

**PALL** Life Sciences

**4th Quarter, 2013**

**(October, November, December)**

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## **Summary of Activity**

CEB = Central Environmental Building  
C3 = C3 aquifer  
D2 = D2 aquifer  
E = E aquifer  
SW = Southwest Property Area  
Maple = Maple Road

### ***Treatment Activities***

10/07/13 - System 2A was shut down briefly for maintenance.  
11/05/13 - TW-19 (E) was shut down briefly for maintenance.  
11/10/13 - System 2A was shut down briefly for maintenance.  
11/27/13 - TW-10 & TW-14 (C3) and TW-17 (E) were turned on briefly for sampling.  
12/03/13 - System 2A was shut down briefly for maintenance.  
12/11/13 – LB-4 (D2) began operation  
12/12/13 - Treatment was shut down briefly for maintenance.

### ***Field Activities***

11/22/13 LB-4 completed

## **Submittals/Responses**

10/10/13 PLS submitted Discharge Monitoring Report (DMR) electronically to DEQ  
10/21/13 MDEQ response to Analysis of 1,4-Dioxane Trends at MW-103, May 22, 2013  
10/15/13 PLS submitted Monthly Monitoring Report (NPDES) to DEQ  
10/18/13 PLS submitted 3rd Quarter 2013 Report to DEQ  
11/14/13 PLS submitted Discharge Monitoring Report (DMR) electronically to DEQ  
PLS submitted Monthly Monitoring Report (NPDES) to DEQ  
12/16/13 PLS submitted Discharge Monitoring Report (DMR) electronically to DEQ  
PLS submitted Monthly Monitoring Report (NPDES) to DEQ

### *Anticipated Major Activities for the Next Quarter*

- Abandon TW-15 due to site access problem

### *Quarterly Performance Analysis*

For the months of October, November, December 2013, over 370 pounds of 1,4-dioxane were removed and 81,096,995 gallons of water were extracted from the contaminated aquifers, treated and discharged. The total mass of 1,4-dioxane removed since May 1997 is over 89,000 pounds and the total volume of water discharged since May 1997 is over 7 billion gallons.

In general, the performance of the operation was as expected, purging and treating contaminated groundwater to the existing allowable capacities.

# **Mass Reduction**

**MASS REDUCTION DETAIL BY AQUIFIER**

**October 1 -October 31, 2013**

Extraction Well	Month To Date Gallons Extracted	Month To Date Average Daily Flow Rate GPM	Month To Date Average Daily Pounds Removed	Month To Date Pounds Removed	Month To Date Average Concentration ppb
<b>C3</b>					
TW-1	-	0	0.0	0.0	120
TW-2 (Dolph)	397,207	9	0.0	0.3	79
TW-3	-	0	0.0	0.0	8
TW-6	-	0	0.0	0.0	58
TW-10	-	0	0.0	0.0	320
TW-14	-	0	0.0	0.0	24
TW-20	2,231,651	50	0.5	15.2	814
MW-22	-	0.0	0.0	0.0	1044
<i>Sub-Totals</i>	<i>2,628,858</i>	<i>59</i>	<i>0</i>	<i>15</i>	
<b>Marshy</b>					
PW-1	95,023	2	0.0	0.8	954
<i>Sub-Totals</i>	<i>95,023</i>	<i>2</i>	<i>0</i>	<i>1</i>	
<b>E</b>					
TW-11	1,312,193	29	0.1	2.1	196
TW-12	-	0	0.0	0.0	33
TW-17	-	0	0.0	0.0	560
TW-18	6,773,912	152	0.5	16.8	297
TW-19	4,555,024	102	0.9	26.9	708
MW-64	-	0	0.0	0.0	52
<i>Sub-Totals</i>	<i>12,641,129</i>	<i>283</i>	<i>1</i>	<i>46</i>	
<b>Southwest</b>					
Active Wells	1,356,043	30	0.2	7.4	651
MW-10d	-	0.0	0.0	0.0	1364
MW-75	-	0	0.0	0.0	1174
MW-45d	-	0.0	0.0	0.0	403
<i>Sub-Totals</i>	<i>1,356,043</i>	<i>30</i>	<i>0</i>	<i>7</i>	
<b>D0</b>					
Ann Arbor Cleaning	-	-	-	0.000	68
<i>Sub-Totals</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>0.000</i>	
<b>D2</b>					
LB-1	4,466,183	100	0.6	18.6	498
LB-3	-	0	0.0	0.0	140
HW-S	-	0	0.0	0.0	630
TW-5	2,267,947	51	0.5	16.4	869
TW-9	1,113,639	25	0.3	8.1	875
TW-21	2,319,499	52	0.1	2.4	130
MW-11D	-	0	0.0	0.0	97
<i>Sub-Totals</i>	<i>10,167,268</i>	<i>228</i>	<i>1</i>	<i>46</i>	
<b>Overall Totals</b>	<b>26,888,321</b>	<b>602</b>	<b>3.7</b>	<b>115.0</b>	

\*SW Active = TW-8, TW-22

**MASS REDUCTION DETAIL BY AQUIFER**

November 1 - November 30, 2013

Extraction Well	Month To Date Gallons Extracted	Month To Date Average Daily Flow Rate GPM	Month To Date Average Daily Pounds Removed	Month To Date Pounds Removed	Month To Date Average Concentration ppb
<b>C3</b>					
TW-1	-	0	0.0	0.0	124
TW-2 (Dolph)	355,159	8	0.0	0.3	92
TW-3	-	0	0.0	0.0	7
TW-6	-	0	0.0	0.0	57
TW-10	493	0	0.0	0.0	312
TW-14	816	0	0.0	0.0	23
TW-20	2,065,369	48	0.5	14.4	837
MW-22	-	0.0	0.0	0.0	1090
<b>Sub-Totals</b>	<b>2,421,837</b>	<b>56</b>	<b>0</b>	<b>15</b>	
<b>Marshy</b>					
PW-1	85,314	2	0.0	0.7	1000
<b>Sub-Totals</b>	<b>85,314</b>	<b>2</b>	<b>0</b>	<b>1</b>	
<b>E</b>					
TW-11	1,351,137	31	0.1	2.3	208
TW-12	-	0	0.0	0.0	32
TW-17	948	0	0.0	0.0	584
TW-18	6,614,139	153	0.5	16.4	298
TW-19	4,399,121	102	1.1	33.3	907
MW-64	-	0	0.0	0.0	47
<b>Sub-Totals</b>	<b>12,365,345</b>	<b>286</b>	<b>2</b>	<b>52</b>	
<b>Southwest</b>					
Active Wells	1,287,627	30	0.2	7.1	661
MW-10d	-	0.0	0.0	0.0	1330
MW-75	-	0	0.0	0.0	1440
MW-45d	-	0.0	0.0	0.0	190
<b>Sub-Totals</b>	<b>1,287,627</b>	<b>30</b>	<b>0</b>	<b>7</b>	
<b>D0</b>					
Ann Arbor Cleaning	-			0.000	75
<b>Sub-Totals</b>	<b>-</b>			<b>0.000</b>	
<b>D2</b>					
LB-1	4,322,658	100	0.6	18.2	503
LB-3	-	0	0.0	0.0	140
HW-S	-	0	0.0	0.0	630
TW-5	2,320,179	54	0.5	14.4	742
TW-9	1,053,946	24	0.3	7.6	870
TW-21	2,189,890	51	0.1	2.3	130
MW-11D	-	0	0.0	0.0	94
<b>Sub-Totals</b>	<b>9,886,673</b>	<b>229</b>	<b>1</b>	<b>42</b>	
<b>Overall Totals</b>	<b>26,046,796</b>	<b>603</b>	<b>3.9</b>	<b>117.0</b>	

\*SW Active = TW-8, TW-22

**MASS REDUCTION DETAIL BY AQUIFER**

**December 1 - December 31, 2013**

Extraction Well	Month To Date Gallons Extracted	Month To Date Average Daily Flow Rate GPM	Month To Date Average Daily Pounds Removed	Month To Date Pounds Removed	Month To Date Average Concentration ppb
<b>C3</b>					
TW-1	-	0	0.0	0.0	150
TW-2 (Dolph)	345,956	8	0.0	0.3	87
TW-3	-	0	0.0	0.0	0
TW-6	-	0	0.0	0.0	57
TW-10	-	0	0.0	0.0	280
TW-14	-	0	0.0	0.0	19
TW-20	2,046,348	46	0.6	18.7	1093
MW-22	-	0.0	0.0	0.0	1090
<i>Sub-Totals</i>	2,392,304	54	1	19	
<b>Marshy</b>					
PW-1	82,002	2	0.0	1.0	1484
<i>Sub-Totals</i>	82,002	2	0	1	
<b>E</b>					
TW-11	1,460,977	33	0.1	2.8	229
TW-12	-	0	0.0	0.0	27
TW-17	-	0	0.0	0.0	740
TW-18	6,691,924	150	0.8	23.8	426
TW-19	4,556,391	102	1.0	30.8	811
MW-64	-	0	0.0	0.0	47
<i>Sub-Totals</i>	12,709,292	285	2	57	
<b>Southwest</b>					
Active Wells	1,317,017	30	0.2	7.6	688
MW-10d	-	0.0	0.0	0.0	1330
MW-75	-	0	0.0	0.0	1440
MW-45d	-	0.0	0.0	0.0	190
<i>Sub-Totals</i>	1,317,017	30	0	8	
<b>D0</b>					
Ann Arbor Cleaning	42,000			0.028	75
<i>Sub-Totals</i>	42,000			0.028	
<b>D2</b>					
LB-1	1,513,702	34	0.2	6.9	549
LB-4	2,950,935	66	0.7	21.2	860
HW-S	-	0	0.0	0.0	630
TW-5	2,480,684	56	0.5	14.3	691
TW-9	1,114,829	25	0.3	8.5	915
TW-21	2,180,451	49	0.1	2.1	120
MW-11D	-	0	0.0	0.0	94
<i>Sub-Totals</i>	10,240,601	229	2	53	
<b>Overall Totals</b>	26,741,216	599	4.4	138.0	

\*SW Active = TW-8, TW-22



**MASS REDUCTION SUMMARY**  
**Mass Removed Per Month (lb)**

A	B	C	D	E	F	G
Month	Mass Removed from Unit E Only	Mass Removed from Southwest Only	Mass Removed from Marshy Only	Mass Removed from Units C3 and D2 Only	Mass Removed from Unit D0	Total Mass Removed from Units E, D2, C3, D0, Southwest and Marshy
Aug-00	0	0	8	366		374
Sep-00	0	0	9	332		341
Oct-00	0	5	9	583		597
Nov-00	0	3	12	1160		1175
Dec-00	0	0	10	1040		1050
Jan-01	0	0	7	816		823
Feb-01	0	0	7	1056		1063
Mar-01	0	0	11	1379		1390
Apr-01	0	0	9	1140		1149
May-01	0	1	8	990		999
Jun-01	0	2	8	933		943
Jul-01	0	2	10	1121		1133
Aug-01	0	2	13	1018		1033
Sep-01	0	1	9	909		919
Oct-01	0	5	8	896		909
Nov-01	0	4	5	827		836
Dec-01	0	6	4	768		778
Jan-02	0	6	5	753		764
Feb-02	0	4	6	691		701
Mar-02	0	7	7	663		677
Apr-02	0	6	7	682		695
May-02	100	9	7	898		1014
Jun-02	94	9	6	889		998
Jul-02	56	10	7	640		713
Aug-02	53	8	6	745		812
Sep-02	51	8	6	860		925
Oct-02	33	6	4	603		646
Nov-02	57	8	5	880		950
Dec-02	48	9	5	842		904
Jan-03	45	8	6	839		898
Feb-03	37	6	6	767		816
Mar-03	44	8	7	763		822
Apr-03	39	8	3	716		766
May-03	36	13	5	725		779
Jun-03	34	15	5	683		737
Jul-03	29	15	5	678		727
Aug-03	31	15	6	676		728
Sep-03	27	16	5	644		692
Oct-03	34	17	5	701		757
Nov-03	26	12	5	663		706
Dec-03	29	14	6	635		684
Jan-04	28	15	6	667		716
Feb-04	8	11	5	485		509
Mar-04	23	14	7	573		617
Apr-04	27	15	6	537		585
May-04	16	10	5	439		470
Jun-04	21	11	5	499		536
Jul-04	36	12	5	506		559

**MASS REDUCTION SUMMARY**  
**Mass Removed Per Month (lb)**

A	B	C	D	E	F	G
Month	Mass Removed from Unit E Only	Mass Removed from Southwest Only	Mass Removed from Marshy Only	Mass Removed from Units C3 and D2 Only	Mass Removed from Unit D0	Total Mass Removed from Units E, D2, C3, D0, Southwest and Marshy
Aug-04	54	12	5	480		551
Sep-04	34	9	5	382		430
Oct-04	30	10	5	358		403
Nov-04	30	9	5	395		439
Dec-04	33	11	5	442		491
Jan-05	29	11	4	404		448
Feb-05	26	9	4	390		429
Mar-05	27	9	4	409		450
Apr-05	33	4	3	396		436
May-05	27	8	2	364		401
Jun-05	31	9	3	361		404
Jul-05	31	8	1	279		319
Aug-05	12	6	2	275		295
Sep-05	13	8	2	327		350
Oct-05	16	6	3	297		322
Nov-05	13	7	4	291		315
Dec-05	12	8	4	325		349
Jan-06	115	7	3	308		433
Feb-06	144	7	3	290		444
Mar-06	148	8	3	331		490
Apr-06	125	7	3	291		426
May-06	137	9	3	402		551
Jun-06	119	5	2	329		456
Jul-06	107	8	3	310		427
Aug-06	104	8	2	307		421
Sep-06	97	9	3	300		409
Oct-06	93	9	3	327		432
Nov-06	80	7	2	268		357
Dec-06	68	6	2	238		314
Jan-07	91	8	2	305		406
Feb-07	84	8	2	284		378
Mar-07	91	8	3	306		408
Apr-07	84	8	2	280		374
May-07	82	8	2	288		380
Jun-07	81	8	2	279		370
Jul-07	66	8	2	256		332
Aug-07	73	8	2	270		353
Sep-07	77	8	2	247		334
Oct-07	73	8	2	244		327
Nov-07	68	8	2	263		341
Dec-07	69	8	2	260		339
Jan-08	65	7	2	237		311
Feb-08	53	6	2	203		264
Mar-08	56	7	2	220		285
Apr-08	54	7	2	200		263
May-08	55	7	2	206		270
Jun-08	52	6	2	195		256
Jul-08	39	1	2	139		181

**MASS REDUCTION SUMMARY**  
**Mass Removed Per Month (lb)**

A	B	C	D	E	F	G
Month	Mass Removed from Unit E Only	Mass Removed from Southwest Only	Mass Removed from Marshy Only	Mass Removed from Units C3 and D2 Only	Mass Removed from Unit D0	Total Mass Removed from Units E, D2, C3, D0, Southwest and Marshy
Aug-08	50	7	2	198		256
Sep-08	43	5	2	177		227
Oct-08	45	5	2	187		239
Nov-08	45	7	2	197		251
Dec-08	45	5	2	187		239
Jan-09	39	8	2	124		173
Feb-09	34	8	2	122		164
Mar-09	35	8	2	122		166
Apr-09	32	6	1	119		158
May-09	45	7	2	201		254
Jun-09	39	5	1	157		202
Jul-09	38	5	1	152		196
Aug-09	39	7	2	202		250
Sep-09	36	6	2	223		267
Oct-09	36	8	2	206		251
Nov-09	32	7	1	167		208
Dec-09	32	8	1	171		212
Jan-10	34	8	1	175		219
Feb-10	30	7	1	161		198
Mar-10	33	7	1	173		214
Apr-10	33	7	1	175		216
May-10	33	7	1	176		217
Jun-10	29	6	1	130		165
Jul-10	20	7	1	171		200
Aug-10	23	7	1	188		220
Sep-10	21	6	1	148		177
Oct-10	24	7	2	185		218
Nov-10	18	6	2	151		176
Dec-10	26	6	2	164		198
Jan-11	25	6	2	163		195
Feb-11	25	7	2	165		198
Mar-11	27	8	2	174		209
Apr-11	22	6	1	143		171
May-11	20	5	1	138		164
Jun-11	17	5	1	104		127
Jul-11	15	4	1	92		112
Aug-11	14	2	1	80		97
Sep-11	16	6	1	98		121
Oct-11	17	6	1	113		137
Nov-11	33	6	1	105		145
Dec-11	45	6	1	98		150
Jan-12	46	6	1	103		156
Feb-12	40	5	1	89		135
Mar-12	43	5	1	94	0.017	142
Apr-12	47	6	1	105	0.000	159
May-12	47	6	1	100	0.000	154
Jun-12	42	6	0.3	99	0.029	148
Jul-12	30	6	0.1	102	0.000	138

**MASS REDUCTION SUMMARY**  
**Mass Removed Per Month (lb)**

A	B	C	D	E	F	G
Month	Mass Removed from Unit E Only	Mass Removed from Southwest Only	Mass Removed from Marshy Only	Mass Removed from Units C3 and D2 Only	Mass Removed from Unit D0	Total Mass Removed from Units E, D2, C3, D0, Southwest and Marshy
Aug-12	29	6	0.0	75	0.000	109
Sep-12	32	5	0.1	62	0.029	100
Oct-12	27	5	0.0	57	0.000	88
Nov-12	33	4	0.0	62	0.000	99
Dec-12	31	3	0.0	52	0.020	86
Jan-13	46	3	0.0	54	0.000	103
Feb-13	46	3	0.0	47	0.000	95
Mar-13	53	3	0.0	53	0.029	109
Apr-13	46	5	0.1	61	0.000	113
May-13	57	8	1.0	60	0.000	126
Jun-13	43	7	0.7	52	0.029	102
Jul-13	57	9	0.9	61	0.000	128
Aug-13	48	7	0.8	63	0.000	120
Sep-13	46	7	0.6	60	0.023	113
Oct-13	46	7	0.8	61	0.000	115
Nov-13	52	7	0.7	57	0.000	117
Dec-13	57	8	1.0	72	0.026	138
<b>Total to date</b>	<b>6472</b>	<b>1115</b>	<b>523</b>	<b>59318</b>	<b>0</b>	<b>67428</b>