Doug Mendoza

From: Ed Galbraith <EGalbraith@barr.com>
Sent: Monday, January 06, 2014 9:46 AM
To: Doug Mendoza; Power, Brian <BPower@republicservices.com> (BPower@republicservices.com) (BPower@republicservices.com)
Cc: John Lodderhose; Kelly Caddy
Subject: RE: RESENDING: Additional information regarding Bridgeton Landfill 3rd quarter 2013 self-monitoring results
Attachments: Historical RadChem Data_01062014.xlsx

Doug,

Per our discussion, attached is a revised spreadsheet of historic and current RadChem Data. We have made the following changes:

- Both Duplicate Original and Duplicate results are now included.
- We have qualified some of recent data based upon the narrative of the Eberline reports, as follows

BQX	Gross Beta 04/05/2013: Per Eberline Report 13-06015, Potassium 40 results confirm actual activity range for Gross Beta in the range of 407-408 pCi/l.
BQX	Alpha 09/13/2013: Per Eberline Report 13-09091 and 13-10138, further analysis of potential alpha emitters ascertained that the sample does not contain any positive alpha emitting radionuclides.
BQX	Gross Gamma 09/13/2013: Per Eberline Report 13-09091, Gross Gamma results were calculated based on Potassium-40 which was the only positive gamma emitting radionuclide in this sample.
BQX	Thorium 230 09/13/2013: Per Eberline Report 13-10138, Thorium 230 result is biased positive and should not be considered a true positive. Results should be qualified as "Estimated High."
BQX	Thorium 228 and 232 09/13/2013: Per Eberline Report 13-10138, All Thorium results should be qualified as estimated due to low chemical recoveries. Due to the high total solids content, this sample is not very amenable to this procedure.

- The Cesium-137 results that are actually "Gross Gamma as Cesium 137" are now reflected as such in the column header. The more recent results, which are truly Gross Gamma scans, are labeled as such to distinguish them from the Cs-137 analysis.

Please let me know if you have any further questions. Thank you.

Ed Galbraith

Senior Environmental Scientist
Jefferson City office: 573.638.5024
cell: 573.418.5562
egalbraith@barr.com
www.barr.com

resourceful. naturally. BARR

From: Doug Mendoza [mailto:DMENDOZA@stlmsd.com]
Sent: Thursday, January 02, 2014 9:38 AM

(1)

Ta

Bridgeton Radio

					Parameter	Solids, total suspended	Uranium	Actinium-228
					Total or Dissolved	NA	Total	NA
Location	Date	lab_name_code	Sample Type	Data Status	lab_sdg			
Outfall008	9/13/2013	Eberline	DO	QC Pending	13-09091	--	--	13.4 +/- 8.30 pC
Outfall008	9/13/2013	Eberline	DUP	QC Pending	13-09091	--	--	9.44 +/- 9.15 pC
Outfall008	9/13/2013	Eberline	DO	QC Pending	13-10138	--	--	--
Outfall008	9/13/2013	Eberline	DUP	QC Pending	13-10138	--	--	--
Outfall008	9/13/2013	Heritage	DO	QC pending	65229	14000 mg/l	--	--
Outfall008	6/18/2013	Eberline	DO	QC Pending	13-06059	--	--	2.99 +/- 7.92 pC
Outfall008	6/18/2013	Eberline	DUP	QC Pending	13-06059	--	--	3.18 +/- 7.78 pC
Outfall008	6/18/2013	Heritage	DO	QC pending	64835	2800 mg/l	--	--
Treat Commingled MSD	4/25/2013	PDC	DO	Validated	3043568	1200 mg/l	--	--
Treat Commingled MSD	4/5/2013	Eberline	DO	Validated	1306015	--	--	5.18 +/- 25.3 pC
Treat Commingled MSD	4/5/2013	Eberline	DUP	Validated	1306015	--	--	-29.3 +/- 35.3 pC
Treat Commingled MSD	4/5/2013	PDC	DO	Validated	3041134	1500 mg/l	--	--
Treat Commingled MSD	4/5/2013	TA	DO	Validated	160-2039-1	--	< 100 ug/l	--
LCH_Outfall008	12/13/2012	TA	DO	QC Pending	160-1108-1	--	< 20 ug/l	--
Outfall008	12/13/2012	Heritage	DO	QC pending	64037	340 mg/l	--	--
Outfall008	9/19/2012	Heritage	DO	QC pending	63614	1300 mg/l	--	--
Outfall008	9/19/2012	TestAmerica	DO	QC pending	F2I190459	--	< 2.0 ug/l	--
Outfall008	5/15/2012	Heritage	DO	QC pending	63070	660 mg/l	--	--
Outfall008	5/15/2012	TestAmerica	DO	QC pending	F2E150442	--	--	--
Outfall008	5/15/2012	TestAmerica	DUP	QC pending	F2E150442	--	--	--
Outfall008	3/6/2012	TestAmerica	DO	QC pending	F2C080411	--	--	--
Outfall008	3/6/2012	TestAmerica	DUP	QC pending	F2C080411	--	--	--
Outfall008	11/29/2011	Heritage	DO	QC pending	62465	61 mg/l	--	--
Outfall008	11/29/2011	TestAmerica	DO	QC pending	F1K290445	--	< 5.0 ug/l	--
Outfall008	8/18/2011	Heritage	DO	QC pending	61987	46 mg/l	--	--
Outfall008	8/18/2011	TestAmerica	DO	QC pending	F1H180440	--	< 1.0 ug/l	--
Outfall008	5/11/2011	Heritage	DO	QC pending	61541	23 mg/l	--	--
Outfall008	5/11/2011	TestAmerica	DO	QC pending	F1E110517	--	< 1.0 ug/l	--
Outfall008	3/16/2011	Heritage	DO	QC pending	61273	33 mg/l	--	--
Outfall008	3/16/2011	TestAmerica	DO	QC pending	F1C160545	--	16.8 +/- 2.3 ug/l	--
Outfall008	11/17/2010	Heritage	DO	QC pending	60800	22 mg/l	--	--
Outfall008	11/17/2010	TestAmerica	DO	Validated	F0K170562	--	13.9 +/- 1.9 U ug/l	--
Outfall008	9/8/2010	Heritage	DO	QC pending	60486	22 mg/l	--	--
Outfall008	9/8/2010	TestAmerica	DO	Validated	F0I080494	--	16.0 +/- 2.2 ug/l	--
Outfall008	5/25/2010	Heritage	DO	QC pending	60022	62 mg/l	--	--
Outfall008	5/25/2010	TestAmerica	DO	Validated	F0E250568	--	0.705 +/- 0.041 ug/l	--
Outfall008	5/25/2010	TestAmerica	DUP	Validated	F0E250568	--	0.909 +/- 0.051 ug/l	--
Outfall008	2/25/2010	Heritage	DO	QC pending	59650	21 mg/l	--	--
Outfall008	2/25/2010	TestAmerica	DO	Validated	F0B250518	--	9.8 +/- 1.3 ug/l	--
Outfall008	11/4/2009	Heritage	DO	Validated	59175	24 mg/l	--	--
Outfall008	11/4/2009	TestAmerica	DO	Validated	F9K040546	--	3.03 +/- 0.37 U ug/l	--
Outfall008	8/6/2009	Heritage	DO	Validated	58742	19 mg/l	--	--
Outfall008	8/6/2009	TestAmerica	DO	Validated	F9H060204	--	2.57 +/- 0.40 U ug/l	--
Outfall008	8/6/2009	TestAmerica	DUP	Validated	F9H060204	--	--	--
Outfall008	5/7/2009	Heritage	DO	Validated	58370	25 mg/l	--	--
Outfall008	5/7/2009	TestAmerica	DO	Validated	F9E080107	--	6.09 +/- 0.83 ug/l	--
Outfall008	2/12/2009	Heritage	DO	Validated	58064	31 mg/l	--	--
Outfall008	2/12/2009	TestAmerica	DO	Validated	F9B120270	--	-0.96 +/- 0.19 U ug/l	--
Outfall008	11/4/2008	Heritage	DO	Validated	57674	24 mg/l	--	--
Outfall008	11/4/2008	TestAmerica	DO	Validated	F8K050146	--	7.09 +/- 0.88 U ug/l	--
Outfall008	11/4/2008	TestAmerica	DUP	Validated	F8K050146	--	--	--
Outfall008	7/16/2008	Heritage	DO	Validated	57153	49 mg/l	--	--
Outfall008	7/16/2008	TestAmerica	DO	Validated	F8G160271	--	--	--
Outfall008	7/16/2008	TestAmerica	DUP	Validated	F8G160271	--	--	--
Outfall008	5/6/2008	Heritage	DO	Validated	56732	15 mg/l	--	--
Outfall008	5/6/2008	TestAmerica	DO	Validated	F8E060240	--	0.542 +/- 0.089 U ug/l	--
Outfall008	5/6/2008	TestAmerica	DUP	Validated	F8E060240	--	--	--
Outfall008	3/13/2008	Heritage	DO	Validated	65044	75 mg/l	--	--
Outfall008	3/13/2008	TestAmerica	DO	Validated	F8C130342	--	0.687 +/- 0.093 U ug/l	--
Outfall008	3/13/2008	TestAmerica	DUP	Validated	F8C130342	--	--	--
Outfall008	11/29/2007	Heritage	DO	Validated	56024	37 mg/l	--	--
Outfall008	11/29/2007	TestAmerica	DO	Validated	F7K290239	--	1.07 +/- 0.18 U ug/l	--
Outfall008	11/29/2007	TestAmerica	DUP	Validated	F7K290239	--	--	--
Outfall006	8/21/2007	Heritage	DO	Validated	55695	11 h mg/l	--	--
Outfall006	8/20/2007	TestAmerica	DO	Validated	F7H220163	--	-20.0 +/- 2.6 U* ug/l	--
Outfall006	8/20/2007	TestAmerica	DUP	Validated	F7H220163	--	--	--

e 1
gical Chemistry

(1)

Bismuth 214	Gross Gamma as Cesium 137	Cobalt-60	Gross Alpha (radiation)	Gross Alpha (radiation)	Gross Beta (radiation)	Gross Beta (radiation)
NA	NA	NA	Dissolved	NA	Dissolved	NA
1.38 +/- 4.04 pCi/l	--	--	--	216 +/- 106 BQX pCi/l	--	819 +/- 169 pCi/l
7.10 +/- 6.28 pCi/l	--	--	--	87.1 +/- 121 BQX pCi/l	--	879 +/- 182 pCi/l
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
-4.18 +/- 3.91 pCi/l	1.54 +/- 1.67 pCi/l	--	--	46.6 +/- 57.1 pCi/l	--	429 +/- 102 pCi/l
0.840 +/- 4.12 pCi/l	0.00207 +/- 1.83 pCi/l	--	--	27.8 +/- 47.3 pCi/l	--	452 +/- 104 pCi/l
--	--	--	--	--	--	--
--	--	--	--	--	--	--
5.78 +/- 19.3 pCi/l	6.62 +/- 8.36 pCi/l	-5.34 +/- 7.14 pCi/l	117 +/- 91.3 pCi/l	-28.9 +/- 56.7 pCi/l	464 +/- 141 pCi/l	1860 +/- 290 BQX pCi/l
39.9 +/- 28.8 pCi/l	4.51 +/- 6.40 pCi/l	-6.80 +/- 8.53 pCi/l	--	-14.0 +/- 58.2 pCi/l	--	408 +/- 104 BQX pCi/l
--	--	--	--	--	--	--
--	< 20.0 U pCi/l	--	--	3.71 +/- 57.3 UG pCi/l	--	--
--	< 20 pCi/l	--	--	< 3 UG pCi/l	--	379 +/- 80.4 pCi/l
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	0.5 +/- 5.6 U pCi/l	--	--	6 +/- 78 U pCi/l	--	331 +/- 74 pCi/l
--	--	--	--	--	--	--
--	-1.4 +/- 6.6 U pCi/l	--	--	29 +/- 30 U pCi/l	--	160 +/- 33 pCi/l
--	1.9 +/- 5.3 U pCi/l	--	--	--	--	--
--	-0.5 +/- 7.3 U pCi/l	--	--	38 +/- 30 U pCi/l	--	183 +/- 33 pCi/l
--	0 +/- 4.5 U pCi/l	--	--	28 +/- 34 U pCi/l	--	170 +/- 32 pCi/l
--	--	--	--	--	--	--
--	-1.1 +/- 6.8 U pCi/l	--	--	21 +/- 15 pCi/l	--	72 +/- 14 pCi/l
--	--	--	--	--	--	--
--	-0.3 +/- 6.2 U pCi/l	--	--	31 +/- 19 pCi/l	--	59 +/- 12 pCi/l
--	--	--	--	--	--	--
--	-2.5 +/- 8.4 U pCi/l	--	--	8 +/- 18 U pCi/l	--	47 +/- 11 pCi/l
--	--	--	--	--	--	--
--	0.3 +/- 6.0 U pCi/l	--	--	3 +/- 13 U pCi/l	--	84 +/- 14 pCi/l
--	--	--	--	--	--	--
--	2.6 +/- 7.0 U pCi/l	--	--	15 +/- 10 pCi/l	--	48.2 +/- 9.7 pCi/l
--	--	--	--	--	--	--
--	0.6 +/- 7.9 U pCi/l	--	--	9 +/- 13 U pCi/l	--	58 +/- 13 pCi/l
--	--	--	--	--	--	--
--	0.757 +/- 5.5 U pCi/l	--	--	5.21 +/- 2.0 U pCi/l	--	114 +/- 9.0 pCi/l
--	6.81 +/- 5.3 U pCi/l	--	--	1.25 +/- 1.2 U pCi/l	--	109 +/- 8.5 pCi/l
--	--	--	--	--	--	--
--	3.5 +/- 8.4 U pCi/l	--	--	10 +/- 10 U pCi/l	--	56.3 +/- 9.4 pCi/l
--	--	--	--	--	--	--
--	-0.06 +/- 5.8 U pCi/l	--	--	8 +/- 10 U pCi/l	--	73 +/- 13 pCi/l
--	--	--	--	--	--	--
--	-0.7 +/- 9.2 U pCi/l	--	--	18 +/- 10 pCi/l	--	50.8 +/- 9.7 pCi/l
--	1 +/- 8.6 U pCi/l	--	--	9 +/- 12 U pCi/l	--	58 +/- 11 U pCi/l
--	--	--	--	--	--	--
--	0 +/- 9.4 U pCi/l	--	--	11.0 +/- 9.9 U pCi/l	--	68 +/- 11 pCi/l
--	--	--	--	--	--	--
--	0.1 +/- 5.9 U pCi/l	--	--	-4.4 +/- 8.2 U pCi/l	--	73 +/- 13 pCi/l
--	--	--	--	--	--	--
--	0.8 +/- 7.0 U pCi/l	--	--	20 +/- 12 pCi/l	--	66 +/- 11 pCi/l
--	0.4 +/- 7.5 U pCi/l	--	--	11 +/- 11 U pCi/l	--	66 +/- 11 pCi/l
--	--	--	--	--	--	--
--	-0.07 +/- 7.8 U pCi/l	--	--	7.3 +/- 7.8 U pCi/l	--	46.4 +/- 8.3 pCi/l
--	-1.1 +/- 8.6 U pCi/l	--	--	3.2 +/- 7.0 U pCi/l	--	49.0 +/- 8.0 pCi/l
--	--	--	--	--	--	--
--	0.5 +/- 6.7 U pCi/l	--	--	-0.2 +/- 7.7 U pCi/l	--	83 +/- 15 pCi/l
--	-0.7 +/- 8.0 U pCi/l	--	--	2 +/- 11 U pCi/l	--	88 +/- 16 pCi/l
--	--	--	--	--	--	--
--	0.3 +/- 8.4 U pCi/l	--	--	20 +/- 16 U pCi/l	--	70 +/- 13 pCi/l
--	1.6 +/- 8.2 U pCi/l	--	--	--	--	--
--	--	--	--	--	--	--
--	1 +/- 9.1 U pCi/l	--	--	11.0 +/- 9.97 U pCi/l	--	71 +/- 16 pCi/l
--	4.1 +/- 6.0 U pCi/l	--	--	--	--	--
--	--	--	--	--	--	--
--	2.8 +/- 8.9 U pCi/l	--	--	12 +/- 12 U pCi/l	--	71 +/- 14 pCi/l
--	-1.3 +/- 9.5 U pCi/l	--	--	--	--	--

(2)

Ta
Bridgeton Radio

					Parameter	Solids, total suspended	Uranium	Actinium-228
					Total or Dissolved	NA	Total	NA
Location	Date	lab_name_code	Sample Type	Data Status	lab_sdg			
Outfall006	5/22/2007	Heritage	DO	Validated	55411.1	**40 mg/l**	--	--
Outfall006	5/22/2007	TestAmerica	DO	Validated	F7E220283	--	**-0.514 +/- 0.086 U ug/l**	--
Outfall006	5/21/2007	TestAmerica	DO	Validated	F7E220283	--	**-0.48 +/- 0.10 U ug/l**	--
Outfall006	5/21/2007	TestAmerica	DUP	Validated	F7E220283	--	--	--
Outfall006	3/8/2007	Heritage	DO	Validated	5400	**25 h mg/l**	--	--
Outfall006	3/8/2007	TestAmerica	DO	Validated	F7C080312	--	**0.424 +/- 0.065 U ug/l**	--
Outfall006	3/8/2007	TestAmerica	DUP	Validated	F7C080312	--	--	--
Outfall006	12/21/2006	Heritage	DO	Validated	5182	**39 h mg/l**	--	--
Outfall006	12/21/2006	TestAmerica	DO	Validated	F6L210233	--	**6.88 +/- 0.86 ug/l**	--
Outfall006	12/21/2006	TestAmerica	DUP	Validated	F6L210233	--	--	--
Outfall006	7/26/2006	Heritage	DO	QC pending	4611	**22 mg/l**	--	--
Outfall006	6/15/2006	Heritage	DO	QC pending	4514	**1200 mg/l**	--	--
Outfall006	1/19/2006	Heritage	DO	QC pending	4063	**150 mg/l**	--	--

e 1
gical Chemistry

(2)

Bismuth 214 NA	Gross Gamma as Cesium 137 NA	Cobalt-60 NA	Gross Alpha (radiation) Dissolved	Gross Alpha (radiation) NA	Gross Beta (radiation) Dissolved	Gross Beta (radiation) NA
--	--	--	--	--	--	--
--	-2.1 +/- 7.8 U pCi/l	--	--	24 +/- 13 pCi/l	--	78 +/- 14 pCi/l
--	1.9 +/- 7.4 U pCi/l	--	--	18 +/- 13 U pCi/l	--	68 +/- 13 U pCi/l
--	--	--	--	11 +/- 12 U pCi/l	--	63 +/- 12 pCi/l
--	--	--	--	--	--	--
--	7.2 +/- 8.0 U pCi/l	--	--	14 +/- 17 U pCi/l	--	88 +/- 16 pCi/l
--	-9.3 +/- 8.7 U pCi/l	--	--	--	--	--
--	--	--	--	--	--	--
--	-3 +/- 10 U pCi/l	--	--	15 +/- 15 U pCi/l	--	81 +/- 17 pCi/l
--	2.0 +/- 9.0 U pCi/l	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--

(3)

Table 1
Bridgeton Radiological Ch

					Parameter	Gross Gamma	Lead 210	Lead 212	Lead 214
					Total or Dissolved	NA	NA	NA	NA
Location	Date	lab_name_code	Sample Type	Data Status	lab_sdg				
Outfall008	9/13/2013	Eberline	DO	QC Pending	13-09091	589 +/- 79.2 BQX pCi/l	--	4.06 +/- 2.78 pCi/l	5.57 +/- 3.80 pC
Outfall008	9/13/2013	Eberline	DUP	QC Pending	13-09091	634 +/- 84.8 BQX pCi/l	--	1.57 +/- 2.82 pCi/l	2.41 +/- 3.65 pC
Outfall008	9/13/2013	Eberline	DO	QC Pending	13-10138	--	--	--	--
Outfall008	9/13/2013	Eberline	DUP	QC Pending	13-10138	--	--	--	--
Outfall008	9/13/2013	Heritage	DO	QC pending	65229	--	--	--	--
Outfall008	6/18/2013	Eberline	DO	QC Pending	13-06059	--	--	1.81 +/- 2.72 pCi/l	-1.24 +/- 3.58 pC
Outfall008	6/18/2013	Eberline	DUP	QC Pending	13-06059	--	--	3.80 +/- 3.65 pCi/l	1.61 +/- 3.56 pC
Outfall008	6/18/2013	Heritage	DO	QC pending	64835	--	--	--	--
Treat Commingled MSD	4/25/2013	PDC	DO	Validated	3043568	--	--	--	--
Treat Commingled MSD	4/5/2013	Eberline	DO	Validated	1306015	--	-111 +/- 190 pCi/l	--	-5.80 +/- 16.5 pC
Treat Commingled MSD	4/5/2013	Eberline	DUP	Validated	1306015	--	34.5 +/- 197 pCi/l	--	-2.57 +/- 17.8 pC
Treat Commingled MSD	4/5/2013	PDC	DO	Validated	3041134	--	--	--	--
Treat Commingled MSD	4/5/2013	TA	DO	Validated	160-2039-1	--	--	--	--
LCH_Outfall008	12/13/2012	TA	DO	QC Pending	160-1108-1	--	--	--	--
Outfall008	12/13/2012	Heritage	DO	QC pending	64037	--	--	--	--
Outfall008	9/19/2012	Heritage	DO	QC pending	63614	--	--	--	--
Outfall008	9/19/2012	TestAmerica	DO	QC pending	F2I190459	--	--	--	--
Outfall008	5/15/2012	Heritage	DO	QC pending	63070	--	--	--	--
Outfall008	5/15/2012	TestAmerica	DO	QC pending	F2E150442	--	--	--	--
Outfall008	5/15/2012	TestAmerica	DUP	QC pending	F2E150442	--	--	--	--
Outfall008	3/6/2012	TestAmerica	DO	QC pending	F2C080411	--	--	--	--
Outfall008	3/6/2012	TestAmerica	DUP	QC pending	F2C080411	--	--	--	--
Outfall008	11/29/2011	Heritage	DO	QC pending	62465	--	--	--	--
Outfall008	11/29/2011	TestAmerica	DO	QC pending	F1K290445	--	--	--	--
Outfall008	8/18/2011	Heritage	DO	QC pending	61987	--	--	--	--
Outfall008	8/18/2011	TestAmerica	DO	QC pending	F1H180440	--	--	--	--
Outfall008	5/11/2011	Heritage	DO	QC pending	61541	--	--	--	--
Outfall008	5/11/2011	TestAmerica	DO	QC pending	F1E110517	--	--	--	--
Outfall008	3/16/2011	Heritage	DO	QC pending	61273	--	--	--	--
Outfall008	3/16/2011	TestAmerica	DO	QC pending	F1C160545	--	--	--	--
Outfall008	11/17/2010	Heritage	DO	QC pending	60800	--	--	--	--
Outfall008	11/17/2010	TestAmerica	DO	Validated	F0K170562	--	--	--	--
Outfall008	9/8/2010	Heritage	DO	QC pending	60486	--	--	--	--
Outfall008	9/8/2010	TestAmerica	DO	Validated	F0I080494	--	--	--	--
Outfall008	5/25/2010	Heritage	DO	QC pending	60022	--	--	--	--
Outfall008	5/25/2010	TestAmerica	DO	Validated	F0E250568	--	--	--	--
Outfall008	5/25/2010	TestAmerica	DUP	Validated	F0E250568	--	--	--	--
Outfall008	2/25/2010	Heritage	DO	QC pending	59650	--	--	--	--
Outfall008	2/25/2010	TestAmerica	DO	Validated	F0B250518	--	--	--	--
Outfall008	11/4/2009	Heritage	DO	Validated	59175	--	--	--	--
Outfall008	11/4/2009	TestAmerica	DO	Validated	F9K040546	--	--	--	--
Outfall008	8/6/2009	Heritage	DO	Validated	58742	--	--	--	--
Outfall008	8/6/2009	TestAmerica	DO	Validated	F9H060204	--	--	--	--
Outfall008	8/6/2009	TestAmerica	DUP	Validated	F9H060204	--	--	--	--
Outfall008	5/7/2009	Heritage	DO	Validated	58370	--	--	--	--
Outfall008	5/7/2009	TestAmerica	DO	Validated	F9E080107	--	--	--	--
Outfall008	2/12/2009	Heritage	DO	Validated	58064	--	--	--	--
Outfall008	2/12/2009	TestAmerica	DO	Validated	F9B120270	--	--	--	--
Outfall008	11/4/2008	Heritage	DO	Validated	57674	--	--	--	--
Outfall008	11/4/2008	TestAmerica	DO	Validated	F8K050146	--	--	--	--
Outfall008	11/4/2008	TestAmerica	DUP	Validated	F8K050146	--	--	--	--
Outfall008	7/16/2008	Heritage	DO	Validated	57153	--	--	--	--
Outfall008	7/16/2008	TestAmerica	DO	Validated	F8G160271	--	--	--	--
Outfall008	7/16/2008	TestAmerica	DUP	Validated	F8G160271	--	--	--	--
Outfall008	5/6/2008	Heritage	DO	Validated	56732	--	--	--	--
Outfall008	5/6/2008	TestAmerica	DO	Validated	F8E060240	--	--	--	--
Outfall008	5/6/2008	TestAmerica	DUP	Validated	F8E060240	--	--	--	--
Outfall008	3/13/2008	Heritage	DO	Validated	65044	--	--	--	--
Outfall008	3/13/2008	TestAmerica	DO	Validated	F8C130342	--	--	--	--
Outfall008	3/13/2008	TestAmerica	DUP	Validated	F8C130342	--	--	--	--
Outfall008	11/29/2007	Heritage	DO	Validated	56024	--	--	--	--
Outfall008	11/29/2007	TestAmerica	DO	Validated	F7K290239	--	--	--	--
Outfall008	11/29/2007	TestAmerica	DUP	Validated	F7K290239	--	--	--	--
Outfall006	8/21/2007	Heritage	DO	Validated	55695	--	--	--	--
Outfall006	8/20/2007	TestAmerica	DO	Validated	F7H220163	--	--	--	--
Outfall006	8/20/2007	TestAmerica	DUP	Validated	F7H220163	--	--	--	--

stry

(3)

Polonium 210	Potassium	Potassium 40	Radium 226	Radium 228	Thallium 208	Thorium 228
NA	NA	NA	NA	NA	NA	NA
--	--	589 +/- 79.2 pCi/l	0.142 +/- 0.240 pCi/l	2.09 +/- 1.33 pCi/l	3.99 +/- 5.27 pCi/l	--
--	--	634 +/- 84.8 pCi/l	0.634 +/- 0.496 pCi/l	0.987 +/- 1.25 pCi/l	9.02 +/- 5.66 pCi/l	--
0.683 +/- 0.472 pCi/l	--	--	--	--	--	0.664 +/- 1.11 BQX pCi/l
0.0654 +/- 0.157 pCi/l	--	--	--	--	--	-0.598 +/- 1.28 BQX pCi/l
--	--	--	--	--	--	--
--	--	376 +/- 70.0 pCi/l	0.0752 +/- 0.163	2.64 +/- 0.904 pCi/l	4.31 +/- 5.57 pCi/l	--
--	--	393 +/- 68.4 pCi/l	0.0867 +/- 0.166	0.289 +/- 0.596 pCi/l	0.205 +/- 5.57 pCi/l	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	557000 ug/l	456 +/- 45.6 pCi/l	--	11.0 +/- 5.79 pCi/l	30.9 +/- 30.2 pCi/l	--
--	--	278 +/- 187 pCi/l	--	6.99 +/- 6.33 pCi/l	22.8 +/- 25.1 pCi/l	--
--	--	--	--	--	--	--
--	--	--	11.4 +/- 2.24 pCi/l	5.36 +/- 3.98 UG pCi/l	--	--
--	--	--	14.0 +/- 3.19 pCi/l	9.69 +/- 3.81 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	13.1 +/- 2.7 pCi/l	7.3 +/- 2.7 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	8.6 +/- 2.6 pCi/l	3.7 +/- 3.3 U pCi/l	--	--
--	--	--	13.4 +/- 3.1 pCi/l	6.2 +/- 2.8 pCi/l	--	--
--	--	--	9.0 +/- 3.8 pCi/l	7.0 +/- 4.9 U pCi/l	--	--
--	--	--	10.8 +/- 3.9 pCi/l	8.9 +/- 5.1 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	5.16 +/- 0.77 pCi/l	1.13 +/- 0.51 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	3.3 +/- 1.0 pCi/l	2.5 +/- 1.1 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	3.22 +/- 0.38 pCi/l	2.04 +/- 0.43 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	4.6 +/- 1.1 pCi/l	1.8 +/- 1.4 U pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	4.31 +/- 0.76 pCi/l	1.02 +/- 0.47 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	2.81 +/- 0.50 pCi/l	1.46 +/- 0.68 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	3.24 +/- 0.34 pCi/l	2.18 +/- 0.26 pCi/l	--	--
--	--	--	3.35 +/- 0.36 pCi/l	2.23 +/- 0.25 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	3.60 +/- 0.53 pCi/l	1.26 +/- 0.46 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	3.71 +/- 0.50 pCi/l	1.24 +/- 0.53 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	3.51 +/- 0.42 pCi/l	1.59 +/- 0.37 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	4.28 +/- 0.58 pCi/l	1.36 +/- 0.34 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	4.24 +/- 0.58 pCi/l	1.61 +/- 0.43 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	4.19 +/- 0.54 pCi/l	1.80 +/- 0.39 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	3.29 +/- 0.46 pCi/l	1.44 +/- 0.36 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	4.98 +/- 0.60 pCi/l	2.01 +/- 0.41 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	5.10 +/- 0.81 pCi/l	1.66 +/- 0.74 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	3.94 +/- 0.68 pCi/l	2.00 +/- 0.68 pCi/l	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	4.66 +/- 0.80 pCi/l	1.3 +/- 1.1 U pCi/l	--	--
--	--	--	--	--	--	--

(4)

					Parameter	Gross Gamma	Lead 210	Lead 212
					Total or Dissolved	NA	NA	NA
Location	Date	lab_name_code	Sample Type	Data Status	lab_sdg			
Outfall006	5/22/2007	Heritage	DO	Validated	55411.1	--	--	--
Outfall006	5/22/2007	TestAmerica	DO	Validated	F7E220283	--	--	--
Outfall006	5/21/2007	TestAmerica	DO	Validated	F7E220283	--	--	--
Outfall006	5/21/2007	TestAmerica	DUP	Validated	F7E220283	--	--	--
Outfall006	3/8/2007	Heritage	DO	Validated	5400	--	--	--
Outfall006	3/8/2007	TestAmerica	DO	Validated	F7C080312	--	--	--
Outfall006	3/8/2007	TestAmerica	DUP	Validated	F7C080312	--	--	--
Outfall006	12/21/2006	Heritage	DO	Validated	5182	--	--	--
Outfall006	12/21/2006	TestAmerica	DO	Validated	F6L210233	--	--	--
Outfall006	12/21/2006	TestAmerica	DUP	Validated	F6L210233	--	--	--
Outfall006	7/26/2006	Heritage	DO	QC pending	4611	--	--	--
Outfall006	6/15/2006	Heritage	DO	QC pending	4514	--	--	--
Outfall006	1/19/2006	Heritage	DO	QC pending	4063	--	--	--

e 1
ogical Chemistry

(4)

Lead 214 NA	Polonium 210 NA	Potassium NA	Potassium 40 NA	Radium 226 NA	Radium 228 NA	Thallium 208 NA	Thorium 228 NA
--	--	--	--	--	--	--	--
--	--	--	--	5.62 +/- 0.81 pCi/l	1.73 +/- 0.74 pCi/l	--	--
--	--	--	--	4.34 +/- 0.64 pCi/l	1.40 +/- 0.54 pCi/l	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	6.26 +/- 0.88 pCi/l	2.12 +/- 0.59 pCi/l	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	125 +/- 94 U pCi/l	4.42 +/- 0.72 pCi/l	3.4 +/- 1.4 pCi/l	--	--
--	--	--	30 +/- 120 U pCi/l	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--

5)

(5)

Table 1
Bridgeton Radiological Chemis

					Parameter	Thorium 230	Thorium 232
					Total or Dissolved	NA	NA
Location	Date	lab_name_code	Sample Type	Data Status	lab_sdg		
Outfall008	9/13/2013	Eberline	DO	QC Pending	13-09091	--	--
Outfall008	9/13/2013	Eberline	DUP	QC Pending	13-09091	--	--
Outfall008	9/13/2013	Eberline	DO	QC Pending	13-10138	1.75 +/- 1.45 BQX pCi/l	0.938 +/- 1.06 BQX pC
Outfall008	9/13/2013	Eberline	DUP	QC Pending	13-10138	--	0.464 +/- 1.13 BQX pC
Outfall008	9/13/2013	Heritage	DO	QC pending	65229	--	--
Outfall008	6/18/2013	Eberline	DO	QC Pending	13-06059	--	--
Outfall008	6/18/2013	Eberline	DUP	QC Pending	13-06059	--	--
Outfall008	6/18/2013	Heritage	DO	QC pending	64835	--	--
Treat Commingled MSD	4/25/2013	PDC	DO	Validated	3043568	--	--
Treat Commingled MSD	4/5/2013	Eberline	DO	Validated	1306015	--	--
Treat Commingled MSD	4/5/2013	Eberline	DUP	Validated	1306015	--	--
Treat Commingled MSD	4/5/2013	PDC	DO	Validated	3041134	--	--
Treat Commingled MSD	4/5/2013	TA	DO	Validated	160-2039-1	--	--
LCH_Outfall008	12/13/2012	TA	DO	QC Pending	160-1108-1	--	--
Outfall008	12/13/2012	Heritage	DO	QC pending	64037	--	--
Outfall008	9/19/2012	Heritage	DO	QC pending	63614	--	--
Outfall008	9/19/2012	TestAmerica	DO	QC pending	F2I190459	--	--
Outfall008	5/15/2012	Heritage	DO	QC pending	63070	--	--
Outfall008	5/15/2012	TestAmerica	DO	QC pending	F2E150442	--	--
Outfall008	5/15/2012	TestAmerica	DUP	QC pending	F2E150442	--	--
Outfall008	3/6/2012	TestAmerica	DO	QC pending	F2C080411	--	--
Outfall008	3/6/2012	TestAmerica	DUP	QC pending	F2C080411	--	--
Outfall008	11/29/2011	Heritage	DO	QC pending	62465	--	--
Outfall008	11/29/2011	TestAmerica	DO	QC pending	F1K290445	--	--
Outfall008	8/18/2011	Heritage	DO	QC pending	61987	--	--
Outfall008	8/18/2011	TestAmerica	DO	QC pending	F1H180440	--	--
Outfall008	5/11/2011	Heritage	DO	QC pending	61541	--	--
Outfall008	5/11/2011	TestAmerica	DO	QC pending	F1E110517	--	--
Outfall008	3/16/2011	Heritage	DO	QC pending	61273	--	--
Outfall008	3/16/2011	TestAmerica	DO	QC pending	F1C160545	--	--
Outfall008	11/17/2010	Heritage	DO	QC pending	60800	--	--
Outfall008	11/17/2010	TestAmerica	DO	Validated	F0K170562	--	--
Outfall008	9/8/2010	Heritage	DO	QC pending	60486	--	--
Outfall008	9/8/2010	TestAmerica	DO	Validated	F0I080494	--	--
Outfall008	5/25/2010	Heritage	DO	QC pending	60022	--	--
Outfall008	5/25/2010	TestAmerica	DO	Validated	F0E250568	--	--
Outfall008	5/25/2010	TestAmerica	DUP	Validated	F0E250568	--	--
Outfall008	2/25/2010	Heritage	DO	QC pending	59650	--	--
Outfall008	2/25/2010	TestAmerica	DO	Validated	F0B250518	--	--
Outfall008	11/4/2009	Heritage	DO	Validated	59175	--	--
Outfall008	11/4/2009	TestAmerica	DO	Validated	F9K040546	--	--
Outfall008	8/6/2009	Heritage	DO	Validated	58742	--	--
Outfall008	8/6/2009	TestAmerica	DO	Validated	F9H060204	--	--
Outfall008	8/6/2009	TestAmerica	DUP	Validated	F9H060204	--	--
Outfall008	5/7/2009	Heritage	DO	Validated	58370	--	--
Outfall008	5/7/2009	TestAmerica	DO	Validated	F9E080107	--	--
Outfall008	2/12/2009	Heritage	DO	Validated	58064	--	--
Outfall008	2/12/2009	TestAmerica	DO	Validated	F9B120270	--	--
Outfall008	11/4/2008	Heritage	DO	Validated	57674	--	--
Outfall008	11/4/2008	TestAmerica	DO	Validated	F8K050146	--	--
Outfall008	11/4/2008	TestAmerica	DUP	Validated	F8K050146	--	--
Outfall008	7/16/2008	Heritage	DO	Validated	57153	--	--
Outfall008	7/16/2008	TestAmerica	DO	Validated	F8G160271	--	--
Outfall008	7/16/2008	TestAmerica	DUP	Validated	F8G160271	--	--
Outfall008	5/6/2008	Heritage	DO	Validated	56732	--	--
Outfall008	5/6/2008	TestAmerica	DO	Validated	F8E060240	--	--
Outfall008	5/6/2008	TestAmerica	DUP	Validated	F8E060240	--	--
Outfall008	3/13/2008	Heritage	DO	Validated	65044	--	--
Outfall008	3/13/2008	TestAmerica	DO	Validated	F8C130342	--	--
Outfall008	3/13/2008	TestAmerica	DUP	Validated	F8C130342	--	--
Outfall008	11/29/2007	Heritage	DO	Validated	56024	--	--
Outfall008	11/29/2007	TestAmerica	DO	Validated	F7K290239	--	--
Outfall008	11/29/2007	TestAmerica	DUP	Validated	F7K290239	--	--
Outfall006	8/21/2007	Heritage	DO	Validated	55695	--	--
Outfall006	8/20/2007	TestAmerica	DO	Validated	F7H220163	--	--
Outfall006	8/20/2007	TestAmerica	DUP	Validated	F7H220163	--	--

y

(5)

Thorium 234 NA	Total Activity NA	Uranium 234 NA	Uranium 235 NA	Uranium 238 NA
86.7 +/- 48.9 pCi/l	--	1.82 +/- 0.990 pCi/l	0.943 +/- 0.821 pCi/l	2.47 +/- 1.15 pCi/l
48.2 +/- 48.8 pCi/l	--	3.10 +/- 1.38 pCi/l	0.735 +/- 0.809 pCi/l	2.20 +/- 1.15 pCi/l
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
-9.61 +/- 33.7 pCi/l	--	0.955 +/- 0.532 pCi/l	0.0549 +/- 0.168 pCi/l	0.380 +/- 0.328 pCi/l
-33.1 +/- 33.1 pCi/l	--	1.09 +/- 0.547 pCi/l	0.0113 +/- 0.158 pCi/l	0.943 +/- 0.513 pCi/l
--	--	--	--	--
--	--	--	--	--
-203 +/- 187 pCi/l	180 +/- 293 pCi/l	--	--	--
29.8 +/- 187 pCi/l	0 +/- 289 pCi/l	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--

(6)

					Parameter	Thorium 230	
					Total or Dissolved	NA	
Location	Date	lab_name_code	Sample Type	Data Status	lab_sdg		
Outfall006	5/22/2007	Heritage	DO	Validated	55411.1	--	
Outfall006	5/22/2007	TestAmerica	DO	Validated	F7E220283	--	
Outfall006	5/21/2007	TestAmerica	DO	Validated	F7E220283	--	
Outfall006	5/21/2007	TestAmerica	DUP	Validated	F7E220283	--	
Outfall006	3/8/2007	Heritage	DO	Validated	5400	--	
Outfall006	3/8/2007	TestAmerica	DO	Validated	F7C080312	--	
Outfall006	3/8/2007	TestAmerica	DUP	Validated	F7C080312	--	
Outfall006	12/21/2006	Heritage	DO	Validated	5182	--	
Outfall006	12/21/2006	TestAmerica	DO	Validated	F6L210233	--	
Outfall006	12/21/2006	TestAmerica	DUP	Validated	F6L210233	--	
Outfall006	7/26/2006	Heritage	DO	QC pending	4611	--	
Outfall006	6/15/2006	Heritage	DO	QC pending	4514	--	
Outfall006	1/19/2006	Heritage	DO	QC pending	4063	--	

e 1
gical Chemistry

(6)

horium 232	Thorium 234	Total Activity	Uranium 234	Uranium 235	Uranium 238
NA	NA	NA	NA	NA	NA
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

Data Qualifiers/Footnotes	
Qualifier	**Definition**
--	Not analyzed/not available.
DO	Duplicate Original.
DUP	Duplicate.
G	The sample MDC is greater than the requested RL.
U	Indicates the analyte was analyzed for but not detected.
BQX	Gross Beta 04/05/2013: Per Eberline Report 13-06015, Potassium 40 results confirm actual activity range for Gross Beta
	in the range of 407-408 pCi/l.
BQX	Alpha 09/13/2013: Per Eberline Report 13-09091 and 13-10138, further analysis of potential alpha emitters ascertained
	that the sample does not contain any positive alpha emitting radionuclides.
BQX	Gross Gamma 09/13/2013: Per Eberline Report 13-09091, Gross Gamma results were calculated based on Potassium-40
	which was the only positive gamma emitting radionuclide in this sample.
BQX	Thorium 230 09/13/2013: Per Eberline Report 13-10138, Thorium 230 result is biased positive and should not be considered
	a true positive. Results should be qualified as "Estimated High."
BQX	Thorium 228 and 232 09/13/2013: Per Eberline Report 13-10138, All Thorium results should be qualified as estimated due to
	low chemical recoveries. Due to the high total solids content, this sample is not very amenable to this procedure.