




From: Dave Larsen <dlarsen@reiengineering.com>
Sent: Thursday, August 15, 2019 9:30 AM
To: Stoltz, Carrie R - DNR
Subject: Greater Bass
Attachments: REI_20190815_092839.pdf

Updated lab results – call when you get a few minutes to discuss.

Thank you,
David N. Larsen P.G
Senior Hydrogeologist / Professional Geologist



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Table 2.a
Groundwater Analytical Results Summary
Greater Bass Lake Storage
N9276 Mill Road, Summit Lake, WI 54485

GB-1										
PARAMETER	ES	PAL	10/5/16	2/2/17	6/11/18	06/12/18	06/21/18	10/29/18	01/15/19	06/06/19
Metals (ug/L)										
Dissolved Lead	15	1.5	55.7	<4.3		NA		NA	NA	NA
Detected VOC's (ug/L)										
Benzene	5	0.5	5,910	434	Carbon Injection Completed	52.5	SVE System Started	9.1	20.5	396
Ethylbenzene	700	140	1,550	<i>498</i>		<i>606</i>		<i>175</i>	<i>414</i>	<i>334</i>
Toluene	800	160	7,840	<i>745</i>		34		3.1 ^J	29	857
Total Xylenes	2,000	400	6,000	1,235		<i>672.4</i>		179	<i>411</i>	<i>620</i>
Methyl-tert-Butyl Ether	60	12	<i>47.3^J</i>	<4.8		< 3.2		< 1.6	< 3.2	< 12.5
Total Trimethylbenzenes	480	96	2,155	1,013		1,755		557	1,161	1,109
Naphthalene	100	10	394	155		285		<i>81.3</i>	239	200
1,2-Dibromoethane (EDB)	0.05	0.005	139	NA		NA		NA	NA	NA
1,2-Dichloroethane	5	0.5	144	NA		NA		NA	NA	NA
n-Propylbenzene			262	NA		NA		NA	NA	NA
Field Measurements										
Temperature (°F)			50.45	47.5		48.03		50.8		
Conductivity (ms/cm)			494	149		214		91.2		
Dissolved Oxygen (mg/L)			0.14	0.41		0.29		0.50		
pH			6.61	6.32		7.98		6.47		
Redox Potential (mV)			0.1	106.9		116.7		165.9		

Notes:

PAL = Preventive Action Limit

ES = Enforcement Standards

Exceeds Enforcement Standard

BOLD
<i>Italic</i>

Exceeds Preventative Action Limit

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Table 2.b
Groundwater Analytical Results Summary
Greater Bass Lake Storage
N9276 Mill Road, Summit Lake, WI 54485

GB-2											
PARAMETER	ES	PAL	10/5/16	2/2/17	6/11/18	06/12/18	06/21/18	10/29/18	01/15/19	06/06/19	
Metals (ug/L)											
Dissolved Lead	15	1.5	<8.7	<4.3		NA		NA	NA	NA	
Detected VOC's (ug/L)											
Benzene	5	0.5	<0.50	<0.40	Carbon Injection Completed	< 0.31	SVE System Started	< 0.31	< 0.31	< 0.25	
Ethylbenzene	700	140	<0.50	<0.39		< 0.49		< 0.49	< 0.49	< 0.22	
Toluene	800	160	<0.50	<0.39		< 0.33		< 0.33	< 0.33	< 0.17	
Total Xylenes	2,000	400	<1.5	<0.80		< 0.66		< 0.66	< 0.66	< 0.47	
Methyl-tert-Butyl Ether	60	12	<0.17	<0.48		< 0.32		< 0.32	< 0.32	< 1.2	
Total Trimethylbenzenes	480	96	<1.0	<0.42		< 0.34		< 0.34	< 0.34	< 0.87	
Naphthalene	100	10	<2.5	<0.42		< 0.51		< 0.51	< 0.51	< 1.2	
Field Measurements											
Temperature (°F)			49.26	46.8		44.47		49.3			
Conductivity (ms/cm)			508	344		234		170.3			
Dissolved Oxygen (mg/L)			0.57	0.59	0.29	0.41					
pH			6.81	6.44	5.07	6.50					
Redox Potential (mV)			-51.3	10.2	204.3	206.8					

Notes:

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Table 2.c
Groundwater Analytical Results Summary
Greater Bass Lake Storage
N9276 Mill Road, Summit Lake, WI 54485

GB-3										
PARAMETER	ES	PAL	10/5/16	2/2/17	6/11/18	06/12/18	06/21/18	10/29/18	01/15/19	06/06/19
Metals (ug/L)										
Dissolved Lead	15	1.5	<4.3	<4.3		NA		NA	NA	NA
Detected VOC's (ug/L)										
Benzene	5	0.5	1,180	873	Carbon Injection Completed	350	SVE System Started	103	126	16
Ethylbenzene	700	140	1,100	<i>672</i>		<i>411</i>		<i>176</i>	<i>188</i>	88.3
Toluene	800	160	1,510	<i>527</i>		93.4		49.6	58.5	13.1 ¹
Total Xylenes	2,000	400	3,518	<i>1,658</i>		<i>934.1</i>		<i>424</i>	<i>451.3</i>	249.3
Methyl-tert-Butyl Ether	60	12	4.1	5.9 ¹		< 3.2		1.4 ¹	2.4 ¹	< 5.0
Total Trimethylbenzenes	480	96	1,507	1,074		517		<i>329.6</i>	<i>282.2</i>	<i>214.2</i>
Naphthalene	100	10	284	161		<i>94.8</i>		<i>57.7</i>	<i>61.3</i>	<i>22.9</i>
1,2-Dibromoethane (EDB)	0.05	0.005	13.9	NA		NA		NA	NA	NA
1,2-Dichloroethane	5	0.5	12.1	NA		NA		NA	NA	NA
Dichlorodifluoromethane	1,000	200	1.7	NA		NA		NA	NA	NA
Isopropylbenzene			67.4	NA		NA		NA	NA	NA
p-Isopropyltoluene			13.1	NA		NA		NA	NA	NA
n-Propylbenzene			243	NA		NA		NA	NA	NA
Field Measurements										
Temperature (°F)			48.28	47.03		44.00		48.3		
Conductivity (ms/cm)			313	309		152		65.9		
Dissolved Oxygen (mg/L)			0.45	0.36		1.36		1.49		
pH			6.55	6.33		7.45		6.24		
Redox Potential (mV)			-4.5	13.4		42.1		126		

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Table 2.d
Groundwater Analytical Results Summary
Greater Bass Lake Storage
N9276 Mill Road, Summit Lake, WI 54485

GB-4												
PARAMETER	ES	PAL	10/5/16	2/2/17	6/11/18	06/12/18	06/21/18	10/29/18	01/15/19	06/06/19		
Metals (ug/L)												
Dissolved Lead	15	1.5	<4.3	<4.3		NA		NA	NA	NA		
Detected VOC's (ug/L)												
Benzene	5	0.5	<i>1.9</i>	<i>0.98^J</i>	Carbon Injection Completed	< 0.31	SVE System Started	< 0.31	< 0.31	< 0.25		
Ethylbenzene	700	140	<0.50	<0.39		< 0.49		< 0.49	< 0.49	< 0.22		
Toluene	800	160	<0.50	<0.39		< 0.33		< 0.33	< 0.33	< 0.17		
Total Xylenes	2,000	400	<1.5	<0.80		< 0.66		< 0.66	< 0.66	< 0.47		
Methyl-tert-Butyl Ether	60	12	<0.17	<0.48		< 0.32		< 0.32	< 0.32	< 1.2		
Total Trimethylbenzenes	480	96	<1.0	<0.42		< 0.34		< 0.34	< 0.34	< 0.87		
Naphthalene	100	10	<2.5	<0.42		< 0.51		< 0.51	< 0.51	< 1.2		
Field Measurements												
Temperature (°F)			51.83	44.87				44.06		52.6		
Conductivity (ms/cm)			249	123				205		167.5		
Dissolved Oxygen (mg/L)			0.23	0.38		0.21		1.43				
pH			6.49	6.22		6.42		6.36				
Redox Potential (mV)			19	91.5		121.8		162.9				

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Table 2.e
Groundwater Analytical Results Summary
Greater Bass Lake Storage
N9276 Mill Road, Summit Lake, WI 54485

GB-5										
PARAMETER	ES	PAL	10/5/16	2/2/17	6/11/18	06/12/18	06/21/18	10/29/18	01/15/19	06/06/19
Metals (ug/L)										
Dissolved Lead	15	1.5	<4.3	<8.7		NA		NA	NA	NA
Detected VOC's (ug/L)										
Benzene	5	0.5	720	1,550	Carbon Injection Completed	2,060	SVE System Started	572	389	158
Ethylbenzene	700	140	1,830	1,550		1,940		1,520	1,550	1,080
Toluene	800	160	6,860	4,120		3,590		2,320	2,220	1,530
Total Xylenes	2,000	400	7,410	5,700		7,300		4,912	4,797	3,613
Methyl-tert-Butyl Ether	60	12	<8.7	<i>17.2^J</i>		<i>21.54^J</i>		10.6 ^J	19.3	< 31.1
Total Trimethylbenzenes	480	96	1,848	1,797		1,954		1,803	1,494	1,193
Naphthalene	100	10	328	320		345		341	339	187
Isopropylbenzene			53.6	NA		NA		NA	NA	NA
n-Propylbenzene			187	NA		NA		NA	NA	NA
Field Measurements										
Temperature (°F)			49.33	46.44		44.18		49.4		
Conductivity (ms/cm)			525	370		410		328.3		
Dissolved Oxygen (mg/L)			0.32	0.67		1.52		1.24		
pH			6.7	6.52		8.85		6.67		
Redox Potential (mV)			-49.4	-47.7		-46.2		-102		

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Table 2.f
Groundwater Analytical Results Summary
Greater Bass Lake Storage
N9276 Mill Road, Summit Lake, WI 54485

GB-6										
PARAMETER	ES	PAL	10/5/16	2/2/17	6/11/18	06/12/18	06/21/18	10/29/18	01/15/19	06/06/19
Metals (ug/L)										
Dissolved Lead	15	1.5	<4.3	<4.3		NA		NA	NA	NA
Detected VOC's (ug/L)										
Benzene	5	0.5	<0.50	<0.40	Carbon Injection Completed	< 0.31	SVE System Started	< 0.31	< 0.31	< 0.25
Ethylbenzene	700	140	<0.50	<0.39		< 0.49		< 0.49	< 0.49	< 0.22
Methyl-tert-Butyl Ether	60	12	<0.17	<0.48		< 0.33		< 0.33	< 0.33	< 0.17
Naphthalene	100	10	<2.5	<0.42		< 0.66		< 0.66	< 0.66	< 0.47
Toluene	800	160	<0.50	<0.39		< 0.32		< 0.32	< 0.32	< 1.2
Total Trimethylbenzenes	480	96	<1.0	<0.42		< 0.34		< 0.34	< 0.34	< 0.87
Total Xylenes	2,000	400	<1.5	<0.80		< 0.51		< 0.51	< 0.51	< 1.2
Field Measurements										
Temperature (°F)			49.44	45.29		45.15		49.4		
Conductivity (ms/cm)			71	57		32		65		
Dissolved Oxygen (mg/L)			3.32	2.46		3.18		2.48		
pH			7.14	6.53		6.4		6.18		
Redox Potential (mV)			48.7	96.5		234.4		70.2		

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Table 2.g
Groundwater Analytical Results Summary
Greater Bass Lake Storage
N9276 Mill Road, Summit Lake, WI 54485

GB-7										
PARAMETER	ES	PAL	2/6/17	6/11/18	06/12/18	06/21/18	10/29/18	01/15/19	06/06/19	
Metals (ug/L)										
Dissolved Lead	15	1.5	<4.3		NA		NA	NA	NA	
Detected VOC's (ug/L)										
Benzene	5	0.5	<0.50	Carbon Injection Completed	< 0.31	SVE System Started	< 0.31	< 0.31	< 0.25	
Ethylbenzene	700	140	<0.50		< 0.49		< 0.49	< 0.49	< 0.22	
Toluene	800	160	<0.50		< 0.32		< 0.32	< 0.33	< 0.17	
Total Xylenes	2,000	400	<1.5		< 0.51		< 0.51	< 0.66	< 0.47	
Methyl-tert-Butyl Ether	60	12	<0.17		< 0.33		< 0.33	< 0.32	< 1.2	
Total Trimethylbenzenes	480	96	<1.0		< 0.34		< 0.34	< 0.34	< 0.87	
Naphthalene	100	10	<2.5		< 0.66		< 0.66	< 0.51	< 1.2	
Field Measurements										
Temperature (°F)			NA				46.38		46.3	
Conductivity (ms/cm)			NA				78		54.4	
Dissolved Oxygen (mg/L)			NA		3.36		2.06			
pH			NA		5.91		5.96			
Redox Potential (mV)			NA		122.9		115.5			

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Exceeds Enforcement Standard

BOLD
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Table 2.h
Groundwater Analytical Results Summary
Greater Bass Lake Storage
N9276 Mill Road, Summit Lake, WI 54485

GB-8										
PARAMETER	ES	PAL	2/6/17	6/11/18	06/12/18	06/21/18	10/29/18	01/15/19	06/06/19	
Metals (ug/L)										
Dissolved Lead	15	1.5	<i>4.9^J</i>		NA		NA	NA	NA	
Detected VOC's (ug/L)										
Benzene	5	0.5	<0.50	Carbon Injection Completed	< 0.31	SVE System Started	< 0.31	< 0.31	< 0.25	
Ethylbenzene	700	140	<0.50		< 0.49		< 0.49	< 0.49	< 0.22	
Toluene	800	160	<0.50		< 0.32		< 0.32	< 0.33	< 0.17	
Total Xylenes	2,000	400	<1.5		< 0.51		< 0.51	< 0.66	< 0.47	
Methyl-tert-Butyl Ether	60	12	<0.17		< 0.33		< 0.33	< 0.32	< 1.2	
Total Trimethylbenzenes	480	96	<1.0		< 0.34		< 0.34	< 0.34	< 0.87	
Naphthalene	100	10	<2.5		< 0.66		< 0.66	< 0.51	< 1.2	
Field Measurements										
Temperature (°F)			NA				46.34		46.1	
Conductivity (ms/cm)			NA				103		137.9	
Dissolved Oxygen (mg/L)			NA		1.95		0.64			
pH			NA		6.88		6.23			
Redox Potential (mV)			NA		79.7		5.1			

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