Pescador, LLC

May 10, 2010

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ENGINEERING DEPT.
CITY OF
TRAVERSE CITY

Mr. Brian F. Bartoszek
Integrys Business Support, LLC
700 North Adams Street
P.O. Box 19001
Green Bay, Wisconsin 54307-9001

RE: Groundwater Monitoring Report
Michigan Gas Utilities - Traverse City Site
Pescador Project Number: 751

Dear Mr. Bartoszek:

On October 13, 2009, Pescador, LLC, completed the groundwater monitoring at the Michigan Gas Utilities Corporation Manufactured Gas Plant facility located at 301 West Grandview Parkway, Traverse City, Michigan. Monitoring was completed at MW-A, MW-B, MW-8d, MW-8s, MW-9, MW-11, MW-12R, and Staff-1.

Prior to sample collection, static water levels were measured at select monitoring wells and the surface water monitoring point. Table 1 summarizes the calculated groundwater and surface water elevations. Figure 1 illustrates the groundwater flow, which is consistent with previous monitoring events.

Pursuant to Michigan Department of Environmental Quality (MDEQ) Operational Memorandum Number 2, monitoring wells were sampled using low-flow sampling procedures. Following sample collection, groundwater and surface water samples were submitted to Brighton Analytical, LLC for analysis of select volatiles, total metals, polynuclear aromatic hydrocarbons, available cyanide, and/or total hardness. The selection of analytical parameters for each sampling point is based upon previous detections of the constituents of concern. Table 1 summarizes recent and historic analytical results for each monitoring location and illustrates exceedences of applicable criteria. Additional table footnotes are contained in Attachment A.

In accordance with MDEQ Rule 57, surface water hardness concentrations and pH values have been used to calculate site-specific GSI criteria values for the appropriate compounds. Attachment B summarizes the GSI criteria calculations.

The laboratory analytical results for the October 13, 2009 sampling event indicate that concentrations of compounds detected in the groundwater at MW-12R exceeded the applicable criteria. The following summarizes these exceedences:

- MW-12R: Available cyanide (6 μg/L).

Pescador, LLC
36 Highview Road
Traverse City, MI 49686
231-932-9880 • Fax 231-933-8812

The historical analytical results provided in Table 1 indicate that sporadic detections of contaminants exceeding the applicable criteria have been encountered in the aforementioned wells during previous monitoring events. Consequently, regularly scheduled semiannual sampling will continue. The next monitoring event has been tentatively scheduled for ~~May~~ Oct. 2010. ?

Should you have any questions, comments, or require additional information, please contact us at your convenience.

Sincerely,

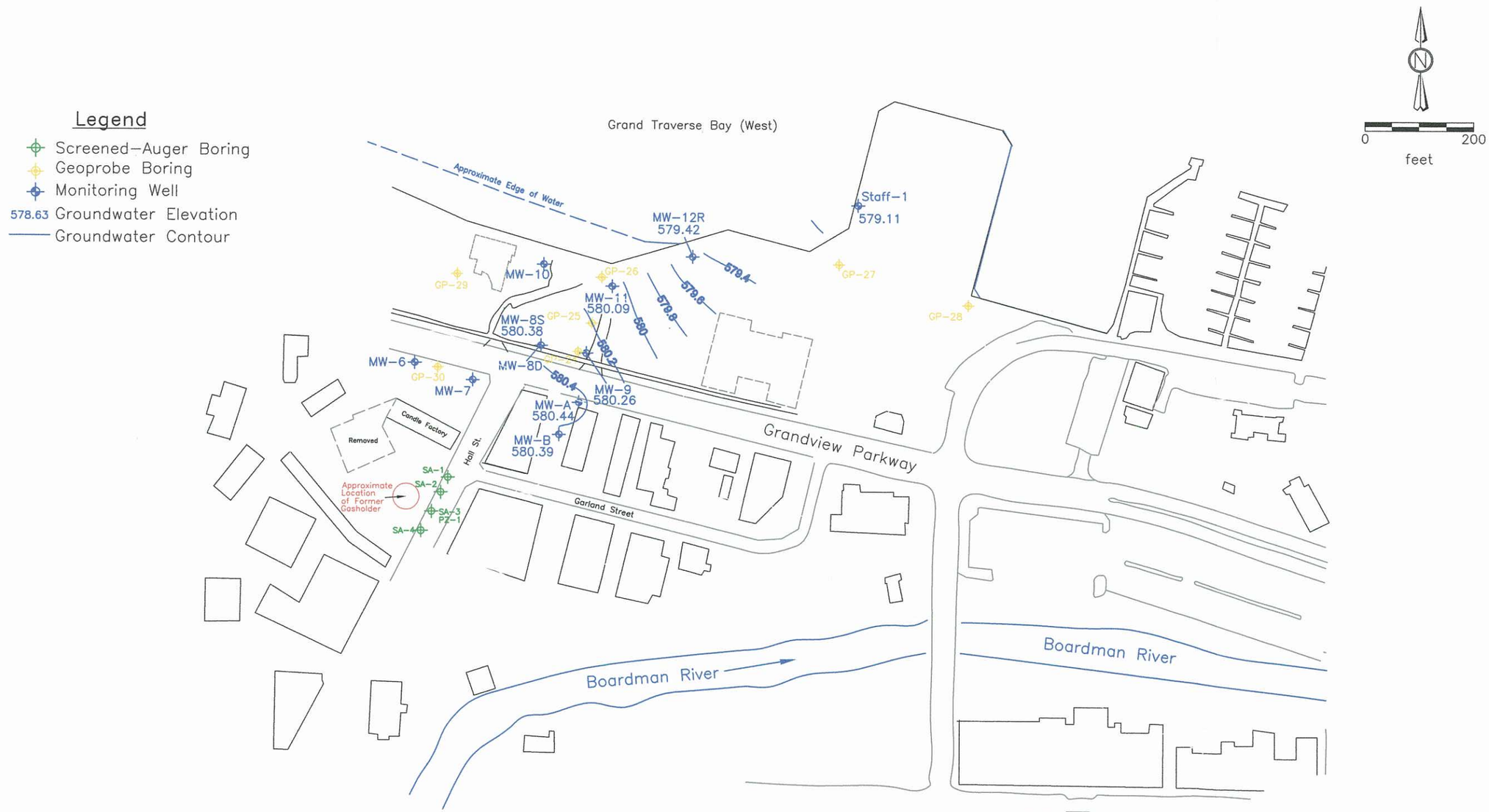
PESCADOR, LLC

Daniel M. Staub QC/CP
Project Manager

DMS/jpi/ajm

Attachments

Cc/enc: Ms. Amy Rivest, DNRE
Mr. Ed Montague, City of Traverse City
Mr. David Chryst, CTM Associates
Mr. Joe Kultenbach, Traverse City Light & Power



Pescador, LLC

36 Highview Road
Traverse City, Michigan
231–932–9880

Project: Traverse City

FILE: TRAVGGWF1009

Figure 1

GROUNDWATER FLOW–OCTOBER 13, 2009
Michigan Gas Utilities–Traverse City MGP
301 W. Grandview Parkway
Traverse City, Michigan

Table 1
Michigan Gas Utilities - Traverse City
Groundwater and Surface Water Elevations and Analytical Results
Pescador, LLC

Sample Location	Sample Date	Groundwater/Surface Water Elevation (feet above mean sea level)	Benzene {I}	Toluene {I}	Ethylbenzene {I}	Xylenes {I}	Methyl-tertiary-butyl-ether	1,2,4-Trimethylbenzene {I}	1,3,5-Trimethylbenzene {I}	Cyanide (Total) {P,R}	Cyanide (Amenable)	Cyanide (Available)	Arsenic (Total)	Barium (Total) {B} *	Cadmium (Total) {B} *	Chromium (Total) {B,H} *	Copper (Total) {B} *	Lead (Total) {B} *	Mercury (Total) {B,Z}	Selenium (Total) {B}	Silver (Total) {B}	Zinc (Total) {B} *	Hardness (as calcium carbonate)
GSI Monitoring Points			Volatiles (µg/L)							Cyanides (µg/L)			Metals (µg/L)										(mg/L)
MW-11	4/24/2001					ND						15											
MW-11	8/30/2001	573.90				ND						8											
MW-11	12/10/2001	579.02	ND	ND	ND	ND	ND	ND	ND			5											
MW-11	2/28/2002	579.05	ND	ND	ND	ND	ND	ND	ND			2											
MW-11	5/1/2002	579.39	ND	ND	ND	ND	ND	ND	ND			5											
MW-11	8/1/2002	579.68	ND	ND	ND	ND	ND	ND	ND			18											
MW-11	11/1/2002	579.02	ND	ND	ND	ND	ND	ND	ND			3											
MW-11	3/19/2003	578.40	ND	ND	ND	ND	ND	ND	ND			7											
MW-11	5/21/2003	578.75	ND	ND	ND	ND	ND	ND	ND			2											
MW-11	8/19/2003	578.86	ND	ND	ND	ND	ND	ND	ND			9											
MW-11	11/10/2003	578.57	ND	ND	ND	ND	ND	ND	ND			2											
MW-11	4/19/2004	579.05										7											
MW-11	10/26/2004	579.43										5											
MW-11	10/3/2005	579.12										ND											
MW-11	4/19/2006	579.00										ND											
MW-11	10/26/2006	579.27										ND											
MW-11	5/8/2007	579.12										11											
MW-11	10/12/2007	578.77										ND											
MW-11	4/17/2008	579.13										5											
MW-11	9/30/2008	579.37										4											
MW-11	5/5/2009	580.05										4											
MW-11	10/13/2009	580.09										<2											
MW-12	4/24/2001					ND						17											
MW-12	8/30/2001	578.63				ND						8											
MW-12	12/10/2001	578.68	ND	ND	ND	ND	ND	ND	ND			8											
MW-12	2/28/2002	578.42	ND	ND	ND	ND	ND	ND	ND			4											
MW-12	5/1/2002	578.91	ND	ND	ND	ND	ND	ND	ND			5											
MW-12	8/1/2002	579.53	ND	ND	ND	ND	ND	ND	ND			28											
MW-12	11/1/2002	578.61	ND	ND	ND	ND	ND	ND	ND			8											
MW-12	3/19/2003	577.75	ND	ND	ND	ND	ND	ND	ND			9											
MW-12	5/21/2003	578.27	ND	ND	ND	ND	ND	ND	ND			4											
MW-12	8/19/2003	578.57	ND	ND	ND	ND	ND	ND	ND			14											
MW-12	11/10/2003	578.01	ND	ND	ND	ND	ND	ND	ND			10											
MW-12	4/19/2004	578.61										3											
MW-12	10/26/2004	578.94										12											
MW-12R	10/13/2009	579.42										6											
Staff-1	8/30/2001	578.47																					140
Staff-1	12/10/2001	578.41																					140
Staff-1	2/28/2002	577.55																					130
Staff-1	5/1/2002	578.48																					130
Staff-1	8/1/2002	579.41																					130
Staff-1	11/1/2002	577.97																					640
Staff-1	3/19/2003	576.83																					45
Staff-1	5/21/2003	577.96																					140
Staff-1	8/19/2003	578.34																					130
Staff-1	11/10/2003	577.41																					130
Staff-1	10/26/2004	578.38																					130
Staff-1	4/8/2005	572.63																					120
Staff-1	10/3/2005	578.41																					130
Staff-1	4/19/2006	578.29																					81
Staff-1	10/26/2006	578.08																					85
Staff-1	5/8/2007	578.49																					86
Staff-1	10/12/2007	577.76																					160
Staff-1	4/17/2008	577.88																					83
Staff-1	9/30/2008	578.62																					120
Staff-1	5/5/2009	579.18																					91
Staff-1	10/13/2009	579.11																					100
Residential Drinking Water Criteria			5 {A}	790 {E}	74 {E}	280 {E}	40 {E}	63 {E}	72 {E}	-	200 {A}	200 {A}	10 {A}	2000 {A}	5.0 {A}	100 {A}	1000 {E}	4.0 {L}	2.0 {A}	50 {A}	34	2400	-
GSI Criteria			200 {X}	140	18	35	730 {X}	17	45	-	5.2	5.2	150 {X}	440 {G}	2.2 {G}	74 {G}	9.0 {G}	10 {G}	1.30E-03	5.0	0.2 {M}	120 {G}	-

Indicates value exceeds Part 201 Residential Drinking Water criteria.
Indicates value exceeds GSI criteria at a GSI monitoring point.
Indicates value exceeds more than one criteria.

* GSI criteria is dependant on site-specific surface water hardness value and pH (for pentachlorophenol). Refer to Attachment B for calculations.
** Compound not listed in Part 201 Criteria.
*** Sample was collected prior to the development of GSI Criteria using Method OIA 1677 for Available Cyanide.
Part 201 Criteria effective January 23, 2006.
\- Indicates not applicable.
Refer to Attachment A for additional Part 201 Criteria Footnote definitions.

Table 1
Michigan Gas Utilities - Traverse City
Groundwater and Surface Water Elevations and Analytical Results
Pescador, LLC

Sample Location	Sample Date	Groundwater/Surface Water Elevation (feet above mean sea level)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene {Q}	Benzo(a)pyrene {Q}	Benzo(b)fluoranthene {Q}	Benzo(g,h,i)perylene	Benzo(k)fluoranthene {Q}	2-Chloronaphthalene	Chrysene {Q}	Dibenzo(a,h)anthracene {Q}	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene {Q}	2-Methlynaphthalene	Naphthalene	Phenanthrene	Pyrene
GSI Monitoring Points			PNAs (µg/L)																	
MW-11	4/24/2001		ND											ND	ND			ND	ND	
MW-11	8/30/2001	573.90	ND											ND	ND			ND	ND	
MW-11	12/10/2001	579.02	ND											ND	ND		ND	ND	ND	
MW-11	2/28/2002	579.05	ND											ND	ND		ND	ND	ND	
MW-11	5/1/2002	579.39	ND											ND	ND		ND	ND	ND	
MW-11	8/1/2002	579.68	ND											ND	ND		ND	ND	ND	
MW-11	11/1/2002	579.02	ND											ND	ND		ND	ND	ND	
MW-11	3/19/2003	578.40	ND											ND	ND		ND	ND	ND	
MW-11	5/21/2003	578.75	ND											ND	ND		ND	ND	ND	
MW-11	8/19/2003	578.86	ND											ND	ND		ND	ND	ND	
MW-11	11/10/2003	578.57	ND											ND	ND		ND	ND	ND	
MW-11	4/19/2004	579.05																		
MW-11	10/26/2004	579.43																		
MW-11	10/3/2005	579.12																		
MW-11	4/19/2006	579.00																		
MW-11	10/26/2006	579.27																		
MW-11	5/8/2007	579.12																		
MW-11	10/12/2007	578.77																		
MW-11	4/17/2008	579.13																		
MW-11	9/30/2008	579.37																		
MW-11	5/5/2009	580.05																		
MW-11	10/13/2009	580.09																		
MW-12	4/24/2001		ND											ND	ND			ND	ND	
MW-12	8/30/2001	578.63	ND											ND	ND			ND	ND	
MW-12	12/10/2001	578.68	ND											ND	ND		ND	ND	ND	
MW-12	2/28/2002	578.42	ND											ND	ND		ND	ND	ND	
MW-12	5/1/2002	578.91	ND											ND	ND		ND	ND	ND	
MW-12	8/1/2002	579.53	ND											ND	ND		ND	ND	ND	
MW-12	11/1/2002	578.61	ND											ND	ND		ND	ND	ND	
MW-12	3/19/2003	577.75	ND											ND	ND		ND	ND	ND	
MW-12	5/21/2003	578.27	ND											ND	ND		ND	ND	ND	
MW-12	8/19/2003	578.57	ND											ND	ND		ND	ND	ND	
MW-12	11/10/2003	578.01	ND											ND	ND		ND	ND	ND	
MW-12	4/19/2004	578.61																		
MW-12	10/26/2004	578.94																		
MW-12R	10/13/2009	579.42																		
Staff-1	8/30/2001	578.47																		
Staff-1	12/10/2001	578.41																		
Staff-1	2/28/2002	577.55																		
Staff-1	5/1/2002	578.48																		
Staff-1	8/1/2002	579.41																		
Staff-1	11/1/2002	577.97																		
Staff-1	3/19/2003	576.83																		
Staff-1	5/21/2003	577.96																		
Staff-1	8/19/2003	578.34																		
Staff-1	11/10/2003	577.41																		
Staff-1	10/26/2004	578.38																		
Staff-1	4/8/2005	572.63																		
Staff-1	10/3/2005	578.41																		
Staff-1	4/19/2006	578.29																		
Staff-1	10/26/2006	578.08																		
Staff-1	5/8/2007	578.49																		
Staff-1	10/12/2007	577.76																		
Staff-1	4/17/2008	577.88																		
Staff-1	9/30/2008	578.62																		
Staff-1	5/5/2009	579.18																		
Staff-1	10/13/2009	579.11																		
Residential Drinking Water Criteria			1300	52	43 {S}	2.1	5.0 {A}	1.5{S,AA	1.0 {M}	1.0 {M}	1800	1.6 {S}	2.0 {M}	210 {S}	880	2.0 {M}	260	520	52	140 {S}
GSI Criteria			19	ID	ID	ID	ID	ID	NA	NA	NA	ID	ID	1.6	12	ID	ID	13	2.4	ID

Sample Location	Sample Date	4-Chloro-3-methylphenol	2-Chlorophenol	2,4-Dichlorophenol	2,6-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2-Methyl-4,6-dinitrophenol	2-Methylphenol {J}	3&4-Methylphenol {J}	2-Nitrophenol	4-Nitrophenol	Pentachlorophenol *	Phenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol
GSI Monitoring Points		Phenols (µg/L)														
MW-11	4/24/2001															
MW-11	8/30/2001															
MW-11	12/10/2001															
MW-11	2/28/2002															
MW-11	5/1/2002															
MW-11	8/1/2002															
MW-11	11/1/2002															
MW-11	3/19/2003															
MW-11	5/21/2003															
MW-11	8/19/2003															
MW-11	11/10/2003															
MW-11	4/19/2004															
MW-11	10/26/2004															
MW-11	10/3/2005															
MW-11	4/19/2006															
MW-11	10/26/2006															
MW-11	5/8/2007															
MW-11	10/12/2007															
MW-11	4/17/2008															
MW-11	9/30/2008															
MW-11	5/5/2009															
MW-11	10/13/2009															
MW-12	4/24/2001															
MW-12	8/30/2001															
MW-12	12/10/2001															
MW-12	2/28/2002															
MW-12	5/1/2002															
MW-12	8/1/2002															
MW-12	11/1/2002															
MW-12	3/19/2003															
MW-12	5/21/2003															
MW-12	8/19/2003															
MW-12	11/10/2003															
MW-12	4/19/2004															
MW-12	10/26/2004															
MW-12R	10/13/2009															
Staff-1	8/30/2001															
Staff-1	12/10/2001															
Staff-1	2/28/2002															
Staff-1	5/1/2002															
Staff-1	8/1/2002															
Staff-1	11/1/2002															
Staff-1	3/19/2003															
Staff-1	5/21/2003															
Staff-1	8/19/2003															
Staff-1	11/10/2003															
Staff-1	10/26/2004															
Staff-1	4/8/2005															
Staff-1	10/3/2005															
Staff-1	4/19/2006															
Staff-1	10/26/2006															
Staff-1	5/8/2007															
Staff-1	10/12/2007															
Staff-1	4/17/2008															
Staff-1	9/30/2008															
Staff-1	5/5/2009															
Staff-1	10/13/2009															
Residential Drinking Water Criteria		150	45	73	**	370	**	20{M}	370		20	**	1.0{A}	4400	730	120
GSI Criteria		7.4	22	19	**	380	**	NA	71	71	ID	**	1.8 {G}	210	NA	4.4

Indicates value exceeds Part 201 Residential Drinking Water criteria.
Indicates value exceeds GSI criteria at a GSI monitoring point.
Indicates value exceeds more than one criteria.

* GSI criteria is dependant on site-specific surface water hardness value and pH (for pentachlorophenol). Refer to Attachment B for calculations.
** Compound not listed in Part 201 Criteria.
*** Sample was collected prior to the development of GSI Criteria using Method OIA 1677 for Available Cyanide.
Part 201 Criteria effective January 23, 2006.
\- Indicates not applicable.
Refer to Attachment A for additional Part 201 Criteria Footnote definitions.

Table 1
Michigan Gas Utilities - Traverse City
Groundwater and Surface Water Elevations and Analytical Results
Pescador, LLC

Sample Location	Sample Date	Groundwater/Surface Water Elevation (feet above mean sea level)	Benzene {I}	Toluene {I}	Ethylbenzene {I}	Xylenes {I}	Methyl-tertiary-butyl-ether	1,2,4-Trimethylbenzene {I}	1,3,5-Trimethylbenzene {I}	Cyanide (Total) {P,R}	Cyanide (Amenable)	Cyanide (Available)	Arsenic (Total)	Barium (Total) {B} *	Cadmium (Total) {B} *	Chromium (Total) {B,H} *	Copper (Total) {B} *	Lead (Total) {B} *	Mercury (Total) {B,Z}	Selenium (Total) {B}	Silver (Total) {B}	Zinc (Total) {B} *	Hardness (as calcium carbonate)
Non-GSI Monitoring Points			Volatiles (µg/L)							Cyanides (µg/L)			Metals (µg/L)										(mg/L)
MW-3d	4/25/2000									ND		ND											
MW-3d	4/25/2000									ND		ND											
MW-3s	-																						
MW-6	8/25/1997		ND	ND	ND	ND																	
MW-6	9/4/1997												ND	ND	0.2	ND	3	ND	ND	ND	ND	166	
MW-6	9/10/1997									500 ***	20 ***												
MW-7	8/25/1997	582.56	ND	ND	ND	ND	ND						1	200	0.4	ND	1	ND	ND	ND	0.6	52	
MW-7	5/1/2002	580.59	ND	ND	ND	ND	ND	ND	ND			17	ND	ND	ND	ND	ND	ND	ND	ND	ND	20	
MW-7	8/1/2002	581.35	ND	ND	ND	ND	ND	ND	ND			55	1	ND	ND	ND	ND	ND	ND	6	ND	20	
MW-8s	1/15/1998		ND	ND	ND	ND	ND			30 ***	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	33	
MW-8s	5/2/1998									99 ***													
MW-8s	6/24/1998									150 ***													
MW-8s	6/24/1998									220 ***													
MW-8s	6/24/1998									140 ***	30 ***												
MW-8s	4/25/2000									ND		ND											
MW-8s	4/25/2000									ND		ND											
MW-8s	5/11/2001		ND	ND	ND	ND						ND	1	ND	ND	ND	ND	ND	ND	ND	ND	20	400
MW-8s	8/30/2001	579.58	ND	ND	ND	ND						ND	1	ND	0.6	ND	ND	ND	ND	ND	ND	20	
MW-8s	12/10/2001	579.66	ND	ND	ND	ND	ND	ND	ND			3	ND	ND	ND	ND	7	ND	ND	ND	ND	ND	
MW-8s	2/28/2002	579.87	ND	ND	ND	ND	ND	ND	ND			ND	ND	ND	0.2	ND	ND	ND	ND	ND	ND	ND	
MW-8s	5/1/2002	580.11	ND	ND	ND	ND	ND	ND	ND			2	1	ND	0.7	ND	ND	ND	ND	ND	ND	20	
MW-8s	8/1/2002	580.11	ND	ND	ND	ND	ND	ND	ND			11	2	110	ND	ND	ND	ND	ND	7	ND	30	
MW-8s	11/1/2002	579.57	ND	ND	ND	ND	ND	ND	ND			15	ND	110	ND	ND	6	4	ND	ND	ND	10	
MW-8s	3/19/2003	579.20	ND	ND	ND	ND	ND	ND	ND			5	ND	130	ND	ND	ND	6	ND	ND	ND	10	
MW-8s	5/21/2003	579.45	ND	ND	ND	ND	ND	ND	ND			5	ND	170	ND	ND	ND	ND	ND	ND	ND	ND	
MW-8s	8/19/2003	579.44	ND	ND	ND	ND	ND	ND	ND			ND	ND	ND	ND	ND	8	ND	ND	ND	ND	ND	
MW-8s	11/10/2003	579.39	ND	ND	ND	ND	ND	ND	ND			12	ND	110	ND	ND	ND	ND	ND	ND	ND	ND	
MW-8s	4/19/2004	579.76										3	1	130	0.2		5	ND		ND		20	
MW-8s	10/26/2004	580.00										7	1	130	0.4		ND	ND		ND		20	
MW-8s	4/8/2005	579.95										24	ND	120	ND		ND	ND		ND		ND	
MW-8s	10/3/2005	579.73										ND	ND	ND	ND		ND	ND		ND		ND	
MW-8s	4/19/2006	579.65										ND	ND	120	ND		ND	ND		ND		20	
MW-8s	10/26/2006	580.08										ND	1	ND	ND		ND	ND		ND		10	
MW-8s	5/8/2007	579.77										9	ND	200	ND		ND	ND		ND		20	
MW-8s	10/12/2007	579.33										3	ND	ND	ND		ND	ND		ND		10	
MW-8s	4/17/2008	579.94										17	ND	ND	ND		ND	ND		ND		ND	
MW-8s	9/30/2008	579.81										ND	ND	ND	0.6		ND	ND		ND		ND	
MW-8s	5/5/2009	580.30										4	1	ND	ND		5	ND		ND		ND	
MW-8s	10/13/2009	580.38										4	1	<100	<0.2		<4	<3		<5		<10	
Residential Drinking Water Criteria			5 {A}	790 {E}	74 {E}	280 {E}	40 {E}	63 {E}	72 {E}	-	200 {A}	200 {A}	10 {A}	2000 {A}	5.0 {A}	100 {A}	1000 {E}	4.0 {L}	2.0 {A}	50 {A}	34	2400	-

Indicates value exceeds Part 201 Residential Drinking Water criteria.

* GSI criteria is dependant on site-specific surface water hardness value and pH (for pentachlorophenol). Refer to Attachment B for calculations.

** Compound not listed in Part 201 Criteria.

*** Sample was collected prior to the development of GSI Criteria using Method OIA 1677 for Available Cyanide.

Part 201 Criteria effective January 23, 2006.

\- Indicates not applicable.

Refer to Attachment A for additional Part 201 Criteria Footnote definitions.

Table 1
Michigan Gas Utilities - Traverse City
Groundwater and Surface Water Elevations and Analytical Results
Pescador, LLC

Sample Location	Sample Date	Groundwater/Surface Water Elevation (feet above mean sea level)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene {Q}	Benzo(a)pyrene {Q}	Benzo(b)fluoranthene {Q}	Benzo(g,h,i)perylene	Benzo(k)fluoranthene {Q}	2-Chloronaphthalene	Chrysene {Q}	Dibenzo(a,h)anthracene {Q}	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene {Q}	2-Methlynaphthalene	Naphthalene	Phenanthrene	Pyrene
Non-GSI Monitoring Points			PNAs (µg/L)																	
MW-3d	4/25/2000																			
MW-3d	4/25/2000																			
MW-3s	-																			
MW-6	8/25/1997		ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-6	9/4/1997																			
MW-6	9/10/1997																			
MW-7	8/25/1997	582.56	ND	13	ND	8	10	8	6	ND		6	ND	17	7	6	19	ND	11	15
MW-7	5/1/2002	580.59	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	8/1/2002	581.35	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8s	1/15/1998		ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8s	5/2/1998																			
MW-8s	6/24/1998																			
MW-8s	6/24/1998																			
MW-8s	6/24/1998																			
MW-8s	4/25/2000																			
MW-8s	4/25/2000																			
MW-8s	5/11/2001		ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8s	8/30/2001	579.58	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8s	12/10/2001	579.66	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8s	2/28/2002	579.87	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8s	5/1/2002	580.11	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8s	8/1/2002	580.11	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8s	11/1/2002	579.57	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8s	3/19/2003	579.20	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8s	5/21/2003	579.45	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8s	8/19/2003	579.44	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8s	11/10/2003	579.39	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8s	4/19/2004	579.76																		
MW-8s	10/26/2004	580.00																		
MW-8s	4/8/2005	579.95																		
MW-8s	10/3/2005	579.73																		
MW-8s	4/19/2006	579.65																		
MW-8s	10/26/2006	580.08																		
MW-8s	5/8/2007	579.77																		
MW-8s	10/12/2007	579.33																		
MW-8s	4/17/2008	579.94																		
MW-8s	9/30/2008	579.81																		
MW-8s	5/5/2009	580.30																		
MW-8s	10/13/2009	580.38																		
Residential Drinking Water Criteria			1300	52	43 {S}	2.1	5.0 {A}	1.5{S,AA	1.0 {M}	1.0 {M}	1800	1.6 {S}	2.0 {M}	210 {S}	880	2.0 {M}	260	520	52	140 {S}

Sample Location	Sample Date	4-Chloro-3-methylphenol	2-Chlorophenol	2,4-Dichlorophenol	2,6-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2-Methyl-4,6-dinitrophenol	2-Methylphenol {J}	3&4-Methylphenol {J}	2-Nitrophenol	4-Nitrophenol	Pentachlorophenol *	Phenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol
Non-GSI Monitoring Points		Phenols (µg/L)														
MW-3d	4/25/2000															
MW-3d	4/25/2000															
MW-3s	-															
MW-6	8/25/1997															
MW-6	9/4/1997															
MW-6	9/10/1997															
MW-7	8/25/1997															
MW-7	5/1/2002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7	8/1/2002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8s	1/15/1998	ND	ND	ND		ND	ND			ND	ND	ND	ND	ND	ND	ND
MW-8s	5/2/1998															
MW-8s	6/24/1998															
MW-8s	6/24/1998															
MW-8s	6/24/1998															
MW-8s	4/25/2000															
MW-8s	4/25/2000															
MW-8s	5/11/2001															
MW-8s	8/30/2001															
MW-8s	12/10/2001															
MW-8s	2/28/2002															
MW-8s	5/1/2002															
MW-8s	8/1/2002															
MW-8s	11/1/2002															
MW-8s	3/19/2003															
MW-8s	5/21/2003															
MW-8s	8/19/2003															
MW-8s	11/10/2003															
MW-8s	4/19/2004															
MW-8s	10/26/2004															
MW-8s	4/8/2005															
MW-8s	10/3/2005															
MW-8s	4/19/2006															
MW-8s	10/26/2006															
MW-8s	5/8/2007															
MW-8s	10/12/2007															
MW-8s	4/17/2008															
MW-8s	9/30/2008															
MW-8s	5/5/2009															
MW-8s	10/13/2009															
Residential Drinking Water Criteria		150	45	73	**	370	**	20{M}	370		20	**	1.0{A}	4400	730	120

Indicates value exceeds Part 201 Residential Drinking Water criteria.

* GSI criteria is dependant on site-specific surface water hardness value and pH (for pentachlorophenol). Refer to Attachment B for calculations.

** Compound not listed in Part 201 Criteria.

*** Sample was collected prior to the development of GSI Criteria using Method OIA 1677 for Available Cyanide.

Part 201 Criteria effective January 23, 2006.

\- Indicates not applicable.

Refer to Attachment A for additional Part 201 Criteria Footnote definitions.

Table 1
Michigan Gas Utilities - Traverse City
Groundwater and Surface Water Elevations and Analytical Results
Pescador, LLC

Sample Location	Sample Date	Groundwater/Surface Water Elevation (feet above mean sea level)	Benzene {I}	Toluene {I}	Ethylbenzene {I}	Xylenes {I}	Methyl-tertiary-butyl-ether	1,2,4-Trimethylbenzene {I}	1,3,5-Trimethylbenzene {I}	Cyanide (Total) {P,R}	Cyanide (Amenable)	Cyanide (Available)	Arsenic (Total)	Barium (Total) {B} *	Cadmium (Total) {B} *	Chromium (Total) {B,H} *	Copper (Total) {B} *	Lead (Total) {B} *	Mercury (Total) {B,Z}	Selenium (Total) {B}	Silver (Total) {B}	Zinc (Total) {B} *	Hardness (as calcium carbonate)
Non-GSI Monitoring Points			Volatiles (µg/L)							Cyanides (µg/L)			Metals (µg/L)										(mg/L)
MW-8d	1/15/1998		32	ND	10	6	ND			390 ***	40 ***		ND	ND	ND	ND	ND	ND	ND	ND	ND	35	
MW-8d	5/2/1998									42 ***													
MW-8d	6/24/1998									370 ***													
MW-8d	6/24/1998									280 ***													
MW-8d	6/24/1998									480 ***	40 ***												
MW-8d	4/25/2000									795 ***		8											
MW-8d	4/25/2000									804 ***		7											
MW-8d	5/11/2001		4	1	3	5						5	4	ND	0.7	ND	ND	ND	ND	ND	ND	20	240.0
MW-8d	8/30/2001	579.57	3	ND	2	6						6	3	110	ND	ND	ND	ND	ND	ND	ND	20	
MW-8d	12/10/2001	579.67	12	1	4	6	ND	ND	ND			6	5	ND	0.5	ND	10	15	ND	ND	ND	20	
MW-8d	2/28/2002	579.87	9	ND	3	7	ND	ND	ND			4	4	ND	3.6	ND	ND	ND	ND	ND	ND	80	
MW-8d	5/1/2002	580.12	ND	ND	3	4	ND	ND	ND			2	2	ND	1	ND	ND	ND	ND	ND	ND	20	
MW-8d	8/1/2002	581.11	2	1	3	4	ND	ND	ND			7	5	ND	0.5	ND	ND	ND	ND	ND	ND	40	
MW-8d	11/1/2002	579.56	4	ND	3	ND	ND	ND	ND			3	5	ND	0.2	ND	ND	ND	ND	ND	ND	10	
MW-8d	3/19/2003	579.20	ND	ND	ND	ND	ND	ND	ND			2	6	ND	25	ND	ND	4	ND	ND	ND	3	
MW-8d	5/21/2003	579.46	ND	ND	ND	ND	ND	ND	ND			ND	5	ND	8.5	ND	6	ND	ND	ND	ND	50	
MW-8d	8/19/2003	579.44	3	ND	3	4	ND	ND	ND			2	12	ND	73	ND	6	5	ND	ND	ND	460	
MW-8d	11/10/2003	579.34	2	ND	2	ND	ND	ND	ND			ND	5	ND	3.5	ND	ND	4	ND	ND	ND	40	
MW-8d	4/19/2004	579.73	ND	ND	2	ND						ND	5	ND	0.9		ND	ND				20	
MW-8d	10/26/2004	580.00	1	ND	2	ND						3	5	ND	1.5		ND	ND				30	
MW-8d	4/8/2005	579.96	2	ND	1	ND						ND	13	ND	ND		ND	ND				ND	
MW-8d	10/3/2005	579.73	3	ND	3	ND						4	3	ND	ND		ND	ND				10	
MW-8d	4/19/2006	579.64	ND	ND	1	ND						ND	5	ND	0.8		ND	ND				30	
MW-8d	10/26/2006	580.06	2	ND	2	ND						ND	4	ND	0.3		ND	ND				10	
MW-8d	5/8/2007	579.77	ND	ND	1	ND						ND	5	ND	1.1		ND	5				20	
MW-8d	10/12/2007	579.31	2	ND	2	ND						2	4	ND	ND		ND	ND				ND	
MW-8d	4/17/2008	579.93	ND	ND	1	ND						ND	4	ND	0.5		ND	ND				20	
MW-8d	9/30/2008	579.81	2	ND	2	ND						ND	4	ND	0.7		ND	ND				ND	
MW-8d	5/5/2009	580.31	ND	ND	2	ND						ND	5	ND	ND		ND	ND				ND	
MW-8d	10/13/2009	580.37	2	<1	<1	<3						<2	4	<100	<0.2		<4	<3				<10	
MW-9	4/24/2001					ND						33											
MW-9	8/30/2001	579.43				ND						38											
MW-9	12/10/2001	579.53	ND	ND	ND	ND	ND	ND	ND			16											
MW-9	2/28/2002	579.69	ND	ND	ND	ND	ND	ND	ND			14											
MW-9	5/1/2002	579.98	ND	ND	ND	ND	ND	ND	ND			8											
MW-9	8/1/2002	580.01	ND	ND	ND	ND	ND	ND	ND			30											
MW-9	11/1/2002	579.45	ND	ND	ND	ND	ND	ND	ND			9											
MW-9	3/19/2003	579.06	ND	ND	ND	ND	ND	ND	ND			15											
MW-9	5/21/2003	579.32	ND	ND	ND	ND	ND	ND	ND			8											
MW-9	8/19/2003	579.31	ND	ND	ND	ND	ND	ND	ND			21											
MW-9	11/10/2003	579.21	ND	ND	ND	ND	ND	ND	ND			24											
MW-9	4/19/2004	579.59										8											
MW-9	10/26/2004	579.85										25											
MW-9	4/8/2005	579.84										23											
MW-9	10/3/2005	579.63										33											
MW-9	4/19/2006	579.50										3											
MW-9	10/26/2006	579.97										10											
MW-9	5/8/2007	579.64										9											
MW-9	10/12/2007	579.20										9											
MW-9	4/17/2008	579.81										6											
MW-9	9/30/2008	579.70										3											
MW-9	5/5/2009	580.18										4											
MW-9	10/13/2009	580.26										4											
Residential Drinking Water Criteria			5 {A}	790 {E}	74 {E}	280 {E}	40 {E}	63 {E}	72 {E}	-	200 {A}	200 {A}	10 {A}	2000 {A}	5.0 {A}	100 {A}	1000 {E}	4.0 {L}	2.0 {A}	50 {A}	34	2400	-

Indicates value exceeds Part 201 Residential Drinking Water criteria.
* GSI criteria is dependant on site-specific surface water hardness value and pH (for pentachlorophenol). Refer to Attachment B for calculations.
** Compound not listed in Part 201 Criteria.
*** Sample was collected prior to the development of GSI Criteria using Method OIA 1677 for Available Cyanide.
Part 201 Criteria effective January 23, 2006.
\- Indicates not applicable.
Refer to Attachment A for additional Part 201 Criteria Footnote definitions.

Table 1
Michigan Gas Utilities - Traverse City
Groundwater and Surface Water Elevations and Analytical Results
Pescador, LLC

Sample Location	Sample Date	Groundwater/Surface Water Elevation (feet above mean sea level)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene {Q}	Benzo(a)pyrene {Q}	Benzo(b)fluoranthene {Q}	Benzo(g,h,i)perylene	Benzo(k)fluoranthene {Q}	2-Chloronaphthalene	Chrysene {Q}	Dibenzo(a,h)anthracene {Q}	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene {Q}	2-Methlynaphthalene	Naphthalene	Phenanthrene	Pyrene
Non-GSI Monitoring Points			PNAs (µg/L)																	
MW-8d	1/15/1998		ND	28	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	5/2/1998																			
MW-8d	6/24/1998																			
MW-8d	6/24/1998																			
MW-8d	6/24/1998																			
MW-8d	4/25/2000																			
MW-8d	4/25/2000																			
MW-8d	5/11/2001		ND	21	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	8/30/2001	579.57	ND	18	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	12/10/2001	579.67	ND	18	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	2/28/2002	579.87	ND	20	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	5/1/2002	580.12	ND	21	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	7	ND	ND	ND
MW-8d	8/1/2002	581.11	ND	22	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	11/1/2002	579.56	ND	14	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	3/19/2003	579.20	ND	16	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	5/21/2003	579.46	ND	20	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	8/19/2003	579.44	17	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	11/10/2003	579.34	ND	21	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	4/19/2004	579.73																		
MW-8d	10/26/2004	580.00	ND	20	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	4/8/2005	579.96	ND	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND
MW-8d	10/3/2005	579.73	ND	19	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	4/19/2006	579.64	ND	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	10/26/2006	580.06	ND	18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	5/8/2007	579.77	ND	10	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	10/12/2007	579.31	ND	19	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	4/17/2008	579.93	ND	12	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	9/30/2008	579.81	ND	10	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	5/5/2009	580.31	ND	12	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8d	10/13/2009	580.37	<5	8	<5	<1	<1	<1	<1	<1		<1	<2	<1	<5	<2	<5	<5	<2	<5
MW-9	4/24/2001		ND											ND	ND			ND	ND	
MW-9	8/30/2001	579.43	ND											ND	ND			ND	ND	
MW-9	12/10/2001	579.53	ND											ND	ND		ND	ND	ND	
MW-9	2/28/2002	579.69	ND											ND	ND		ND	ND	ND	
MW-9	5/1/2002	579.98	5											ND	ND		ND	ND	ND	
MW-9	8/1/2002	580.01	ND											ND	ND		ND	ND	ND	
MW-9	11/1/2002	579.45	ND											ND	ND		ND	ND	ND	
MW-9	3/19/2003	579.06	ND											ND	ND		ND	ND	ND	
MW-9	5/21/2003	579.32	ND											ND	ND		ND	ND	ND	
MW-9	8/19/2003	579.31	ND											ND	ND		ND	ND	ND	
MW-9	11/10/2003	579.21	ND											ND	ND		ND	ND	ND	
MW-9	4/19/2004	579.59																		
MW-9	10/26/2004	579.85																		
MW-9	4/8/2005	579.84																		
MW-9	10/3/2005	579.63																		
MW-9	4/19/2006	579.50																		
MW-9	10/26/2006	579.97																		
MW-9	5/8/2007	579.64																		
MW-9	10/12/2007	579.20																		
MW-9	4/17/2008	579.81																		
MW-9	9/30/2008	579.70																		
MW-9	5/5/2009	580.18																		
MW-9	10/13/2009	580.26																		
Residential Drinking Water Criteria			1300	52	43 {S}	2.1	5.0 {A}	1.5{S,AA	1.0 {M}	1.0 {M}	1800	1.6 {S}	2.0 {M}	210 {S}	880	2.0 {M}	260	520	52	140 {S}

Sample Location	Sample Date	4-Chloro-3-methylphenol	2-Chlorophenol	2,4-Dichlorophenol	2,6-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2-Methyl-4,6-dinitrophenol	2-Methylphenol {J}	3&4-Methylphenol {J}	2-Nitrophenol	4-Nitrophenol	Pentachlorophenol *	Phenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol
Non-GSI Monitoring Points		Phenols (µg/L)														
MW-8d	1/15/1998	ND	ND	ND		ND	ND			ND	ND	ND	ND	ND	ND	ND
MW-8d	5/2/1998															
MW-8d	6/24/1998															
MW-8d	6/24/1998															
MW-8d	6/24/1998															
MW-8d	4/25/2000															
MW-8d	4/25/2000															
MW-8d	5/11/2001															
MW-8d	8/30/2001															
MW-8d	12/10/2001															
MW-8d	2/28/2002															
MW-8d	5/1/2002															
MW-8d	8/1/2002															
MW-8d	11/1/2002															
MW-8d	3/19/2003															
MW-8d	5/21/2003															
MW-8d	8/19/2003															
MW-8d	11/10/2003															
MW-8d	4/19/2004															
MW-8d	10/26/2004															
MW-8d	4/8/2005															
MW-8d	10/3/2005															
MW-8d	4/19/2006															
MW-8d	10/26/2006															
MW-8d	5/8/2007															
MW-8d	10/12/2007															
MW-8d	4/17/2008															
MW-8d	9/30/2008															
MW-8d	5/5/2009															
MW-8d	10/13/2009															
MW-9	4/24/2001															
MW-9	8/30/2001															
MW-9	12/10/2001															
MW-9	2/28/2002															
MW-9	5/1/2002															
MW-9	8/1/2002															
MW-9	11/1/2002															
MW-9	3/19/2003															
MW-9	5/21/2003															
MW-9	8/19/2003															
MW-9	11/10/2003															
MW-9	4/19/2004															
MW-9	10/26/2004															
MW-9	4/8/2005															
MW-9	10/3/2005															
MW-9	4/19/2006															
MW-9	10/26/2006															
MW-9	5/8/2007															
MW-9	10/12/2007															
MW-9	4/17/2008															
MW-9	9/30/2008															
MW-9	5/5/2009															
MW-9	10/13/2009															
Residential Drinking Water Criteria		150	45	73	**	370	**	20{M}	370		20	**	1.0{A}	4400	730	120

Indicates value exceeds Part 201 Residential Drinking Water criteria.

* GSI criteria is dependant on site-specific surface water hardness value and pH (for pentachlorophenol). Refer to Attachment B for calculations.

** Compound not listed in Part 201 Criteria.

*** Sample was collected prior to the development of GSI Criteria using Method OIA 1677 for Available Cyanide.

Part 201 Criteria effective January 23, 2006.

\- Indicates not applicable.

Refer to Attachment A for additional Part 201 Criteria Footnote definitions.

Table 1
Michigan Gas Utilities - Traverse City
Groundwater and Surface Water Elevations and Analytical Results
Pescador, LLC

Sample Location	Sample Date	Groundwater/Surface Water Elevation (feet above mean sea level)	Benzene {I}	Toluene {I}	Ethylbenzene {I}	Xylenes {I}	Methyl-tertiary-butyl-ether	1,2,4-Trimethylbenzene {I}	1,3,5-Trimethylbenzene {I}	Cyanide (Total) {P,R}	Cyanide (Amenable)	Cyanide (Available)	Arsenic (Total)	Barium (Total) {B} *	Cadmium (Total) {B} *	Chromium (Total) {B,H} *	Copper (Total) {B} *	Lead (Total) {B} *	Mercury (Total) {B,Z}	Selenium (Total) {B}	Silver (Total) {B}	Zinc (Total) {B} *	Hardness (as calcium carbonate)
Non-GSI Monitoring Points			Volatiles (µg/L)							Cyanides (µg/L)			Metals (µg/L)										(mg/L)
MW-A	6/28/2001		ND	ND	ND	ND						27	ND	ND	ND	ND	ND	ND	ND	ND	ND	10	370
MW-A	8/30/2001	579.63				ND						12											
MW-A	12/10/2001	579.74	ND	ND	ND	ND	ND	ND	ND			27											
MW-A	2/22/2002																						
MW-A	5/1/2002	580.26	ND	ND	ND	ND	ND	ND	ND			9											
MW-A	8/1/2002																						
MW-A	11/1/2002	579.62	ND	ND	ND	ND	ND	ND	ND			19											
MW-A	3/19/2003	579.33	ND	ND	ND	ND	ND	ND	ND			10											
MW-A	5/21/2003	579.56	ND	ND	ND	ND	ND	ND	ND			ND											
MW-A	8/19/2003	579.49	ND	ND	ND	ND	ND	ND	ND			11											
MW-A	11/10/2003	579.49	ND	ND	ND	ND	ND	ND	ND			12											
MW-A	4/19/2004	579.87										7											
MW-A	10/26/2004	580.05										4											
MW-A	4/8/2005	580.07										8											
MW-A	10/3/2005	579.80										7											
MW-A	4/19/2006	579.75										3											
MW-A	5/8/2007	579.89										5											
MW-A	10/12/2007	579.39										ND											
MW-A	4/17/2008	580.11										2											
MW-A	9/30/2008	579.87										2											
MW-A	5/5/2009	580.39										5											
MW-A	10/13/2009	580.44										11											
MW-B	6/28/2001		ND	ND	ND	ND						12	ND	ND	0.3	ND	ND	ND	ND	ND	ND	10	290
MW-B	8/30/2001	579.54				ND						8											
MW-B	12/10/2001	579.70	ND	ND	ND	ND	ND	ND	ND			19											
MW-B	2/28/2002	579.83	ND	ND	ND	ND	ND	ND	ND			10											
MW-B	5/1/2002	580.18	ND	ND	ND	ND	ND	ND	ND			4											
MW-B	8/1/2002	580.05	ND	ND	ND	ND	ND	ND	ND			33											
MW-B	11/1/2002	579.55	ND	ND	ND	ND	ND	ND	ND			12											
MW-B	3/19/2003	579.28	ND	ND	ND	ND	ND	ND	ND			6											
MW-B	5/21/2003	579.51	ND	ND	ND	ND	ND	ND	ND			2											
MW-B	8/19/2003	579.40	ND	ND	ND	ND	ND	ND	ND			11											
MW-B	11/10/2003	579.45	ND	ND	ND	ND	ND	ND	ND			11											
MW-B	4/19/2004	579.81										4											
MW-B	10/26/2004	579.99										6											
MW-B	4/8/2005	580.00										5											
MW-B	10/3/2005	579.74										7											
MW-B	4/19/2006	579.69										ND											
MW-B	5/8/2007	579.85										5											
MW-B	10/12/2007	579.29										ND											
MW-B	4/17/2008	580.08										2											
MW-B	9/30/2008	579.81										ND											
MW-B	5/5/2009	580.34										2											
MW-B	10/13/2009	580.39										3											
Residential Drinking Water Criteria			5 {A}	790 {E}	74 {E}	280 {E}	40 {E}	63 {E}	72 {E}	-	200 {A}	200 {A}	10 {A}	2000 {A}	5.0 {A}	100 {A}	1000 {E}	4.0 {L}	2.0 {A}	50 {A}	34	2400	-

Indicates value exceeds Part 201 Residential Drinking Water criteria.
* GSI criteria is dependant on site-specific surface water hardness value and pH (for pentachlorophenol). Refer to Attachment B for calculations.
** Compound not listed in Part 201 Criteria.
*** Sample was collected prior to the development of GSI Criteria using Method OIA 1677 for Available Cyanide.
Part 201 Criteria effective January 23, 2006.
\- Indicates not applicable.
Refer to Attachment A for additional Part 201 Criteria Footnote definitions.

Table 1
Michigan Gas Utilities - Traverse City
Groundwater and Surface Water Elevations and Analytical Results
Pescador, LLC

Sample Location	Sample Date	Groundwater/Surface Water Elevation (feet above mean sea level)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene {Q}	Benzo(a)pyrene {Q}	Benzo(b)fluoranthene {Q}	Benzo(g,h,i)perylene	Benzo(k)fluoranthene {Q}	2-Chloronaphthalene	Chrysene {Q}	Dibenzo(a,h)anthracene {Q}	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene {Q}	2-Methlynaphthalene	Naphthalene	Phenanthrene	Pyrene
Non-GSI Monitoring Points			PNAs (µg/L)																	
MW-A	6/28/2001		ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-A	8/30/2001	579.63	ND											ND	ND			ND	ND	
MW-A	12/10/2001	579.74	ND											ND	ND		ND	ND	ND	
MW-A	2/22/2002																			
MW-A	5/1/2002	580.26	ND											ND	ND		ND	ND	ND	
MW-A	8/1/2002																			
MW-A	11/1/2002	579.62	ND											ND	ND		ND	ND	ND	
MW-A	3/19/2003	579.33	ND											ND	ND		ND	ND	ND	
MW-A	5/21/2003	579.56	ND											ND	ND		ND	ND	ND	
MW-A	8/19/2003	579.49	ND											ND	ND		ND	ND	ND	
MW-A	11/10/2003	579.49	ND											ND	ND		ND	ND	ND	
MW-A	4/19/2004	579.87																		
MW-A	10/26/2004	580.05																		
MW-A	4/8/2005	580.07																		
MW-A	10/3/2005	579.80																		
MW-A	4/19/2006	579.75																		
MW-A	5/8/2007	579.89																		
MW-A	10/12/2007	579.39																		
MW-A	4/17/2008	580.11																		
MW-A	9/30/2008	579.87																		
MW-A	5/5/2009	580.39																		
MW-A	10/13/2009	580.44																		
MW-B	6/28/2001		ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-B	8/30/2001	579.54	ND											ND	ND			ND	ND	
MW-B	12/10/2001	579.70	ND											ND	ND		ND	ND	ND	
MW-B	2/28/2002	579.83	ND											ND	ND		ND	ND	ND	
MW-B	5/1/2002	580.18	ND											ND	ND		ND	ND	ND	
MW-B	8/1/2002	580.05	ND											ND	ND		ND	ND	ND	
MW-B	11/1/2002	579.55	ND											ND	ND		ND	ND	ND	
MW-B	3/19/2003	579.28	ND											ND	ND		ND	ND	ND	
MW-B	5/21/2003	579.51	ND											ND	ND		ND	ND	ND	
MW-B	8/19/2003	579.40	ND											ND	ND		ND	ND	ND	
MW-B	11/10/2003	579.45	ND											ND	ND		ND	ND	ND	
MW-B	4/19/2004	579.81																		
MW-B	10/26/2004	579.99																		
MW-B	4/8/2005	580.00																		
MW-B	10/3/2005	579.74																		
MW-B	4/19/2006	579.69																		
MW-B	5/8/2007	579.85																		
MW-B	10/12/2007	579.29																		
MW-B	4/17/2008	580.08																		
MW-B	9/30/2008	579.81																		
MW-B	5/5/2009	580.34																		
MW-B	10/13/2009	580.39																		
Residential Drinking Water Criteria			1300	52	43 {S}	2.1	5.0 {A}	1.5{S,AA	1.0 {M}	1.0 {M}	1800	1.6 {S}	2.0 {M}	210 {S}	880	2.0 {M}	260	520	52	140 {S}

Sample Location	Sample Date	4-Chloro-3-methylphenol	2-Chlorophenol	2,4-Dichlorophenol	2,6-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2-Methyl-4,6-dinitrophenol	2-Methylphenol {J}	3&4-Methylphenol {J}	2-Nitrophenol	4-Nitrophenol	Pentachlorophenol *	Phenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol
Non-GSI Monitoring Points		Phenols (µg/L)														
MW-A	6/28/2001															
MW-A	8/30/2001															
MW-A	12/10/2001															
MW-A	2/22/2002															
MW-A	5/1/2002															
MW-A	8/1/2002															
MW-A	11/1/2002															
MW-A	3/19/2003															
MW-A	5/21/2003															
MW-A	8/19/2003															
MW-A	11/10/2003															
MW-A	4/19/2004															
MW-A	10/26/2004															
MW-A	4/8/2005															
MW-A	10/3/2005															
MW-A	4/19/2006															
MW-A	5/8/2007															
MW-A	10/12/2007															
MW-A	4/17/2008															
MW-A	9/30/2008															
MW-A	5/5/2009															
MW-A	10/13/2009															
MW-B	6/28/2001															
MW-B	8/30/2001															
MW-B	12/10/2001															
MW-B	2/28/2002															
MW-B	5/1/2002															
MW-B	8/1/2002															
MW-B	11/1/2002															
MW-B	3/19/2003															
MW-B	5/21/2003															
MW-B	8/19/2003															
MW-B	11/10/2003															
MW-B	4/19/2004															
MW-B	10/26/2004															
MW-B	4/8/2005															
MW-B	10/3/2005															
MW-B	4/19/2006															
MW-B	5/8/2007															
MW-B	10/12/2007															
MW-B	4/17/2008															
MW-B	9/30/2008															
MW-B	5/5/2009															
MW-B	10/13/2009															
Residential Drinking Water Criteria		150	45	73	**	370	**	20{M}	370	20	**	1.0{A}	4400	730	120	

Indicates value exceeds Part 201 Residential Drinking Water criteria.
* GSI criteria is dependant on site-specific surface water hardness value and pH (for pentachlorophenol). Refer to Attachment B for calculations.
** Compound not listed in Part 201 Criteria.
*** Sample was collected prior to the development of GSI Criteria using Method OIA 1677 for Available Cyanide.
Part 201 Criteria effective January 23, 2006.
\- Indicates not applicable.
Refer to Attachment A for additional Part 201 Criteria Footnote definitions.

ATTACHMENT A

Note: Information in these footnotes has been updated pursuant to R 299.5706a & 5716(6) and R 323.1057. See RRD Op. Memo No. 1, Attach. 1.

R 299.5750 Footnotes for generic cleanup criteria tables.

Rule 750. (1) The footnotes that apply to the generic criteria tables in R 299.5744, R 299.5746, and R 299.5748 are as follows:

(A) Criterion is the state of Michigan drinking water standard established pursuant to section 5 of 1976 PA 399, MCL 325.1005.

(B) Background, as defined in R 299.5701(b), may be substituted if higher than the calculated cleanup criterion. Background levels may be less than criteria for some inorganic compounds.

(C) Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) 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%, hence it is reduced to 100% or 1.0E+9 ppb.

(E) Criterion is the aesthetic drinking water value, as required by section 20120a(5) of the act. A notice of aesthetic impact may be employed as an institutional control mechanism if groundwater concentrations exceed the aesthetic drinking water criterion, but do not exceed the applicable health-based drinking water value provided in the following table:

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

(F) Criterion is based on adverse impacts to plant life and phytotoxicity.

(G) Groundwater surface water interface (GSI) criterion depends on the pH or water hardness, or both, of the receiving surface water. The final chronic value (FCV) for the protection of aquatic life shall be calculated based on the pH or hardness of the receiving surface water. Where water hardness exceeds 400 mg $CaCO_3$/L, use 400 mg $CaCO_3$/L for the FCV calculation. The FCV formula provides values in units of ug/l or ppb. The generic GSI criterion is the lesser of the calculated FCV, the wildlife value (WV), and the surface water human non-drinking water value (HNDV). The soil GSI protection criteria for these hazardous substances are the greater of the

20 times the GSI criterion or the GSI soil-water partition values using the GSI criteria developed with the procedure described in this footnote.

Hazardous Substance	FCV Formula ug/L	FCV Conversion Factor (CF)	WV ug/L	HNDV ug/L
Barium⊗	EXP(1.0629*(LnH)+1.1869)	NA	NA	1.6E+5
Beryllium	EXP(2.5279*(LnH)-10.7689)	NA	NA	1,200
Cadmium⊗	(EXP(0.7852*(LnH)-2.715))*CF	1.101672-((LnH)*(0.041838))	NA	130
Chromium (III) ⊗	(EXP(0.819*(LnH)+0.6848))*CF	0.86	NA	9,400
Copper	(EXP(0.8545*(LnH)-1.702)) *CF	0.96	NA	64,000
Lead⊗	(EXP(1.273*(LnH)-3.296))*CF	1.46203-((LnH)*(0.14571))	NA	190
Manganese	EXP(0.8784*(LnH)+3.5199)	NA	NA	59,000
Nickel	(EXP(0.846*(LnH)+0.0584))*CF	0.997	NA	2.1E+5
Pentachlorophenol	EXP(1.005*(pH)-5.134)	NA	NA	2.8
Zinc	(EXP(0.8473*(LnH)+0.884))*CF	0.986	NA	22,000

where,

EXP(x) = The base of the natural logarithm raised to power x (e^x).
LnH = The natural logarithm of water hardness in mg $CaCO_3$/L.
* = The multiplication symbol.
⊗ = The GSI criterion developed here may not be protective for surface water that is used as a drinking water source. Refer to footnote (X) for further guidance.

A spreadsheet that may be used to calculate GSI and GSI protection criteria for (G)-footnoted hazardous substances is available on the department's internet web site.

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

(I) Hazardous substance may exhibit the characteristic of ignitability as defined in 40 C.F.R. §261.21 (revised as of July 1, 2001), which is adopted by reference in these rules and which is available for inspection a the Lansing office of the department, 525 West Allegan Street, Lansing, Michigan. Copies of the regulation may be purchased, at a cost as of the time of adoption of these rules of $45.00, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401 (stock number 869-044-00155-1), or from the Department of Environmental Quality, Remediation and Redevelopment Division, 525 West Allegan Street, Lansing, MI 48933, at cost.

(J) Hazardous substance may be present in several isomer forms. Isomer-specific concentrations shall be added together for comparison to criteria.

(K) Hazardous substance may be flammable or explosive, or both.

(L) Criteria for lead are derived using a biologically based model, as allowed for under section 20120a(10) of the act, 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 act if soil concentrations are appropriately lower than 400 mg/kg. If a site-specific criterion is approved based on this subdivision, a notice shall be filed on the deed for all property where the groundwater concentrations will exceed 4 ug/l to provide notice of the potential for unacceptable risk if soil or groundwater concentrations increase. Acceptable combinations of site-specific soil and drinking water concentrations are presented in the following table:

Acceptable Combinations of Lead in Drinking Water and Soil

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

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

(N) The concentrations of all potential sources of nitrate-nitrogen (e.g., ammonia-N, nitrite-N, nitrate-N) in groundwater that is used as a source of drinking water shall not, when added together, exceed the nitrate drinking water criterion of 10,000 ug/l. Where leaching to groundwater is a relevant pathway, soil concentrations of all potential sources of nitrate-nitrogen shall not, when added together, exceed the nitrate drinking water protection criterion of 2.0E+5 ug/kg.

(O) The concentration of all polychlorinated and polybrominated dibenzodioxin and dibenzofuran isomers present at a facility, expressed as an equivalent concentration of 2,3,7,8-tetrachlorodibenzo-p-dioxin based upon their relative potency, shall be added together and compared to the criteria for 2,3,7,8-tetrachlorodibenzo-p-dioxin. The generic cleanup criteria for 2,3,7,8-tetrachlorodibenzo-p-dioxin are not calculated according to the algorithms presented in R 299.5714 to R 299.5726. The generic cleanup criteria are being held at the values that the department has used since August 1998, in recognition of the fact that national efforts to reassess risks posed by dioxin are not yet complete. Until these studies are

complete, it is premature to select a revised slope factor and/or reference dose for calculation of generic cleanup criteria.

(P) Amenable cyanide methods or method OIA-1677 shall be used to quantify cyanide concentrations for compliance with all groundwater criteria. Total cyanide methods or method OIA-1677 shall be used to quantify cyanide concentrations for compliance with soil criteria. Industrial/commercial direct contact criteria may not be protective of the potential for release of hydrogen cyanide gas. Additional land or resource use restrictions may be necessary to protect for the acute inhalation concerns associated with hydrogen cyanide gas.

(Q) Criteria for carcinogenic polycyclic aromatic hydrocarbons were developed using relative potential potencies to benzo(a)pyrene.

(R) Hazardous substance may exhibit the characteristic of reactivity as defined in 40 C.F.R. §261.23 (revised as of July 1, 2001), which is adopted by reference in these rules and which is available for inspection a the Lansing office of the Department, 525 West Allegan Street, Lansing, Michigan. Copies of the regulation may be purchased, at a cost as of the time of adoption of these rules of $45.00, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401 (stock number 869-044-00155-1), or from the Department of Environmental Quality, Remediation and Redevelopment Division, 525 West Allegan Street, Lansing, MI 48933, at cost.

(S) Criterion defaults to the hazardous substance-specific water solubility limit.

(T) Refer to the federal toxic substances control act (TSCA), 40 C.F.R. §761, Subpart D and 40 C.F.R. §761, Subpart G, to determine the applicability of TSCA cleanup standards. Subpart D and Subpart G of 40 C.F.R. §761 (July 1, 2001), are adopted by reference in these rules and are available for inspection a the Lansing office of the department, 525 West Allegan Street, Lansing, Michigan. Copies of the regulations may be purchased, at a cost as of the time of adoption of these rules of $55.00, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401, or from the Department of Environmental Quality, Remediation and Redevelopment Division, 525 West Allegan Street, Lansing, MI 48933, at cost. Alternatives to compliance with the TSCA standards listed below are possible under 40 C.F.R. §761 Subpart D. New releases may be subject to the standards identified in 40 C.F.R. §761, Subpart G. Use part 201 soil direct contact cleanup criteria in the following table if TSCA standards are not applicable:

Land Use Category	TSCA, Subpart D Cleanup Standards	Part 201 Soil Direct Contact Cleanup Criteria
Residential & Commercial I	1,000 ppb, or 10,000 ppb if capped	4,000 ppb
Industrial & Commercial II	1,000 ppb, or 10,000 ppb if capped	16,000 ppb
Commercial III	1,000 ppb, or 10,000 ppb if capped	33,000 ppb
Commercial IV	1,000 ppb, or 10,000 ppb if capped	22,000 ppb

(U) Hazardous substance may exhibit the characteristic of corrosivity as defined in 40 C.F.R. §261.22 (revised as of July 1, 2001), which is adopted by reference in these rules and which is available for inspection a the Lansing office of the department, 525 West Allegan Street, Lansing, Michigan. Copies of the regulation may be purchased, at a cost as of the time of adoption of these rules of $45.00, from the Superintendent of Documents, Government Printing Office, Washington, DC 20401 (stock number 869-044-00155-1), or from the Department of Environmental Quality, Remediation and Redevelopment Division, 525 West Allegan Street, Lansing, MI 48933, at cost.

(V) Criterion is the aesthetic drinking water value, as required by section 20120(a)(5) of the act. Concentrations up to 200 ug/l may be acceptable, and still allow for drinking water use, as part of a site-specific cleanup under section 20120a(2) of the act.

(W) Concentrations of trihalomethanes in groundwater shall be added together to determine compliance with the Michigan drinking water standard of 100 ug/l. Concentrations of trihalomethanes in soil shall be added together to determine compliance with the drinking water protection criterion of 2,000 ug/kg.

(X) The groundwater surface water interface (GSI) criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source. For a groundwater discharge to the Great Lakes and their connecting waters or discharge in close proximity to a water supply intake in inland surface waters, the generic GSI criterion shall be the surface water human drinking water value (HDV) listed in the table in this footnote, except for those HDV indicated with an asterisk. For HDV with an asterisk, the generic GSI criterion shall be the lowest of the HDV, the WV, and the calculated FCV. See formulas in footnote (G). Soil protection criteria based on the HDV shall be as listed in the table in this footnote, except for those values with an asterisk. Soil GSI protection criteria based on the HDV shall be as listed in the table in this footnote, except for those values with an asterisk. Soil GSI protection criteria for compounds with an asterisk shall be the greater of 20 times the GSI criterion or the GSI soil-water partition values using the GSI criteria developed with the procedure described in this footnote.

Hazardous Substance	Chemical Abstract Service Number	Surface Water Human Drinking Water Values (HDV) (ug/L)	Soil GSI Protection Criteria for HDV (ug/kg)
Acrylonitrile	107131	0.87	17
Alachlor	15972608	3.5	91
Antimony	7440360	2	1,400
Arsenic	7440382	50	23,000
Atrazine	1912249	4.3	86
Barium	7440393	1,900*	*
Benzene	71432	12	240
Butyl benzyl phthalate	85687	6.9	13,000
Cadmium	7440439	2.5*	*
Carbon tetrachloride	56235	5.6	110
Chloride	16887006	50,000	1.0E+6
Chloroform	67663	77	1,500
Chromium (III)	16065831	120*	*
Cyanazine	21725462	10 (M)	500 (M)
3,3'-Dichlorobenzidine	91941	0.3 (M)	2,000 (M)
1,2-Dichloroethane	107062	6	120
1,1-Dichloroethylene	75354	24	480
1,2-Dichloropropane	78875	9.1	180
N,N-Dimethylacetamide	127195	700	14,000
1,4-Dioxane	123911	34	680
Ethylene glycol	107211	56,000	1.1E+6
Heptachlor	76448	0.01 (M)	NLL
beta-Hexachlorocyclohexane	319857	0.024	20 (M)
Hexachloroethane	67721	5.3	310
Isophorone	78591	310	6,200
Isopropyl alcohol	67630	28,000	5.6E+5
Lead	7439921	14*	*
Manganese	7439965	3600	72,000
Methyl-tert-butyl ether (MTBE)	1634044	100	2,000
Methylene chloride	75092	47	940
Mirex	2385855	0.02 (M)	NLL
Molybdenum	7439987	120	2,400
Nitrobenzene	98953	4.7	200 (M)
Pentachlorophenol	87865	1.8*	*
1,2,4,5-Tetrachlorobenzene	95943	2.8	3,300
1,1,1,2-Tetrachloroethane	630206	19	380
1,1,2,2-Tetrachloroethane	79345	3.2	64
Tetrachloroethylene	127184	11	220
Tetrahydrofuran	109999	350	7,000
Thallium	7440280	1.2	1400
1,1,2-Trichloroethane	79005	12	240
Trichloroethylene	79016	29	580

(Y) Source size modifiers shown in the following table shall be used to determine soil inhalation criteria for ambient air when the source size is not 1/2 acre. The modifier shall be multiplied by the generic soil inhalation criteria shown in the table of generic cleanup criteria to determine the applicable criterion.

Source Size sq. feet or acres	Modifier
400 sq feet	3.17
1000 sq feet	2.2
2000 sq feet	1.76
1/4 acre	1.15
1/2 acre	1
1 acre	0.87
2 acre	0.77
5 acre	0.66
10 acre	0.6
32 acre	0.5
100 acre	0.43

(Z) Mercury is typically measured as total mercury. The generic cleanup criteria, however, are based on data for different species of mercury. Specifically, data for elemental mercury, chemical abstract service number 7439976, serve as the basis for the soil volatilization to indoor air criteria, groundwater volatilization to indoor air, and soil inhalation criteria. Data for methyl mercury, chemical abstract service number 22967926, serve as the basis for the groundwater surface water interface criterion; and data for mercuric chloride, chemical abstract service number 7487947, serve as the basis for the drinking water, groundwater contact, soil direct contact, and the groundwater protection criteria. Comparison to criteria shall be based on species-specific analytical data only if sufficient facility characterization has been conducted to rule out the presence of other species of mercury.

(AA) Comparison to these criteria may take into account an evaluation of whether the hazardous substances are adsorbed to particulates rather than dissolved in water and whether filtered groundwater samples were used to evaluate groundwater.

(BB) The state drinking water standard for asbestos is in units of fibers per milliliter of water (f/mL) longer than 10 millimicrons. Soil concentrations of asbestos are determined by polarized light microscopy.

(CC) Groundwater: The generic groundwater surface water interface criteria are based on the toxicity of unionized ammonia (NH_3); the criteria are 29 ug/l and 53 ug/l for coldwater and warmwater surface water, respectively. As a result, the GSI criterion shall be compared to the percent of the total ammonia concentration in the groundwater that will become NH_3 in the surface water. This percent NH_3 is a function of the pH and temperature of the receiving surface water and can be estimated using the following table, taken from Emerson, et al. [J. Fish. Res. Board Can., Vol. 32(12):2382, 1975]

Percent NH_3 in Aqueous Ammonia Solutions for 0-30 °C and pH 6-10

Temp (°F)	Temp (°C)	pH 6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
32.0	0	0.00827	0.0261	0.0826	0.261	0.820	2.55	7.64	20.7	45.3
33.8	1	0.00899	0.0284	0.0898	0.284	0.891	2.77	8.25	22.1	47.3
35.6	2	0.00977	0.0309	0.0977	0.308	0.968	3.00	8.90	23.6	49.4
37.4	3	0.0106	0.0336	0.106	0.335	1.05	3.25	9.60	25.1	51.5
39.2	4	0.0115	0.0364	0.115	0.363	1.14	3.52	10.3	26.7	53.5
41.0	5	0.0125	0.0395	0.125	0.394	1.23	3.80	11.1	28.3	55.6
42.8	6	0.0136	0.0429	0.135	0.427	1.34	4.11	11.9	30.0	57.6
44.6	7	0.0147	0.0464	0.147	0.462	1.45	4.44	12.8	31.7	59.5
46.4	8	0.0159	0.0503	0.159	0.501	1.57	4.79	13.7	33.5	61.4
48.2	9	0.0172	0.0544	0.172	0.542	1.69	5.16	14.7	35.3	63.3
50.0	10	0.0186	0.0589	0.186	0.586	1.83	5.56	15.7	37.1	65.1
51.8	11	0.0201	0.0637	0.201	0.633	1.97	5.99	16.8	38.9	66.8
53.6	12	0.0218	0.0688	0.217	0.684	2.13	6.44	17.9	40.8	68.5
55.4	13	0.0235	0.0743	0.235	0.738	2.30	6.92	19.0	42.6	70.2
57.2	14	0.0254	0.0802	0.253	0.796	2.48	7.43	20.2	44.5	71.7
59.0	15	0.0274	0.0865	0.273	0.859	2.67	7.97	21.5	46.4	73.3
60.8	16	0.0295	0.0933	0.294	0.925	2.87	8.54	22.8	48.3	74.7
62.6	17	0.0318	0.101	0.317	0.996	3.08	9.14	24.1	50.2	76.1
64.4	18	0.0343	0.108	0.342	1.07	3.31	9.78	25.5	52.0	77.4
66.2	19	0.0369	0.117	0.368	1.15	3.56	10.5	27.0	53.9	78.7
68.0	20	0.0397	0.125	0.396	1.24	3.82	11.2	28.4	55.7	79.9
69.8	21	0.0427	0.135	0.425	1.33	4.10	11.9	29.9	57.5	81.0
71.6	22	0.0459	0.145	0.457	1.43	4.39	12.7	31.5	59.2	82.1
73.4	23	0.0493	0.156	0.491	1.54	4.70	13.5	33.0	60.9	83.2
75.2	24	0.0530	0.167	0.527	1.65	5.03	14.4	34.6	62.6	84.1
77.0	25	0.0569	0.180	0.566	1.77	5.38	15.3	36.3	64.3	85.1
78.8	26	0.0610	0.193	0.607	1.89	5.75	16.2	37.9	65.9	85.9
80.6	27	0.0654	0.207	0.651	2.03	6.15	17.2	39.6	67.4	86.8
82.4	28	0.0701	0.221	0.697	2.17	6.56	18.2	41.2	68.9	87.3
84.2	29	0.0752	0.237	0.747	2.32	7.00	19.2	42.9	70.4	88.3
86.0	30	0.0805	0.254	0.799	2.48	7.46	20.3	44.6	71.8	89.0

The generic approach for estimating NH_3 assumes a default pH of 8 and default temperatures of 68°F and 85°F for coldwater and warmwater surface water, respectively. The resulting percent NH_3 is 3.8% and 7.2% for coldwater and warmwater, respectively. This default percentage shall be multiplied by the total ammonia-nitrogen (NH_3-N) concentration in the

groundwater and the resulting NH_3 concentration compared to the applicable groundwater surface water interface criterion. As an alternative, the maximum pH and temperature data from the specific receiving surface water can be used to estimate, from the table in this footnote, a lower percent unionized ammonia concentration for comparison to the generic groundwater surface water interface criteria. Soil: The generic soil groundwater surface water interface protection criteria for unionized ammonia are 580 ug/kg and 1,100 ug/kg for coldwater and warmwater surface water, respectively.

(DD) Hazardous substance causes developmental effects. Residential and commercial I direct contact criteria are protective of both prenatal and postnatal exposure. Industrial and commercial II, III and IV DCC are protective for a pregnant adult receptor.

(EE) The following are applicable generic groundwater surface water interface criteria as required by section 20120a(15) of the act.

Hazardous Substance	GSI (ug/L)	Notes
Phosphorus	1,000	Criteria applicable unless receiving water is a surface water that has a phosphorus waste load allocation or is an inland lake. In those cases, contact the department for applicable values.
Total dissolved solids (TDS)	5.0E+5	If TDS data are not available, the TDS criterion may be used a screening level for the sum of the concentrations of the following substances: Calcium, Chlorides, Iron, Magnesium, Potassium, Sodium, Sulfate.
Dissolved Oxygen (DO): Cold receiving waters Warm receiving waters	 ≥ 7,000 ≥ 5,000	Since a low level of DO can be harmful to aquatic life, the criterion represents a minimum level that on-site samples must exceed. This is in contrast to other criteria which represent "not to exceed" concentrations. DO criteria are not applicable if groundwater Carbonaceous Biochemical Oxygen Demand (CBOD) is less than 10,000 ug/L and groundwater ammonia concentration is less than 2,000 ug/L.

(FF) The chloride groundwater surface water interface 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.

(2) When used in the generic cleanup criteria tables in R 299.5744, R 299.5746, and R 299.5748, abbreviations have the following meanings:

(a) "ID" means insufficient data to develop criterion.

(b) "NA" means a criterion or value is not available or, in the case of background and chemical abstract service numbers, not applicable.

(c) "NLL" means hazardous substance is not likely to leach under most soil conditions.

(d) "NLV" means hazardous substance is not likely to volatilize under most conditions.

ATTACHMENT B

Attachment B
Pescador, LLC
Michigan Gas Utilities - Traverse City
GSI Criteria Calculations - 10/13/09

Hardness-specific GSI Criteria Calculations									
Hazardous Substance	Hardness in mg CaCO3/L (400 mg/L maximum)	pH	FCV Conversion Factor	Final Chronic Value (FCV)	Wildlife Value (WV)	Surface Water Human Non-Drinking Water Value (HNDV)	Surface Water Human Drinking Water Value (HDV)	GSI Criteria for Surface Water Not Protected for Drinking Water Use	GSI Criteria for Surface Water Protected for Drinking Water Use
Barium	100	NA	NA	4.4E+2	NA	1.6E+5	1,900	4.4E+02	4.4E+02
Cadmium	100	NA	0.91	2.2E+0	NA	130	3	2.2E+00	2.2E+00
Chromium (III)	100	NA	0.86	7.4E+1	NA	9,400	120	7.4E+01	7.4E+01
Copper	100	NA	0.96	9.0E+0	NA	64,000	790	9.0E+00	9.0E+00
Lead	100	NA	0.79	1.0E+1	NA	190	14	1.0E+01	1.0E+01
Zinc	100	NA	0.99	1.2E+2	NA	22,000	4,500	1.2E+02	1.2E+02
Pentachlorophenol	NA	8.00	NA	1.8E+1	NA	2.8	1.8	2.8E+0	1.8E+0

All values are reported in µg/L.
NA - Criterion or value is not available or not applicable.
FCV - Final Chronic Value
WV - Wildlife Value
HNDV - Human Non-Drinking Water Value
HDV - Human Drinking Water Value
GSI - Groundwater/Surface Water Interface Criteria
The GSI criteria calculations for (G)-footnoted hazardous substances were performed using calculations available on the MDEQ website.
Site-specific hardness value used for receiving surface water.
Default surface water pH value of 8.00 used for calculations.