GROUNDWATER MONITORING DATA RELEASE
2011 SAMPLING EVENT
HARSHAW CHEMICAL COMPANY FUSRAP SITE

U.S. Army Corps of Engineers
Buffalo District

Building Strong®

April 2012

Formerly Utilized Sites Remedial Action Program (FUSRAP)

FUSRAP was initiated in 1974 to identify, investigate, and cleanup or control sites throughout the United States that were part of the Nation's early atomic weapons and energy programs during the 1940s, 1950s, and 1960s. When implementing FUSRAP, the Corps follows the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

Site Description

The 55-acre former Harshaw Chemical Company Site is located at 1000 Harvard Avenue, approximately three miles southwest of downtown Cleveland in Cuyahoga County, Ohio. The site is in a low-lying area adjacent to the Cuyahoga River and Big Creek which is surrounded on three sides by industries and includes several developed and undeveloped land parcels.

Purpose

The purpose of releasing groundwater monitoring data from the 2011 sampling event at the former Harshaw Chemical Company Site is to show the potential for contaminant movement. A subset of the on-site wells is sampled annually to supplement the Remedial Investigation (RI) results. The U.S. Army Corps of Engineers (Corps) Buffalo District will use these groundwater data in the Feasibility Study to develop and evaluate remedial alternatives for the site.

The Corps is posting this information to the Harshaw Site webpage available at http://www.lrb.usace.army.mil/fusrap/harshaw. Included on the webpage are annual groundwater monitoring data and the Corps' interpretation of these data, a description of the site's conceptual groundwater model, and the community outreach annual groundwater monitoring fact sheet.

Scope

Groundwater monitoring is performed annually at the Harshaw Site. Figure 1 shows the locations of the twenty-one (21) groundwater monitoring wells sampled at the Harshaw Site in May 2011. Both filtered

and unfiltered samples were collected from these wells. Based on results from sampling events prior to 2009, wells with no potential impacts were ruled out from further sampling. Figure 2 shows the locations of the groundwater monitoring wells that were sampled from 2008 through 2011.

Additional information on the rationale for groundwater sampling at the Harshaw Site is presented in Table 1. The groundwater analyses included isotopic radium (Ra-226, Ra-228), isotopic thorium (Th-228, Th-230, Th-232), isotopic uranium (U-234, U-235, U-238), and total uranium. Hydrogeologic conditions and a more detailed description of the site groundwater monitoring program are summarized in the Conceptual Site Model for Groundwater that is available on the Harshaw Site webpage.

Groundwater flow at the Harshaw Site is controlled by the nature of the unconsolidated soil deposits, the topography of the underlying shale bedrock, the relative elevation of the Cuyahoga River and Big Creek, and the recovery of site groundwater. In general, groundwater flows across the site from west to east. A potentiometric map (Figure 3), using groundwater elevations taken from most of the Harshaw Site monitoring wells was developed for the 2011 sampling event, and shows the local direction of groundwater flow.

Constituents of interest (COIs), with their associated U.S. Environmental Protection Agency (USEPA) Maximum Contaminant Levels (MCLs), include isotopic radium (5 pCi/L), isotopic thorium (15 pCi/L[1]), and total uranium (30 µg/L).

Results and Interpretation

Groundwater surface elevations measured at the groundwater wells are presented in Table 1 and were plotted as groundwater contours in Figure 3. These data indicate that groundwater flow at the site is generally consistent with the interpretations presented in the RI report. Localized variations in groundwater contours and flow patterns may be explained by groundwater withdrawals induced by the existing site groundwater pump and treat system that is operated by the site owner. The estimated zone of influence for the pump and treat system is discussed in detail in the Conceptual Site Model for Groundwater available on the Harshaw Site webpage.

Analytical results for the 2011 monitoring event are presented in Tables 2 and 3, which list unfiltered and filtered (dissolved phase) data, respectively. Analytical results above the USEPA MCLs for total uranium (both filtered and unfiltered) were found in wells BKA48, DM15, and IA10-MW0001. Wells BKA48 and DM-15 are located adjacent to Building G-1, whereas IA10-MW0001 is located in the northwestern part of the site; all these wells are located within previously identified contaminated soils areas. Total uranium concentrations vary slightly from year to year, yet show generally stable concentrations that reflect conditions first identified in 2003. Although the current dataset is not sufficient to statistically define long-term concentration trends in the groundwater monitoring wells, the uranium, radium, and thorium concentrations are consistent with previously monitored results, which indicate radionuclide movement in groundwater is minimal and will not result in unacceptable exposures to the public.

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[1] Gross alpha MCL includes thorium isotopes and excludes radon and uranium

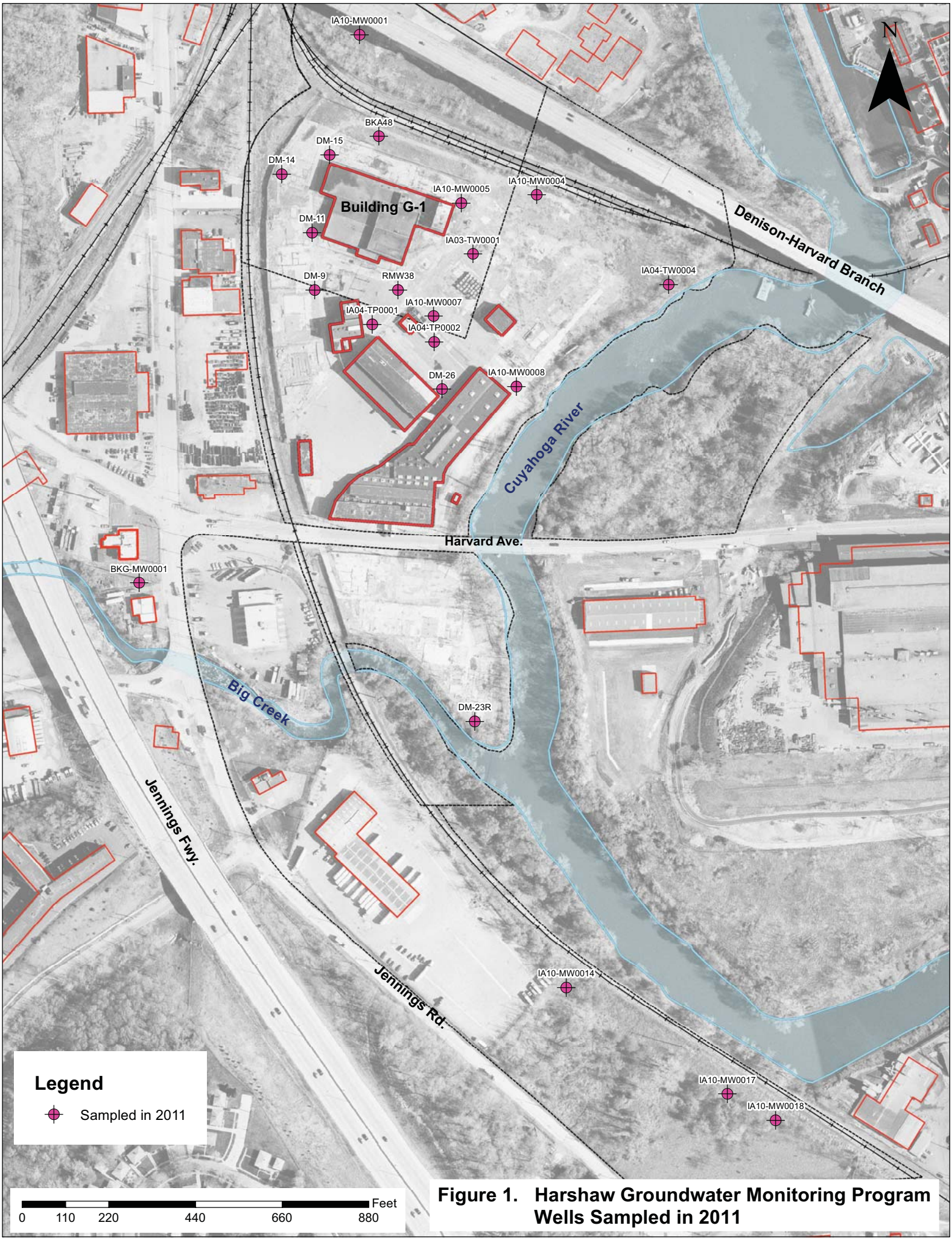

Figure 1. Harshaw Groundwater Monitoring Program Wells Sampled in 2011

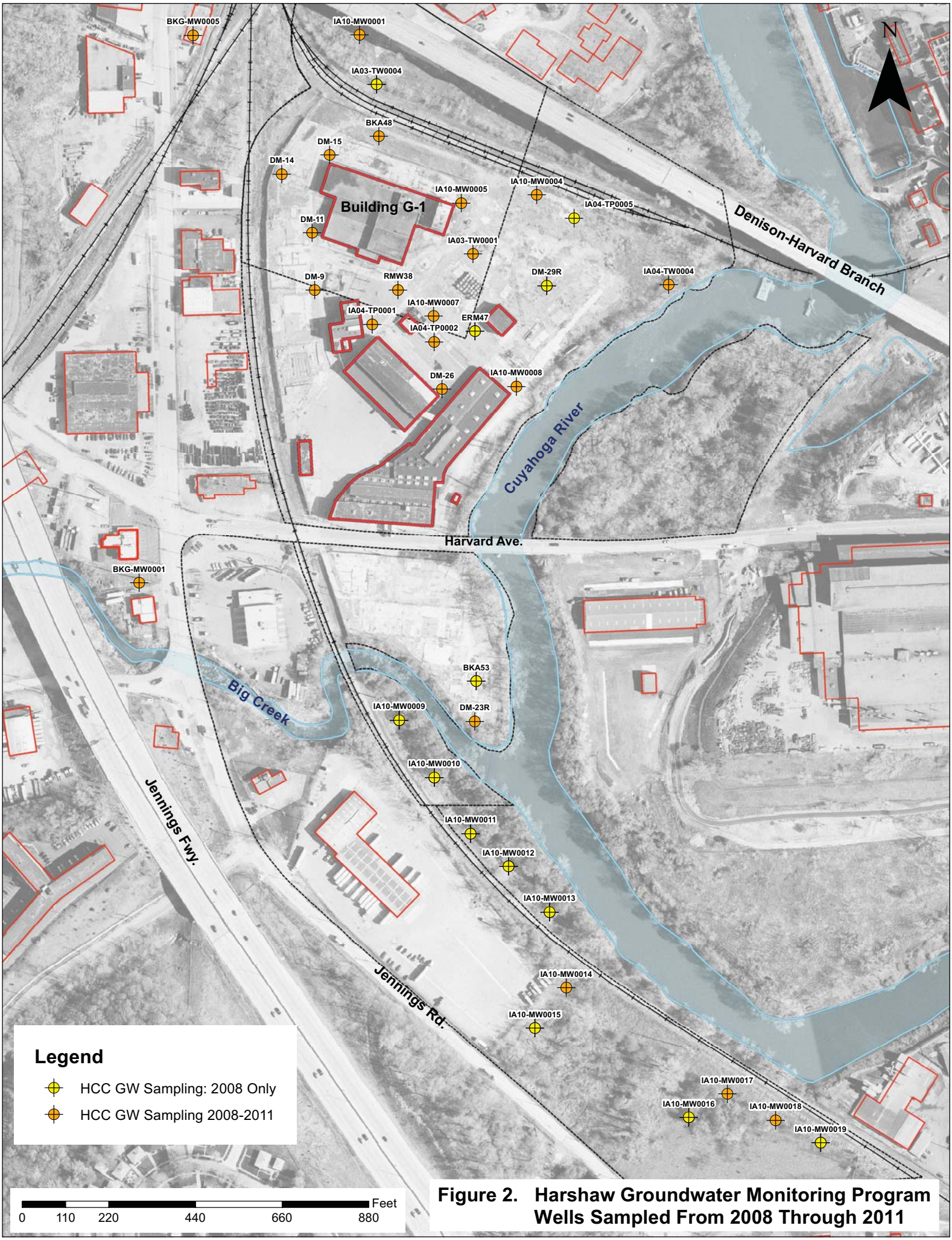

Figure 2. Harshaw Groundwater Monitoring Program Wells Sampled From 2008 Through 2011

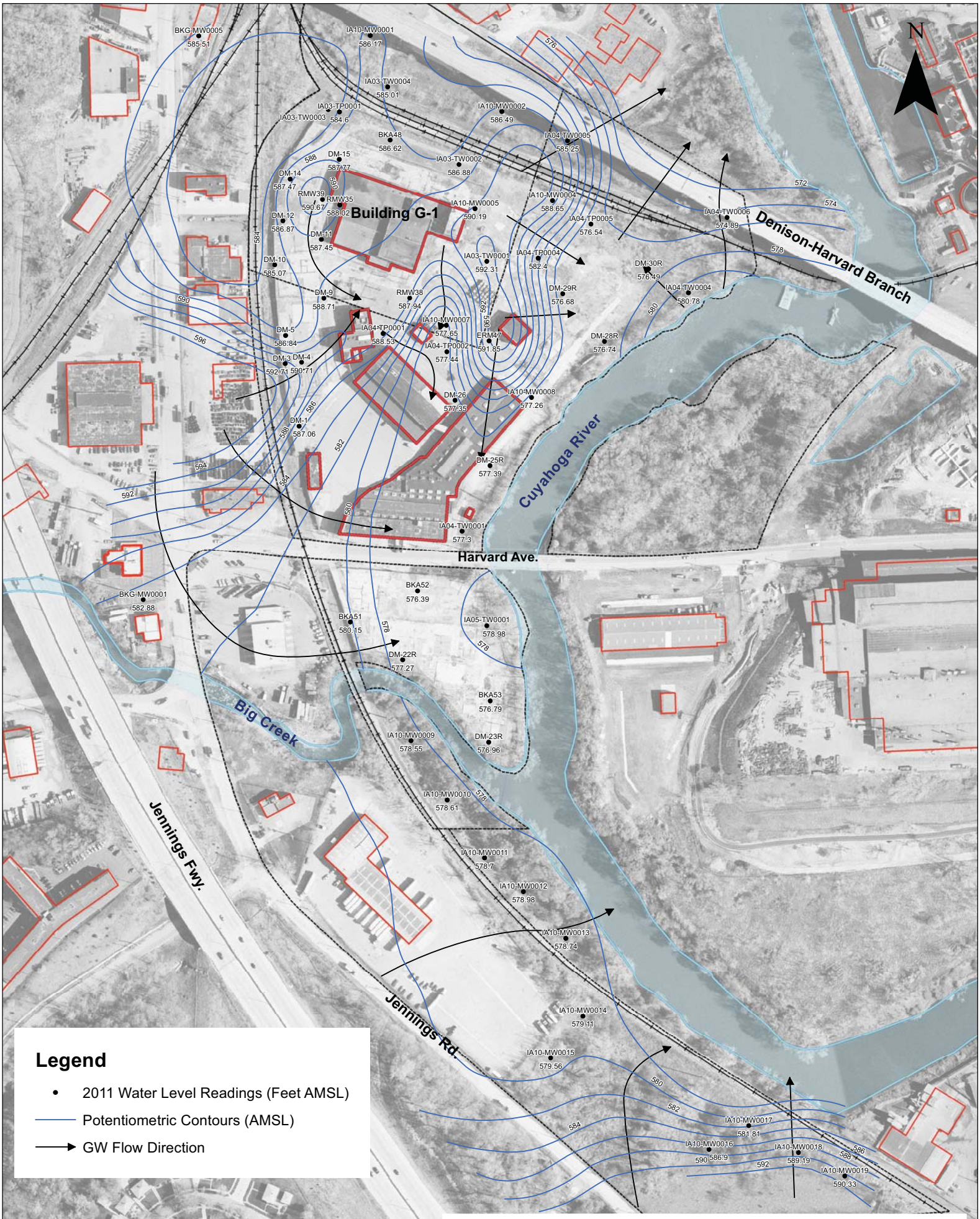

Figure 3. Harshaw Groundwater Monitoring Program Potentiometric Map, May 2011

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Table 1
Harshaw Chemical Company FUSRAP Site
Groundwater Elevations 2008-2011

Well	Top of Casing Elev (ft AMSL)	2008 Depth to Water (ft TOC)	2008 WL Elev (ft AMSL)	2009 Depth to Water (ft TOC)	2009 WL Elev (ft AMSL)	2010 Depth to Water (ft TOC)	2010 WL Elev (ft AMSL)	2011 Depth to Water (ft TOC)	2011 WL Elev (ft AMSL)
BKA48	594.87	12.65	582.22	11.33	583.54	9.72	585.15	8.25	586.62
BKA51	595.76	--	--	--	--	17.65	578.11	15.61	580.15
BKA52	593.13	--	--	--	--	--	--	16.74	576.39
BKA53	593.40	19.99	573.41	20.01	573.39	18.08	575.32	16.61	576.79
BKG-MW0001	592.10	--	--	--	--	10.38	581.72	9.22	582.88
BKG-MW0003	591.98	9.94	582.04	8.62	583.36	--	--	--	--
BKG-MW0005	592.20	--	--	--	--	7.81	584.39	6.69	585.51
DM-1	596.13	--	--	--	--	9.98	586.15	9.07	587.06
DM-3	594.14	--	--	--	--	1.57	592.57	1.43	592.71
DM-4	593.84	--	--	--	--	3.98	589.86	3.13	590.71
DM-5	596.36	--	--	--	--	11.25	585.11	9.52	586.84
DM-9	598.01	--	--	--	--	11.97	586.04	9.30	588.71
DM-10	592.71	--	--	--	--	9.47	583.24	7.64	585.07
DM-11	595.89	--	--	--	--	10.48	585.41	8.44	587.45
DM-12	596.13	--	--	--	--	11.15	584.98	9.26	586.87
DM-14	596.33	13.95	582.38	12.68	583.65	10.77	585.56	8.86	587.47
DM-15	596.46	16.48	579.98	13.32	583.14	12.66	583.80	8.69	587.77
DM-26	592.99	--	--	--	--	17.26	575.73	15.64	577.35
DM-22R	594.81	--	--	--	--	19.02	575.79	17.54	577.27
DM-23R	593.06	19.60	573.46	19.67	573.39	17.43	575.63	16.10	576.96
DM-25R	592.84	--	--	--	--	17.39	575.45	15.45	577.39
DM-28R	595.09	--	--	--	--	20.53	574.56	18.35	576.74
DM-29R	595.49	22.51	572.98	22.08	573.41	20.70	574.79	18.81	576.68
DM-30R	594.91	--	--	--	--	20.56	574.35	18.42	576.49
ERM47	593.06	19.56	573.50	13.68	579.38	2.74	590.32	1.21	591.85
IA03- TP0001	594.16	--	--	--	--	--	--	9.56	584.60
IA03- TW0001	596.50	6.39	590.11	--	--	4.81	591.69	4.19	592.31
IA03- TW0002	595.39	--	--	--	--	8.96	586.43	8.51	586.88
IA03- TW0003	593.39	--	--	--	--	11.91	581.48	11.20	582.19
IA03- TW0004	592.92	12.15	580.77	--	--	9.21	583.71	7.91	585.01
IA04- TP0001	596.32	17.02	579.30	9.46	586.86	8.00	588.32	7.79	588.53
IA04- TP0002	595.74	--	--	--	--	19.79	575.95	18.30	577.44
IA04- TP0003	595.39	--	--	--	--	17.55	577.84	--	--
IA04- TP0004	595.20	19.50	575.70	14.79	580.41	13.79	581.41	12.80	582.40
IA04- TP0005	594.47	21.64	572.83	--	--	19.99	574.48	17.93	576.54
IA04- TW0001	595.16	--	--	--	--	20.81	574.35	17.86	577.30
IA04- TW0002	593.59	--	--	--	--	14.76	578.83	--	--
IA04- TW0003	580.97	--	--	--	--	R	--	--	--
IA04- TW0004	594.44	17.52	576.92	--	--	15.02	579.42	13.66	580.78
IA04- TW0005	593.23	--	--	--	--	--	--	7.98	585.25
IA04- TW0006	589.71	--	--	--	--	17.34	572.37	14.82	574.89
IA05- TW0001	598.64	--	--	--	--	21.13	577.51	19.66	578.98
IA10- MW0001	593.86	11.81	582.05	10.31	583.55	9.96	583.90	7.69	586.17
IA10- MW0002	595.72	13.80	581.92	12.22	583.50	10.32	585.40	9.23	586.49
IA10- MW0003	584.05	--	--	--	--	R	--	12.76	571.29
IA10- MW0004	595.88	13.92	581.96	12.82	583.06	9.32	586.56	7.23	588.65
IA10- MW0005	594.83	--	--	5.69	589.14	0.00	594.83	4.64	590.19
IA10- MW0007	592.95	--	--	17.87	575.08	16.89	576.06	15.30	577.65
IA10- MW0008	592.57	--	--	18.98	573.59	17.25	575.32	15.31	577.26
IA10- MW0009	586.74	--	--	12.99	573.75	11.41	575.33	8.19	578.55
IA10- MW0010	586.60	--	--	12.86	573.74	11.15	575.45	7.99	578.61
IA10- MW0011	591.43	--	--	17.65	573.78	15.99	575.44	12.73	578.70
IA10- MW0012	583.70	--	--	9.95	573.75	7.98	575.72	4.72	578.98
IA10- MW0013	586.09	--	--	12.36	573.73	10.73	575.36	7.35	578.74
IA10- MW0014	597.25	--	--	23.42	573.83	21.81	575.44	18.14	579.11
IA10- MW0015	598.56	--	--	24.60	573.96	22.70	575.86	19.00	579.56
IA10- MW0016	594.71	--	--	17.54	577.17	14.82	579.89	7.81	586.90
IA10- MW0017	595.48	--	--	19.42	576.06	17.72	577.76	13.67	581.81
IA10- MW0018	592.21	--	--	13.64	578.57	10.69	581.52	3.02	589.19
IA10- MW0019	597.19	--	--	13.98	583.21	9.58	587.61	6.86	590.33
RMW-35	596.44	--	--	--	--	--	--	8.42	588.02
RMW-38	596.76	12.33	584.43	10.93	585.83	9.51	587.25	8.82	587.94
RMW-39	595.93	--	--	--	--	9.36	586.57	5.26	590.67

AMSL	Above Mean Sea Level
ft	foot (feet)
--	Not Available/Not Measured
TOC	Top of Casing
R	Data rejected due to quality issues

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Table 2
Harshaw Chemical Company FUSRAP Site
Groundwater Unfiltered Analytical Results 2011

Well	Date of Collection	Radium-226[1]	Radium-228[1]	Thorium-230[2]	Thorium-232[2]	Total Uranium (KPA)	Total Uranium[3] (Alpha Spec)	Uranium-234	Uranium-235	Uranium-238
Units		pCi/L	pCi/L	pCi/L	pCi/L	µg/L	pCi/L	pCi/L	pCi/L	pCi/L
US EPA MCLs		5	5	15	15	30 µg/L	27 pCi/L	-	-	-
	Aug-08	ND	ND	0.389	ND	**271**	**234**	115	3.82	115
	Aug-09	0.713	0.94	0.0533	0.00671	**457**	**293**	139	10.1	144
	Jun-10	ND	ND	ND	ND	**270**	**216**	105	1.22	110
BKA48	May-11	ND	2.73	0.113	ND	**254**	**173**	83.7	4.48	84.5
	Aug-08	1.15	1.64	ND	ND	ND	ND	ND	ND	ND
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BKA53	--	--	--	--	--	--	--	--	--	--
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BKG-MW0001	May-11	0.877	1.23	ND	0.027	1.32	1.295	0.765	0.054	0.476
	Aug-08	0.89	ND	ND	ND	5	3.77	2.07	ND	1.7
	Aug-09	0.127	2.69	ND	0.0168	5.17	3.8382	2.02	0.0682	1.75
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BKG-MW0003[4]	--	--	--	--	--	--	--	--	--	--
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	Jun-10	0.927	ND	0.45	ND	1.54	1.856	1.01	0.215	0.631
BKG-MW0005[4]	--	--	--	--	--	--	--	--	--	--
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DM9	May-11	ND	0.89	0.228	0.087	2.98	2.231	1.33	0.08	0.821
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DM11	May-11	0.855	0.885	0.322	0.062	0.199	0.774	0.348	0.026	0.4
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	Aug-09	0.254	1.05	0.567	0.421	17.2	15.207	6.94	0.547	7.72
	Jun-10	ND	ND	0.516	0.325	7.58	7.146	3.81	0.316	3.02
DM14	May-11	0.262	1.55	ND	0.366	2.08	4.18	2.43	ND	1.75
	Aug-08	1.72	0.987	ND	ND	**34.6**	23.8	12.7	ND	11.1
	Aug-09	0.52	0.436	ND	ND	28.1	21.407	10.3	0.707	10.4
	Jun-10	0.298	ND	0.77	0.25	**49.8**	**38.7**	19.7	ND	19
DM15	May-11	0.876	1.07	ND	ND	**42.2**	**32.13**	15.1	1.03	16
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	Aug-09	0.774	1.94	0.0111	ND	2.78	2.472	1.25	0.032	1.19
	Jun-10	1.43	ND	ND	ND	2.53	1.311	0.843	ND	0.468
DM23R	May-11	0.789	1.49	ND	ND	1.77	1.253	0.611	0.107	0.535
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DM26	May-11	0.956	1.28	0.18	ND	ND	0.082	0.05	ND	0.032
	Aug-08	1.01	2.75	ND	ND	ND	0.388	0.388	ND	ND
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DM29R	--	--	--	--	--	--	--	--	--	--
	Aug-08	1.25	1.46	ND	ND	ND	0.127	ND	ND	0.127
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ERM47	--	--	--	--	--	--	--	--	--	--
	Aug-08	ND	0.909	0.262	0.332	2.53	1.399	0.723	ND	0.676
	Aug-09	0.413	2.5	0.242	0.301	1.93	1.7505	0.868	0.0685	0.814
	Jun-10	ND	ND	ND	ND	1.88	1.88	1.44	ND	0.44
IA03-TW0001	May-11	ND	1.16	0.153	0.036	0.758	0.594	0.398	ND	0.196
	Aug-08	1.05	1.53	ND	ND	ND	0.47	0.313	ND	0.157
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IA03-TW0004	--	--	--	--	--	--	--	--	--	--
	Aug-08	0.582	1.73	ND	ND	7.16	6.713	3.17	0.233	3.31
	Aug-09	0.285	1.89	0.0304	0.00442	14.8	6.903	3.53	0.143	3.23
	Jun-10	ND	ND	ND	0.275	5.41	4.576	2.36	0.406	1.81
IA04-TP0001	May-11	0.382	1.16	ND	0.459	26	13.142		0.842	12.3
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IA04-TP0002	May-11	0.311	1.13	ND	ND	0.449	0.832	0.521	0.031	0.28
	Aug-08	0.615	ND	ND	0.0823	ND	0.472	0.297	ND	0.175
	Aug-09	1.2	3.51	0.522	0.667	14	7.851	4.17	0.171	3.51
	Jun-10	0.24	ND	ND	R	2.35	2.066	1.34	ND	0.726
IA04-TP0004	--	--	--	--	--	--	--	--	--	--
	Aug-08	0.75	0.875	ND	ND	ND	ND	ND	ND	ND
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IA04-TP0005	--	--	--	--	--	--	--	--	--	--
	Aug-08	0.671	0.96	ND	ND	11.1	7.78	3.26	ND	4.52
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IA04-TW0004	May-11	0.465	1.46	ND	0.054	4.86	5.337	2.6	0.067	2.67
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IA09-SW0008	May-11	ND	0.72	0.126	0.027	**206**	**141.65**	68.4	3.75	69.5

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Well	Date of Collection	Radium-226[1]	Radium-228[1]	Thorium-230[2]	Thorium-232[2]	Total Uranium (KPA)	Total Uranium[3] (Alpha Spec)	Uranium-234	Uranium-235	Uranium-238
Units		pCi/L	pCi/L	pCi/L	pCi/L	µg/L	pCi/L	pCi/L	pCi/L	pCi/L
US EPA MCLs		5	5	15	15	30 µg/L	27 pCi/L	-	-	-
	Aug-08	0.751	1.32	0.25	ND	21.2	13.58	7.16	0.55	5.87
	Aug-09	0.427	0.764	ND	ND	25.4	19.297	9.28	0.497	9.52
	Jun-10	0.358	ND	ND	ND	28.7	21.967	10.9	0.367	10.7
IA10-MW0001	May-11	0.352	1.36	ND	ND	**32.2**	22.175	10.9	0.475	10.8
	Aug-08	1.2	1.21	0.0416	ND	ND	ND	ND	ND	ND
	Aug-09	0.187	3.9	0.0342	0.00882	ND	0.03493	0.00193	ND	0.033
	Jun-10	2.39	0.439	1.06	0.35	1.02	1.866	1.41	ND	0.456
IA10-MW0002	--	--	--	--	--	--	--	--	--	--
	Aug-08	0.908	0.884	ND	ND	6.26	5.69	3.58	ND	2.11
	Aug-09	0.569	3.05	0.0262	0.0215	6.21	4.5724	2.46	0.0624	2.05
	Jun-10	ND	ND	0.425	ND	6.39	6.618	3.56	0.448	2.61
IA10- MW0004	May-11	0.222	0.495	ND	ND	6.79	4.431	2.56	0.141	1.73
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	Aug-09	0.984	2.25	0.284	0.281	17.3	18.485	9.84	0.505	8.14
	Jun-10	ND	ND	ND	ND	14.8	11.188	6.01	0.178	5
IA10- MW0005	May-11	ND	1.15	0.317	0.131	15.3	13.078	7.05	0.458	5.57
	Sep-08	0.486	1.46	ND	ND	--	12.935	7.93	0.535	4.47
	Aug-09	0.373	1.89	0.0464	ND	21.3	18.271	9.67	0.511	8.09
	Jun-10	ND	ND	ND	R	20.3	16.134	8.33	0.234	7.57
IA10- MW0007	May-11	0.224	ND	ND	ND	25.3	19.894	10.7	0.704	8.49
	Sep-08	0.722	ND	ND	ND	--	3.85	2.02	ND	1.83
	Aug-09	0.605	1.99	0.065	ND	9.53	5.372	2.54	0.192	2.64
	Jun-10	ND	ND	ND	0.134	21.7	16.283	7.53	0.293	8.46
IA10- MW0008	May-11	ND	0.519	ND	ND	23.4	22.864	11.6	0.564	10.7
	Sep-08	1.14	2.16	0.0766	ND	--	0.347	0.034	ND	0.313
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IA10-MW0009	--	--	--	--	--	--	--	--	--	--
	Sep-08	1.24	2.46	0.146	0.0781	--	0.432	0.167	0.155	0.11
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IA10- MW0010	--	--	--	--	--	--	--	--	--	--
	Sep-08	R	2.61	ND	ND	--	0.236	0.236	ND	ND
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IA10- MW0011	--	--	--	--	--	--	--	--	--	--
	Sep-08	R	2.8	R	ND	--	ND	ND	ND	ND
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IA10- MW0012	--	--	--	--	--	--	--	--	--	--
	Sep-08	2.25	2.78	ND	ND	--	ND	ND	ND	ND
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IA10- MW0013	--	--	--	--	--	--	--	--	--	--
	Sep-08	ND	1.52	R	ND	--	0.496	0.496	ND	ND
	Aug-09	0.848	3.36	0.0326	0.00971	0.222	0.3128	0.146	0.0138	0.153
	Jun-10	ND	1	ND	0.366	1.03	0.242	ND	0.242	ND
IA10- MW0014	May-11	1.35	2.64	ND	ND	0.185	0.114	0.081	0.033	ND
	Sep-08	1.11	2.5	0.053	ND	--	1.639	0.889	0.168	0.582
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IA10- MW0015	--	--	--	--	--	--	--	--	--	--
	Sep-08	ND	ND	ND	ND	--	0.269	ND	ND	0.269
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IA10- MW0016	--	--	--	--	--	--	--	--	--	--
	Sep-08	R	ND	ND	ND	--	12.72	6.88	ND	5.84
	Aug-09	0.428	2.73	0.0171	0.0282	14.7	7.855	4.16	0.215	3.48
	Jun-10	0.376	1.34	ND	ND	2.04	1.808	0.83	ND	0.978
IA10- MW0017	May-11	0.343	2.06	ND	ND	0.96	3.009	1.43	0.169	1.41
	Sep-08	R	2.12	ND	ND	--	4.87	2.52	ND	2.35
	Aug-09	ND	1.59	0.00954	0.000257	5.15	4.0243	2.1	0.0743	1.85
	Jun-10	ND	ND	0.536	ND	7.42	6.121	2.98	0.371	2.77
IA10- MW0018	May-11	0.23	1.12	ND	0.048	11.2	9.965	5.17	0.185	4.61
	Sep-08	R	1.42	R	ND	--	4.589	2.6	0.349	1.64
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IA10- MW0019	--	--	--	--	--	--	--	--	--	--
	Aug-08	ND	0.915	ND	ND	4.39	3.14	1.79	ND	1.35
	Aug-09	0.573	1.51	0.0196	ND	2.66	2.1938	1.13	0.0438	1.02
	Jun-10	ND	ND	ND	0.211	3.71	3.34	1.68	0.39	1.27
RMW38	May-11	ND	0.517	0.087	ND	11.5	8.405	3.95	0.205	4.25

-- Not Analyzed
ND Not Detected
R Data has been rejected because of quality issues
1 MCL refers to the sum of Ra-226 and Ra-228 (MCL=5pCi/L)
2 Gross alpha MCL includes Thorium isotopes, and excludes radon and uranium. Th-230 refers specifically to alpha radiation.
3 MCL refers to the sum of Uranium Isotopes (MCL=27pCi/L or 30 µg/L)
4 Background Well

US Army Corps of Engineers. Buffalo District BUILDING STRONG.

Table 3
Harshaw Chemical Company FUSRAP Site
Groundwater Filtered Analytical Results 2011

Well	Date of Collection	Radium-226[1] Dissolved	Radium-228[1] Dissolved	Thorium-230[2] Dissolved	Thorium-232[2] Dissolved	Total Uranium Dissolved (KPA)	Total Uranium[3] Dissolved (Alpha Spec)	Uranium-234 Dissolved	Uranium-235 Dissolved	Uranium-238 Dissolved
Units		pCi/L	pCi/L	pCi/L	pCi/L	µg/L	pCi/L	pCi/L	pCi/L	pCi/L
US EPA MCLs		5	5	15	15	30 µg/L	27 pCi/L	-	-	-
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	Jun-10	ND	ND	ND	ND	**298**	**226**	103	0.7	122
BKA48	May-11	0.285	0.58	0.178	ND	**253**	**160.28**	79.1	4.48	76.7
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BKA53	--	--	--	--	--	--	--	--	--	--
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BKG-MW0001[4]	May-11	0.685	1.58	0.246	ND	1.49	1.054	0.564	0.021	0.469
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BKG-MW0003[4]	--	--	--	--	--	--	--	--	--	--
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	Jun-10	ND	ND	ND	ND	1.8	0.860	0.436	ND	0.424
BKG-MW0005[4]	--	--	--	--	--	--	--	--	--	--
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DM9	May-11	0.47	1.14	ND	0.054	2.92	2.489	1.24	0.139	1.11
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DM11	May-11	ND	0.806	ND	0.112	ND	ND	ND	ND	ND
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	Jun-10	ND	0.583	ND	ND	4.99	5.92	2.85	0.502	2.57
DM14	May-11	ND	2.05	ND	0.131	1.27	3.416	1.96	0.276	1.18
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	Jun-10	0.281	ND	0.437	0.546	**47.8**	**41.6**	20	0.712	20.9
DM15	May-11	ND	ND	ND	ND	**41.7**	**28.386**	14.1	0.786	13.5
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	Jun-10	0.832	0.84	0.331	0.798	2.98	1.46	0.629	ND	0.826
DM23R	May-11	0.298	1.56	ND	ND	1.74	0.983	0.478	NA	0.505
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DM26	May-11	0.771	1.85	0.212	ND	ND	0.065	ND	ND	0.065
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DM29R	--	--	--	--	--	--	--	--	--	--
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ERM47	--	--	--	--	--	--	--	--	--	--
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	Jun-10	ND	ND	0.619	ND	2.18	2.43	1.32	0.244	0.862
IA03-TW0001	May-11	ND	0.821	0.113	0.061	0.701	0.439	0.245	ND	0.194
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IA03-TW0004	--	--	--	--	--	--	--	--	--	--
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	Jun-10	ND	ND	0.656	0.156	5.01	4.09	2.39	ND	1.7
IA04-TP0001	May-11	ND	1.22	ND	ND	2.9	0.931		0.029	0.902
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IA04-TP0002	May-11	0.334	1.9	ND	ND	0.361	0.747	0.324	0.031	0.392
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	Jun-10	ND	ND	ND	ND	2.01	2.25	1.52	ND	0.727
IA04-TP0004	--	--	--	--	--	--	--	--	--	--
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IA04-TP0005	--	--	--	--	--	--	--	--	--	--
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IA04-TW0004	May-11	0.529	1.38	ND	ND	3.55	3.69	1.62	ND	2.07
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IA09-SW0008	May-11	ND	0.644	0.086	0.038	**215**	**148.73**	73.1	4.23	71.4
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	Jun-10	ND	ND	ND	ND	**31.8**	21.1	10.9	ND	10.2
IA10-MW0001	May-11	0.411	0.752	0.116	0.052	**33.9**	22.776	11.2	0.576	11

US Army Corps of Engineers. Buffalo District BUILDING STRONG.

Table 3
Harshaw Chemical Company FUSRAP Site
Groundwater Filtered Analytical Results 2011

Well	Date of Collection	Radium-226[1] Dissolved	Radium-228[1] Dissolved	Thorium-230[2] Dissolved	Thorium-232[2] Dissolved	Total Uranium Dissolved (KPA)	Total Uranium[3] Dissolved (Alpha Spec)	Uranium-234 Dissolved	Uranium-235 Dissolved	Uranium-238 Dissolved
Units		pCi/L	pCi/L	pCi/L	pCi/L	µg/L	pCi/L	pCi/L	pCi/L	pCi/L
US EPA MCLs		5	5	15	15	30 µg/L	27 pCi/L	-	-	-
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IA10-MW0002	Jun-10	0.343	ND	0.895	0.292	1.31	1.25	1.25	ND	ND
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	Jun-10	ND	ND	ND	ND	6.33	5.40	3.15	0.208	2.04
IA10- MW0004	May-11	ND	0.631	ND	0.033	6.15	4.694	2.75	0.064	1.88
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	Jun-10	ND	ND	ND	ND	16	10.7	5.87	ND	4.87
IA10- MW0005	May-11	0.833	0.655	0.091	0.03	17.2	13.925	7.42	0.165	6.34
	Sep-08	0.966	0.827	R	ND	--	11.5	6.82	0.467	4.19
	--	--	--	--	--	--	--	--	--	--
	Jun-10	ND	ND	ND	ND	17.3	13.1	7.32	ND	5.77
IA10- MW0007	May-11	0.348	1.18	ND	ND	22.9	20.559	11	0.539	9.02
	Sep-08	0.464	R	ND	ND	--	4.31	2.04	ND	2.27
	--	--	--	--	--	--	--	--	--	--
	Jun-10	ND	ND	ND	ND	21	18.0	9.39	0.368	8.2
IA10- MW0008	May-11	ND	1.1	0.128	ND	21.4	22.455	10.4	0.955	11.1
	Sep-08	0.685	0.673	ND	0.034	--	0.0539	ND	ND	0.0539
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IA10-MW0009	--	--	--	--	--	--	--	--	--	--
	Sep-08	0.818	1.97	0.0601	0.0386	--	0.155	0.0443	0.0684	0.042
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IA10- MW0010	--	--	--	--	--	--	--	--	--	--
	Sep-08	0.759	3.45	ND	ND	--	0	ND	ND	ND
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IA10- MW0011	--	--	--	--	--	--	--	--	--	--
	Sep-08	0.926	ND	ND	ND	--	ND	ND	ND	ND
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IA10- MW0012	--	--	--	--	--	--	--	--	--	--
	Sep-08	2.31	ND	R	ND	--	0.532	0.532	ND	ND
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IA10- MW0013	--	--	--	--	--	--	--	--	--	--
	Sep-08	1.21	R	R	ND	--	3.87	1.64	ND	2.23
	Aug-09	1.14	2.87	0.0401	ND	0.222	0.310	0.185	0.00405	0.121
	Jun-10	0.695	1.43	ND	0.088	1.11	ND	ND	ND	ND
IA10- MW0014	May-11	0.588	3.63	ND	ND	0.169	0.074	ND	ND	0.074
	Sep-08	0.996	1.78	0.0835	0.0337	--	2.03	1.12	ND	0.909
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IA10- MW0015	--	--	--	--	--	--	--	--	--	--
	Sep-08	ND	R	R	ND	--	0.427	ND	ND	0.427
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IA10- MW0016	--	--	--	--	--	--	--	--	--	--
	Sep-08	ND	3.32	ND	ND	--	10.4	6.08	ND	4.3
	Aug-09	0.817	3.34	0.00347	ND	13.3	7.13	3.67	0.22	3.24
	Jun-10	0.503	1.36	0.372	ND	1.8	1.88	1.07	ND	0.805
IA10- MW0017	May-11	ND	2.04	ND	ND	0.968	2.429	1.32	0.059	1.05
	Sep-08	ND	4.7	ND	ND	--	4.03	2.26	0.423	1.35
	Aug-09	0.516	3.73	0.0399	ND	6.49	4.10	2.14	0.118	1.84
	Jun-10	0.365	ND	0.483	0.206	7.59	5.69	3.12	ND	2.57
IA10- MW0018	May-11	ND	ND	ND	ND	14.6	11.099	5.67	0.369	5.06
	Sep-08	ND	R	ND	ND	--	3.76	2.15	ND	1.61
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IA10- MW0019	--	--	--	--	--	--	--	--	--	--
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	Jun-10	ND	ND	ND	0.325	3.58	3.30	1.87	ND	1.43
RMW38	May-11	0.372	1.03	0.088	ND	8.92	6.442	3.23	0.152	3.06

-- Not Analyzed
ND Not Detected
R Data has been rejected because of quality issues
1 MCL refers to the sum of Ra-226 and R-228 (MCL=5pCi/L)
2 Gross alpha MCL includes Thorium isotopes, and excludes radon and uranium. Th-230 refers specifically to alpha radiation.
3 MCL refers to the sum of Uranium Isotopes (MCL=27pCi/L or 30 µg/L)
4 Background Well