GROUNDWATER MONITORING DATA RELEASE
2008 AND 2009 SAMPLING EVENTS
HARSHAW FUSRAP SITE

U.S. Army Corps of Engineers
Buffalo District

Building Strong®

Formerly Utilized Sites Remedial Action Program (FUSRAP)

November 2010

Site Description

The Harshaw Chemical Company is located at 1000 Harvard Avenue, in Cleveland, Ohio, approximately three miles south of downtown Cleveland and it is adjacent to the Cuyahoga River and Big Creek. It is a 55-acre property located in an industrialized area of Cleveland, and includes several developed and undeveloped land parcels.

Purpose

The U.S. Army Corps of Engineers follows the process outlined in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan for FUSRAP sites. The purpose of this environmental data release is to support the CERCLA process and to provide groundwater monitoring data that can be used to assess FUSRAP contaminant movement. A subset of all site wells are sampled annually to complement the Remedial Investigation (RI) Results.

The Corps is posting this data to the Harshaw Site webpage available at http://www.lrb.usace.army.mil/fusrap/harshaw/. Included are groundwater monitoring data for 2008-2009 and the Corps' analyses of these data.

Scope

Groundwater monitoring is currently being performed at the Harshaw Site. Figure 1 shows the location of all groundwater monitoring wells at the Harshaw Site. A total of 32 wells were part of the monitoring program in 2008 and 2009, of which, 14 are newer wells installed after completion of the remedial investigation (IA10-MW005 to IA10-MW0019). The Corps sampled 7 out of the 14 newly installed wells in 2009, based on results from the 2008 sampling event which ruled out wells with no potential impact. Discretionary filtered and unfiltered samples were taken for both sampling events. Additional information on the rationale for groundwater sampling at the Harshaw Site is presented in Table 1. The groundwater analysis includes monitoring for isotopic radium (Ra-226, Ra-228), isotopic thorium (Th-230, Th-232), isotopic uranium (U-234, U-235, U-238), and total uranium (sum of these three isotopes).

Hydrogeologic conditions and a more detailed description of the Site groundwater monitoring program are summarized in a 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 deposits, the topography of the underlying shale bedrock, and the relative elevation of the Cuyahoga River and Big Creek. In general, groundwater flow across the site is from west to east.

Constituents of interest (COIs), and associated United States Environmental Protection Agency (USEPA) Maximum Contaminant Levels (MCLs) include isotopic radium (5 µg/L), isotopic thorium (15 µg/L), isotopic uranium (30 µg/L), and total uranium (sum of these three isotopes).

Results and Interpretation

Groundwater surface elevations measured at the groundwater wells are presented in Table 1. This data indicates that groundwater flow at the site was consistent with the interpretations presented in the RI Report. This confirms that in general the groundwater flow across the site is from west to east.

Analytical results for the 2008 and 2009 monitoring events are presented in Tables 2 and 3. Table 2 shows data for unfiltered samples and Table 3 shows data for filtered samples (dissolved). Analytical results above the USEPA MCLs were detected in monitoring wells BKA48 and DM15 for total uranium. Both of these wells are located adjacent to Building G-1 and report concentrations similar to those measured during the RI. The concentration of total uranium in a third well (RMW-38), down-gradient of building G-1, has decreased significantly below the USEPA MCL since RI monitoring was performed. In general, recent constituent concentrations measured in RI monitoring wells are consistent with previously monitored results, including the background monitoring location (BKG-MW0003). There is currently not sufficient data to establish long-term concentration trends in the groundwater monitoring wells.

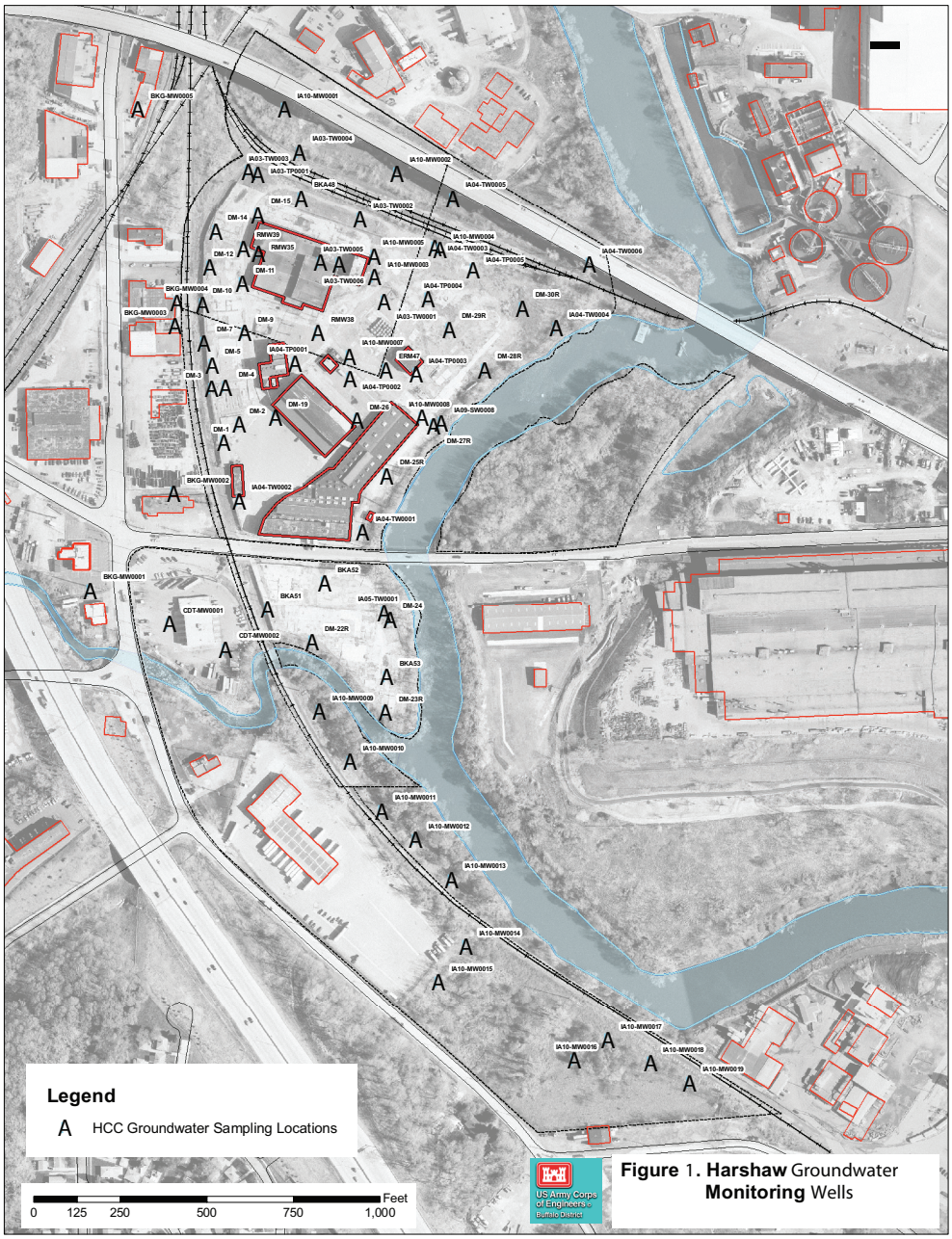

Figure 1. Harshaw Groundwater Monitoring Wells

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Table 1
Harshaw FUSRAP Site
Groundwater Elevations
2008-2009

Well	Top of Casing Elev (ft AMSL)	Depth to Water (ft TOC)	WL Elev (ft AMSL)	Depth to Water (ft TOC)	WL Elev (ft AMSL)	Well Sampling Rationale
		2008		2009		
BKA48	594.87	12.65	582.22	11.33	583.54	Monitor Uranium Plume
BKA53	593.40	19.99	573.41	20.01	573.39	Determine MED Impacts in IA05
BKG-MW0003	591.98	9.94	582.04	8.62	583.36	Upgradinet Monitoring Baseline
DM14	596.33	13.95	582.38	12.68	583.65	Monitor Uranium Plume
DM15	596.46	16.48	579.98	13.32	583.14	Monitor Uranium Plume
DM23R	593.06	19.60	573.46	19.67	573.39	Determine MED Impacts in IA05
DM29R	595.49	22.51	572.98	22.08	573.41	Monitor Uranium Plume
ERM47	593.06	19.56	573.50	13.68	579.38	Monitor Uranium Plume
IA03-TW0001	596.50	6.39	590.11	--	--	Monitor Uranium Plume
IA03-TW0004	592.92	12.15	580.77	--	--	Monitor Uranium Plume
IA04-TP0001	596.32	17.02	579.30	9.46	586.86	Monitor Uranium Plume
IA04-TP0004	595.20	19.50	575.70	14.79	580.41	Monitor Uranium Plume
IA04-TP0005	594.47	21.64	572.83	--	--	Monitor Uranium Plume
IA04-TW0004	594.44	17.52	576.92	--	--	Monitor Uranium Plume
IA10-MW0001	593.86	11.81	582.05	10.31	583.55	Monitor Uranium Plume
IA10-MW0002	595.72	13.80	581.92	12.22	583.50	Monitor Uranium Plume
IA10- MW0004	595.88	13.92	581.96	12.82	583.06	Monitor Uranium Plume
IA10- MW0005	594.83	--	--	5.69	589.14	Monitor Uranium Plume
IA10- MW0007	592.95	--	--	17.87	575.08	Monitor Uranium Plume
IA10- MW0008	592.57	--	--	18.98	573.59	Monitor Uranium Plume
IA10-MW0009	586.74	--	--	12.99	573.75	Determine MED Impacts in IA07
IA10- MW0010	586.60	--	--	12.86	573.74	Determine MED Impacts in IA07
IA10- MW0011	591.43	--	--	17.65	573.78	Determine MED Impacts in IA07
IA10- MW0012	583.70	--	--	9.95	573.75	Determine MED Impacts in IA07
IA10- MW0013	586.09	--	--	12.36	573.73	Determine MED Impacts in IA07
IA10- MW0014	597.25	--	--	23.42	573.83	Determine MED Impacts in IA07
IA10- MW0015	598.56	--	--	24.60	573.96	Determine MED Impacts in IA07
IA10- MW0016	594.71	--	--	17.54	577.17	Determine MED Impacts in IA07
IA10- MW0017	595.48	--	--	19.42	576.06	Determine MED Impacts in IA07
IA10- MW0018	592.21	--	--	13.64	578.57	Determine MED Impacts in IA07
IA10- MW0019	597.19	--	--	13.98	583.21	Determine MED Impacts in IA07
RMW38	596.76	12.33	584.43	10.93	585.83	Monitor Uranium Plume

AMSL	Above Mean Sea Level
ft	foot (feet)
--	Not Available
NM	Not Measured
TOC	Top of Casing

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Table 2
Former Harshaw Chemical Site
Groundwater Unfiltered Analytical Results
2008-2009

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	-	-	-
BKA48	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
BKA53	Aug-08	1.15	1.64	ND	ND	ND	ND	ND	ND	ND
	--	--	--	--	--	--	--	--	--	--
BKG-MW0003[4]	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	3.84	2.02	0.0682	1.75
DM14	--	--	--	--	--	--	--	--	--	--
	Aug-09	0.254	1.05	0.567	0.421	17.2	15.2	6.94	0.547	7.72
DM15	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	21.4	10.3	0.707	10.4
DM23R	--	--	--	--	--	--	--	--	--	--
	Aug-09	0.774	1.94	0.0111	ND	2.78	2.47	1.25	0.032	1.19
DM29R	Aug-08	1.01	2.75	ND	ND	ND	0.388	0.388	ND	ND
	--	--	--	--	--	--	--	--	--	--
ERM47	Aug-08	1.25	1.46	ND	ND	ND	0.127	ND	ND	0.127
	--	--	--	--	--	--	--	--	--	--
IA03-TW0001	Aug-08	ND	0.909	0.262	0.332	2.53	1.40	0.723	ND	0.676
	Aug-09	0.413	2.5	0.242	0.301	1.93	1.75	0.868	0.0685	0.814
IA03-TW0004	Aug-08	1.05	1.53	ND	ND	ND	0.470	0.313	ND	0.157
	--	--	--	--	--	--	--	--	--	--
IA04-TP0001	Aug-08	0.582	1.73	ND	ND	7.16	6.71	3.17	0.233	3.31
	Aug-09	0.285	1.89	0.0304	0.00442	14.8	6.90	3.53	0.143	3.23
IA04-TP0004	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	7.85	4.17	0.171	3.51
IA04-TP0005	Aug-08	0.75	0.875	ND	ND	ND	ND	ND	ND	ND
	--	--	--	--	--	--	--	--	--	--
IA04-TW0004	Aug-08	0.671	0.96	ND	ND	11.1	7.78	3.26	ND	4.52
	--	--	--	--	--	--	--	--	--	--
IA10-MW0001	Aug-08	0.751	1.32	0.25	ND	21.2	13.6	7.16	0.55	5.87
	Aug-09	0.43	0.76	ND	ND	25.4	19.3	9.28	0.50	9.52
IA10-MW0002	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	0.0349	0.00193	ND	0.033
IA10- MW0004	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	4.57	2.46	0.0624	2.05
IA10- MW0005	--	--	--	--	--	--	--	--	--	--
	Aug-09	0.984	2.25	0.284	0.281	17.3	18.5	9.84	0.505	8.14
IA10- MW0007	Sep-08	0.486	1.46	ND	ND	--	12.9	7.93	0.535	4.47
	Aug-09	0.373	1.89	0.0464	ND	21.3	18.3	9.67	0.511	8.09
IA10- MW0008	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	5.37	2.54	0.192	2.64
IA10-MW0009	Sep-08	1.14	2.16	0.0766	ND	--	0.347	0.034	ND	0.313
	--	--	--	--	--	--	--	--	--	--

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Table 2
Former Harshaw Chemical Site
Groundwater Unfiltered Analytical Results
2008-2009

Well Units	Date of Collection	Radium-226[1] pCi/L	Radium-228[1] pCi/L	Thorium-230[2] pCi/L	Thorium-232[2] pCi/L	Total Uranium (KPA) µg/L	Total Uranium[3] (Alpha Spec) pCi/L	Uranium-234 pCi/L	Uranium-235 pCi/L	Uranium-238 pCi/L
US EPA MCLs		5	5	15	15	30 µg/L	27 pCi/L	-	-	-
IA10- MW0010	Sep-08	1.24	2.46	0.146	0.0781	--	0.432	0.167	0.155	0.11
	--	--	--	--	--	--	--	--	--	--
IA10- MW0011	Sep-08	R	2.61	ND	ND	--	0.236	0.236	ND	ND
	--	--	--	--	--	--	--	--	--	--
IA10- MW0012	Sep-08	R	2.8	R	ND	--	ND	ND	ND	ND
	--	--	--	--	--	--	--	--	--	--
IA10- MW0013	Sep-08	2.25	2.78	ND	ND	--	ND	ND	ND	ND
	--	--	--	--	--	--	--	--	--	--
IA10- MW0014	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	0.313	0.146	0.0138	0.153
IA10- MW0015	Sep-08	1.11	2.5	0.053	ND	--	1.64	0.889	0.168	0.582
	--	--	--	--	--	--	--	--	--	--
IA10- MW0016	Sep-08	ND	ND	ND	ND	--	0.269	ND	ND	0.269
	--	--	--	--	--	--	--	--	--	--
IA10- MW0017	Sep-08	R	ND	ND	ND	--	12.7	6.88	ND	5.84
	Aug-09	0.428	2.73	0.0171	0.0282	14.7	7.86	4.16	0.215	3.48
IA10- MW0018	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	4.02	2.1	0.0743	1.85
IA10- MW0019	Sep-08	R	1.42	R	ND	--	4.59	2.6	0.349	1.64
	--	--	--	--	--	--	--	--	--	--
RMW38	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	2.19	1.13	0.0438	1.02

-- 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

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Table 3
Former Harshaw Chemical Site
Groundwater Filtered Analytical Results
2008-2009

Well Units	Year	Radium-226[1] Dissolved pCi/L	Radium-228[1] Dissolved pCi/L	Thorium-230[2] Dissolved pCi/L	Thorium-232[2] Dissolved pCi/L	Total Uranium Dissolved (KPA) µg/L	Total Uranium[3] Dissolved (Alpha Spec) pCi/L	Uranium-234 Dissolved pCi/L	Uranium-235 Dissolved pCi/L	Uranium-238 Dissolved pCi/L
US EPA MCLs		5	5	15	15	30 µg/L	27 pCi/L	-	-	-
IA10- MW0008	Sep-08	0.464	R	ND	ND	--	4.31	2.04	ND	2.27
	--	--	--	--	--	--	--	--	--	--
IA10-MW0009	Sep-08	0.685	0.673	ND	0.034	--	0.0539	ND	ND	0.0539
	--	--	--	--	--	--	--	--	--	--
IA10- MW0010	Sep-08	0.818	1.97	0.0601	0.0386	--	0.155	0.0443	0.0684	0.042
	--	--	--	--	--	--	--	--	--	--
IA10- MW0011	Sep-08	0.759	3.45	ND	ND	--	0	ND	ND	ND
	--	--	--	--	--	--	--	--	--	--
IA10- MW0012	Sep-08	0.926	ND	ND	ND	--	ND	ND	ND	ND
	--	--	--	--	--	--	--	--	--	--
IA10- MW0013	Sep-08	2.31	ND	R	ND	--	0.532	0.532	ND	ND
	--	--	--	--	--	--	--	--	--	--
IA10- MW0014	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
IA10- MW0015	Sep-08	0.996	1.78	0.0835	0.0337	--	2.03	1.12	ND	0.909
	--	--	--	--	--	--	--	--	--	--
IA10- MW0016	Sep-08	ND	R	R	ND	--	0.427	ND	ND	0.427
	--	--	--	--	--	--	--	--	--	--
IA10- MW0017	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
IA10- MW0018	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
IA10- MW0019	Sep-08	ND	R	ND	ND	--	3.76	2.15	ND	1.61
	--	--	--	--	--	--	--	--	--	--
RMW38	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--

-- 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)
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Table 3
Former Harshaw Chemical Site
Groundwater Filtered Analytical Results
2008-2009

Well Units	Year	Radium-226[1] Dissolved pCi/L	Radium-228[1] Dissolved pCi/L	Thorium-230[2] Dissolved pCi/L	Thorium-232[2] Dissolved pCi/L	Total Uranium Dissolved (KPA) µg/L	Total Uranium[3] Dissolved (Alpha Spec) pCi/L	Uranium-234 Dissolved pCi/L	Uranium-235 Dissolved pCi/L	Uranium-238 Dissolved pCi/L
US EPA MCLs		5	5	15	15	30 µg/L	27 pCi/L	-	-	-
BKA48	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
BKA53	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
BKG-MW0003[4]	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
DM14	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
DM15	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
DM23R	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
DM29R	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
ERM47	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
IA03-TW0001	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
IA03-TW0004	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
IA04-TP0001	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
IA04-TP0004	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
IA04-TP0005	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
IA04-TW0004	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
IA10-MW0001	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
IA10-MW0002	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
IA10- MW0004	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
IA10- MW0005	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
IA10- MW0007	Sep-08 --	0.966 --	0.827 --	R --	ND --	-- --	11.5 --	6.82 --	0.467 --	4.19 --