THE TOTAL CHROMIUM IS TRIVALENT CHROMIUM. HEXAVALENT CHROMIUM IS STILL SAMPLED AT NUMEROUS LOCATIONS AND IS COMPARED TO HEXAVALENT CHROMIUM CRITERIA.
 - GROUNDWATER ELEVATION NOT USED IN DETERMINATION OF GROUNDWATER CONTOURS.

SCALE VERIFICATION

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

RACER NODULAR IRON INDUSTRIAL LAND
SAGINAW, MICHIGAN
SUMMARY OF EI LOCATIONS AND RESULTS (1998 - 2016)



Source Reference:

Project Manager:	Reviewed By:	Date:
M.T.	J.P.	DECEMBER 2016
Scale:	Project No.:	Report No.:
1" = 200'	58502-T01	NEMA033
		Drawing No.:
		figure 1

**Groundwater Ammonia FAV Compliance Worksheet
GSI Compliance Sampling Event of November 2016
Nodular Iron Industrial Land
Saginaw, Michigan**

GSI Compliance Point Number (WELL ID)	Measured Total NH ₃ (ug/L)	Groundwater Temperature (°C)	Groundwater pH	Saginaw River Temperature (°C) ⁴	Saginaw River pH ⁴	Average Temperature (°C) ¹	Average pH ²	% Unionized NH ₃ ³	Calculated Unionized NH ₃ (ug/L)
MW-04257	380	17.55	7.06	10.70	7.70	14.13	7.27	0.47%	1.8
MW-04051	530	17.48	6.71	10.70	7.70	14.09	6.97	0.24%	1.3
MW-03945	7400	14.26	6.56	10.70	7.70	12.48	6.83	0.15%	11.3
Other Wells									
MW-04250R	2800	15.76	8.77	10.70	7.70	13.23	7.97	2.15%	60.3
MW-04757	280	17.10	8.30	10.70	7.70	13.90	7.90	1.97%	5.5
MW-04836	18000	14.63	6.82	10.70	7.70	12.67	7.07	0.27%	47.8
MW-04040	710	13.40	7.33	10.70	7.70	12.05	7.48	0.65%	4.6
MW-8	11000	16.64	10.74	10.70	7.70	13.67	8.00	2.41%	265.1
MW-05036	3600	15.10	11.39	10.70	7.70	12.90	8.00	2.28%	82.0

Notes:

1. Temperature is the average of the groundwater temperature and the Saginaw river temperature
2. pH value for average of groundwater and Saginaw River H⁺ concentrations
3. Ammonia toxicity equations taken from Steven C. Chapra "Surface Water-Quality Modeling", McGraw-Hill Series in Water Resources and Environmental Engineering 1997
4. The Saginaw River temperature and pH were taken from the USGS Station 04157005 - Saginaw River at Holland Avenue, Saginaw MI (approximately 3.7 miles upstream)



Boxed Value indicates exceedance of FAV criterion of 420 ug/L.

**Revised EI Monitoring Program
Nodular Facility, Saginaw, Michigan**

IU	Location	Parameter	Monitoring Purpose	Propose to Eliminate from EI Monitoring	Comments
G	MW-04250/MW-04250R	mercury	GSI	Yes	Mercury did not exceed criteria for four consecutive rounds, therefore mercury is proposed to be removed from future EI monitoring
G	MW-04250/MW-04250R	pH	GSI	No	
G	MW-04250/MW-04250R	ammonia	GSI	No	
G	MW-04250/MW-04250R	temperature	GSI	No	
G	MW-04757	ammonia	GSI	No	
G	MW-04757	pH	GSI	No	
G	MW-04757	temperature	GSI	No	

Wells added in 2007 per EPA's email request dated August 8, 2007.

G	MW-03945	pH	GSI	No
G	MW-03945	ammonia	GSI	No
G	MW-03945	temperature	GSI	No
G	MW-04051	pH	GSI	No
G	MW-04051	ammonia	GSI	No
G	MW-04051	temperature	GSI	No
G	MW-04257	pH	GSI	No
G	MW-04257	ammonia	GSI	No
G	MW-04257	temperature	GSI	No

Wells added in 2013 per RACER's recommendation dated October 23, 2013

G	MW-04836	pH	GSI	No
G	MW-04836	ammonia	GSI	No
G	MW-04836	Temperature	GSI	No
G	MW-05036	pH	GSI	No
G	MW-05036	ammonia	GSI	No
G	MW-05036	Temperature	GSI	No
G	MW-8	pH	GSI	No
G	MW-8	ammonia	GSI	No
G	MW-8	Temperature	GSI	No

Well to be added to the the 2014 monitoring program

G	MW-04040	ammonia	GSI	No
G	MW-04040	pH	GSI	No
G	MW-04040	temperature	GSI	No

Sampling Location to be added to the 2016 monitoring program

G	Saginaw River (next to MW-03945)	pH	GSI	No
G	Saginaw River (next to MW-03945)	temperature	GSI	No

Notes:

- Table updated to remove select parameters based on 4 consecutive rounds below criteria.
- Wells evaluated using most recent groundwater data compared to appropriate EI criteria.
- Since 2005 all samples for metals analyses have been collected using low flow sampling techniques and were unfiltered.
- GSI = Selected to monitor stability based on exceedances of groundwater surface water interface criteria in most recent samples.