

Office of Legacy Management

**Groundwater and Surface Water
Monitoring Evaluation Report
for the Naturita, Colorado,
Processing Site**

April 2011



U.S. DEPARTMENT OF
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Abbreviations

ACL	alternate concentration limit
COPC	contaminant of potential concern
DOE	U.S. Department of Energy
ft	foot (feet)
GCAP	<i>Ground Water Compliance Action Plan for the Naturita, Colorado, UMTRA Project Site</i>
LM	Office of Legacy Management
MCL	maximum concentration limit
mg/L	milligram(s) per liter
NRC	U.S. Nuclear Regulatory Commission
POC	point-of-compliance
RBC	risk-based concentration
VMR	verification monitoring report

1.0 Introduction

The Naturita, Colorado, processing site is located in Montrose County, approximately 2 miles north of the Town of Naturita, Colorado (Figure 1). The compliance strategy for the site is no remediation with the application of alternate concentration limits (ACLs) for uranium and vanadium—the contaminants of potential concern (COPCs). Institutional controls and monitoring are also components of the remedy as described in the draft *Ground Water Compliance Action Plan for the Naturita, Colorado, UMTRA Project Site* (GCAP) (DOE 2002a). The draft GCAP will be revised to incorporate additional information requested by the U.S. Nuclear Regulatory Commission (NRC) prior to final approval.

This report updates groundwater and surface water monitoring data collected since 1999 (after surface remediation) and assesses the status of the compliance strategy for groundwater cleanup. Verification monitoring reports (VMRs) have been prepared in the past for the Naturita processing site. However, because the compliance strategy for the site does not include natural flushing or active remediation, VMRs are not required. This monitoring evaluation report will update the last VMR with data from 2010, but future data will be reported in a summary section to be added to the data validation package for the site.

2.0 Site Conditions

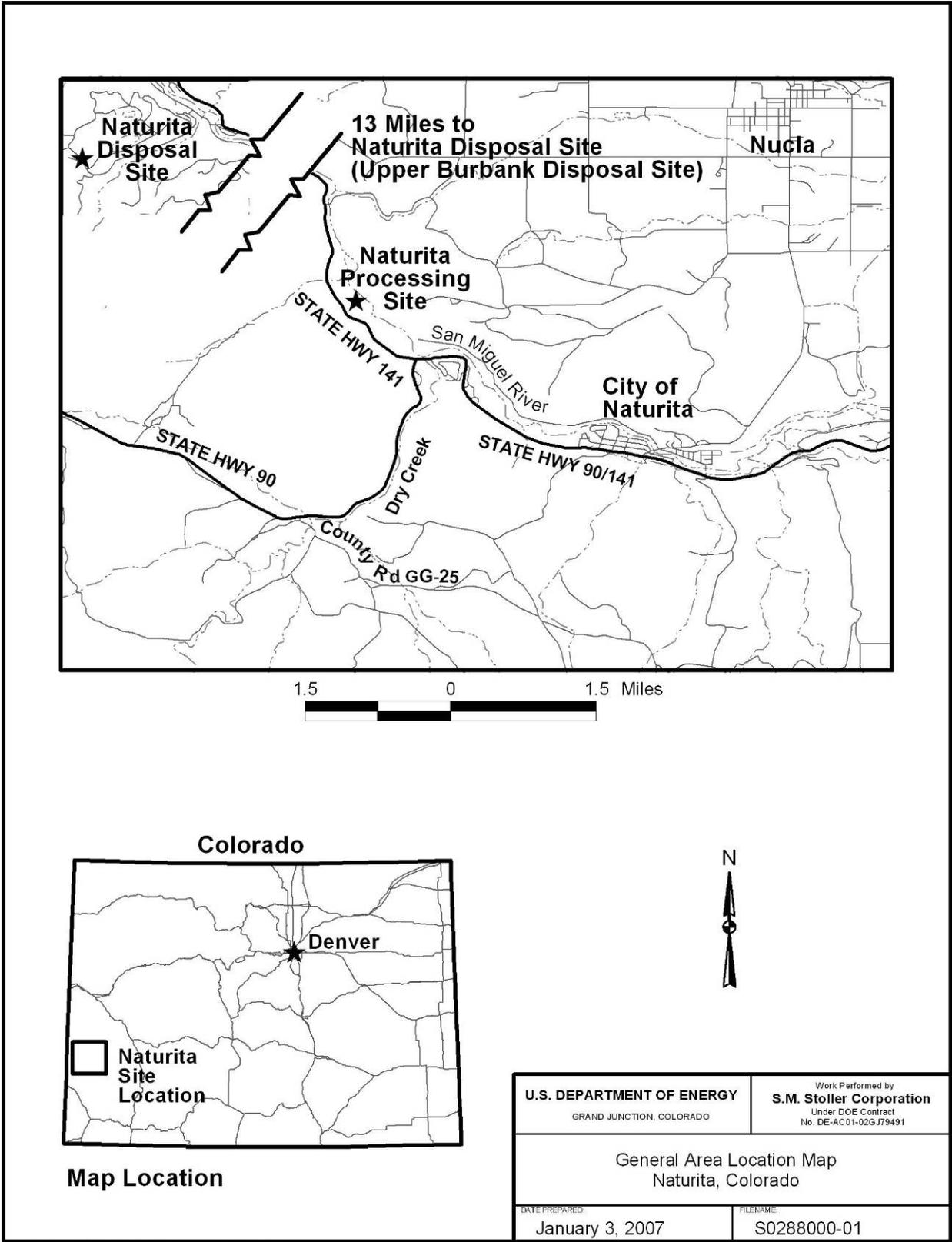
2.1 Hydrogeology

The unconfined alluvial aquifer is the uppermost aquifer at the Naturita processing site. It consists of a wedge of sediment that pinches out along the western bedrock and reaches a maximum thickness of about 23 feet (ft) by the San Miguel River along the northern portion of the site. Over most of the site, the alluvium is generally 5 to 10 ft thick. Between 1998 and 2001, when site characterization was conducted (DOE 2002b), the saturated thickness ranged from less than 2 ft to nearly 15 ft. Recharge and discharge occur along the length of the San Miguel River, depending on the river level. Groundwater flow paths in the alluvial aquifer are generally parallel to the river. The river is the primary surface water in the vicinity of the site and is used as a water source for irrigation and livestock.

The underlying Brushy Basin Member of the Morrison Formation separates the alluvial aquifer from the bedrock Salt Wash aquifer. The Brushy Basin Member is an effective aquitard and prevents downward migration of contamination to the deeper aquifer.

2.2 Water Quality

Uranium and vanadium values are elevated in alluvial groundwater at the former Naturita mill site. Arsenic was removed from the list of COPCs in 2003, when values in all wells dropped below the maximum concentration limit (MCL) of 0.05 milligrams per liter (mg/L), specified in Title 40 *Code of Federal Regulations* Part 192 (40 CFR 192). However, the Safe Drinking Water Act standard for arsenic was lowered to 0.01 mg/L in 2006, and in response to NRC's concerns, arsenic sampling resumed in 2009.



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Figure 1. General Area Location Map, Naturita, Colorado

Groundwater modeling of uranium and vanadium indicates that constituents will not flush to levels permitting unrestricted use during the 100-year natural flushing period (DOE 2002b). However, because the water is not currently being used, and institutional controls will prevent future use, ACLs have been proposed for uranium and vanadium. ACLs of 3 mg/L for uranium and 6 mg/L for vanadium were proposed as action levels at the points of compliance. The MCL for uranium is 0.044 mg/L. Vanadium has no MCL; however, vanadium concentrations exceed the EPA Region III residential risk-based concentration (RBC) of 0.33 mg/L (EPA 2002). The ACL values are the approximate maximum concentrations observed in groundwater in the years following surface remediation and are protective of human health because there are no complete exposure pathways. They are protective of the environment because the San Miguel River provides a significant dilution effect (a factor of 4000 to 5000; DOE 1995).

In the past, surface water was sampled at location 0538 (Figure 2), a historical channel of the San Miguel River where groundwater surfaced. Levels of uranium at the sampling location were above the MCL of 0.044 mg/L. To remove any potential risk associated with wildlife and livestock exposure to the water, the channel was filled with cobbles and sand in April 2010. The work was completed under a U.S. Army Corps of Engineers 404 Nationwide Permit, and it resulted in no net loss of wetlands. Surface water is no longer present in the historical channel except during periods of high river stage, when river water floods the area. Therefore, sampling has been discontinued at location 0538.

2.3 Surface Remediation Activities

The site is the location of a former vanadium and uranium mill that operated intermittently from 1939 until 1958. Surface remediation at the site occurred between January 1993 and September 1998 under the Uranium Mill Tailings Remedial Action Project. A total of 771,400 cubic yards of material was removed from the site and disposed of at the Naturita disposal site, about 15 miles northwest, near the former town of Uravan, Colorado. Supplemental standards were applied to five areas totaling 11 acres on the Naturita processing site and to another 11 acres on the adjoining vicinity property downgradient of the site (Figure 3). This material was left in place because potential negative consequences (destruction of sensitive riparian areas and construction-related risk to workers) outweighed the benefits of removing the low levels of radiological contamination.

2.4 Institutional Controls

Institutional controls have been or will be placed on groundwater associated with the Naturita processing site that is currently contaminated or may become contaminated in the future (Figure 4). The historical site area now consists of 79 acres and includes property owned by the Town of Naturita and Chemetall Foote Corporation. Groundwater contamination extends downgradient beneath a private property adjacent to the site.

The institutional controls for the Naturita site are environmental covenants between the landowners and the State of Colorado, represented by the Colorado Department of Public Health and Environment. The covenants prohibit the installation of wells in the alluvial aquifer for purposes other than environmental monitoring and remediation. Controls are in place on property owned by the Town of Naturita and the private property. Controls are being negotiated for property owned by Chemetall Foote Corporation.

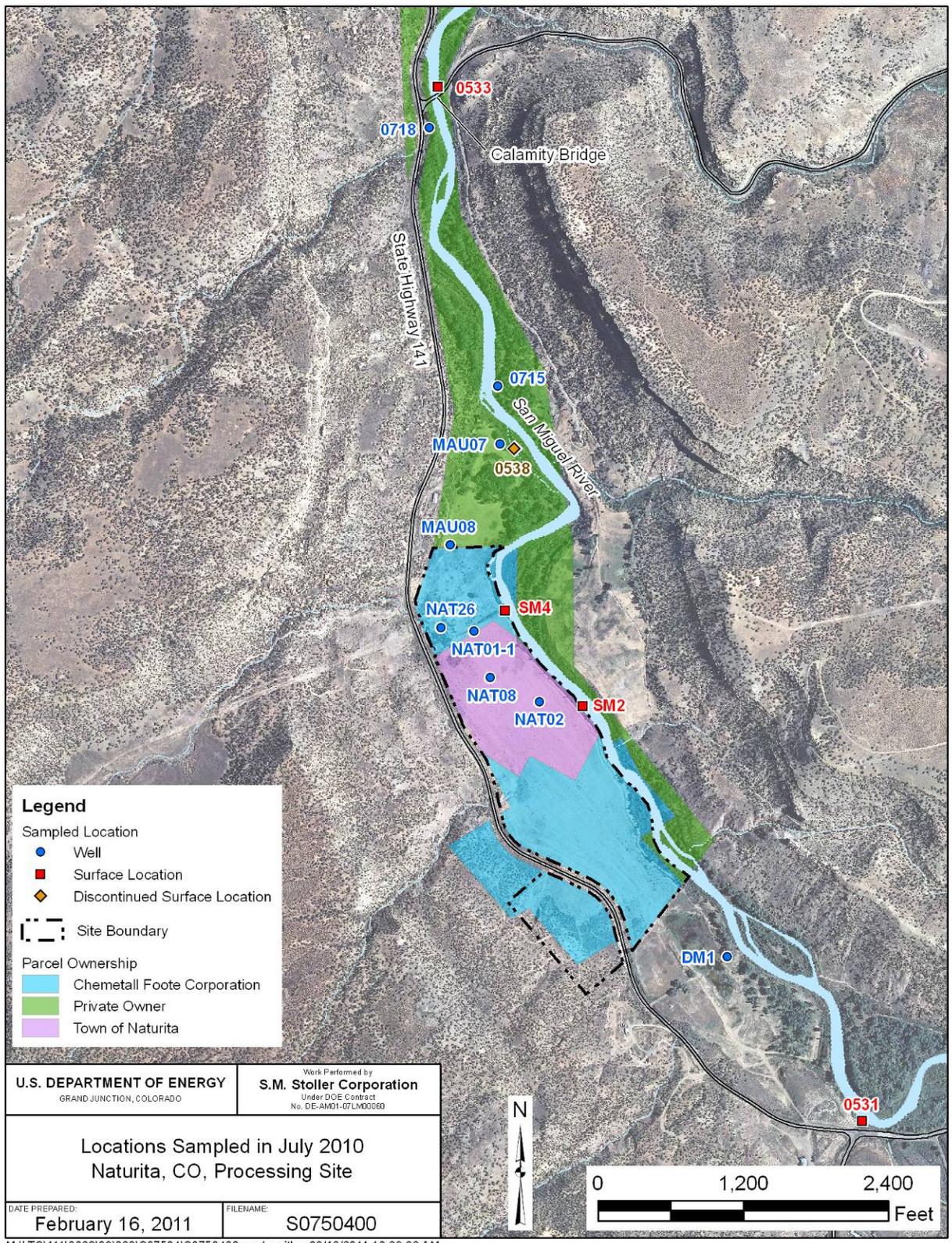


Figure 2. Locations Sampled in July 2010, Naturita Processing Site

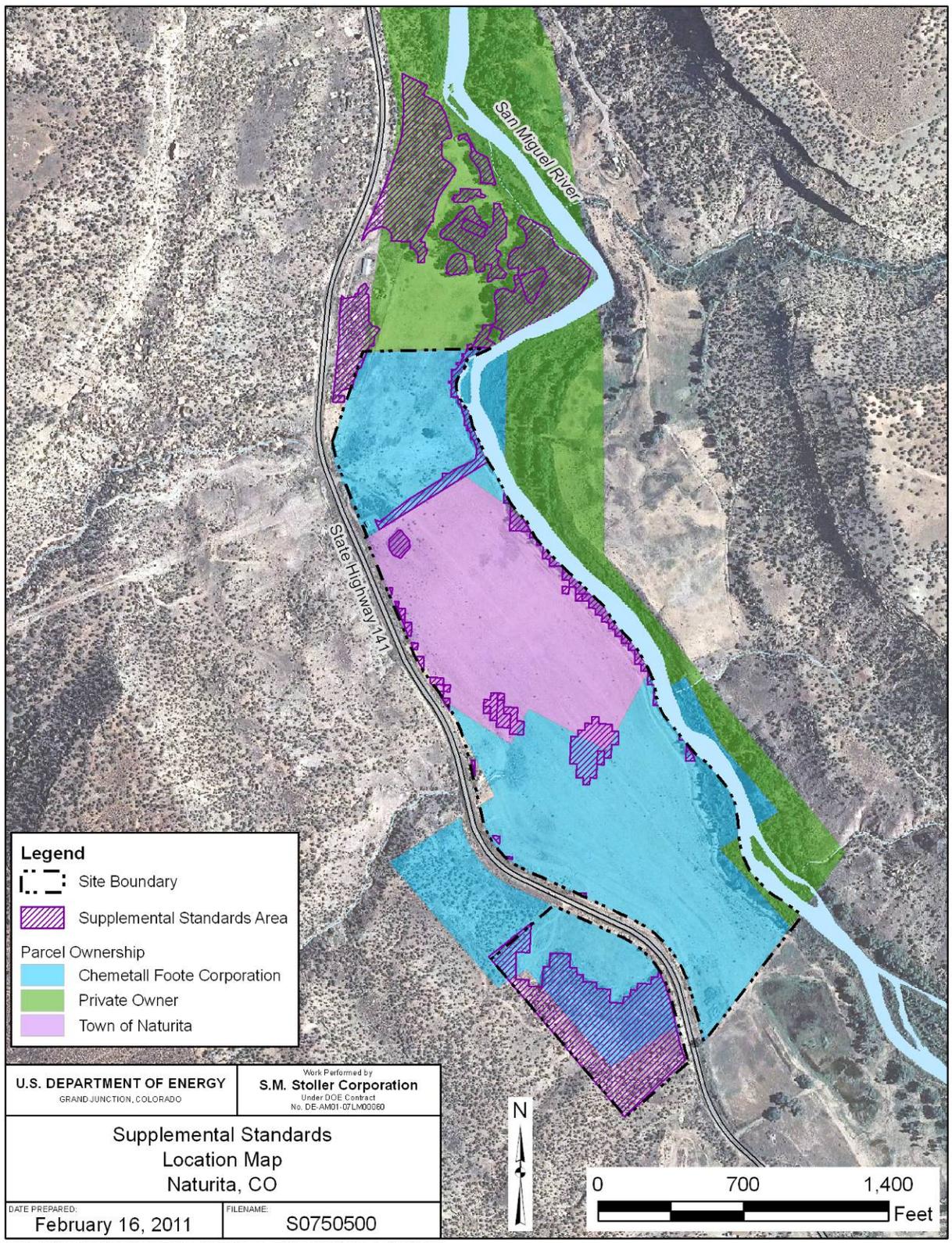


Figure 3. Supplemental Standards Location Map, Naturita Processing Site

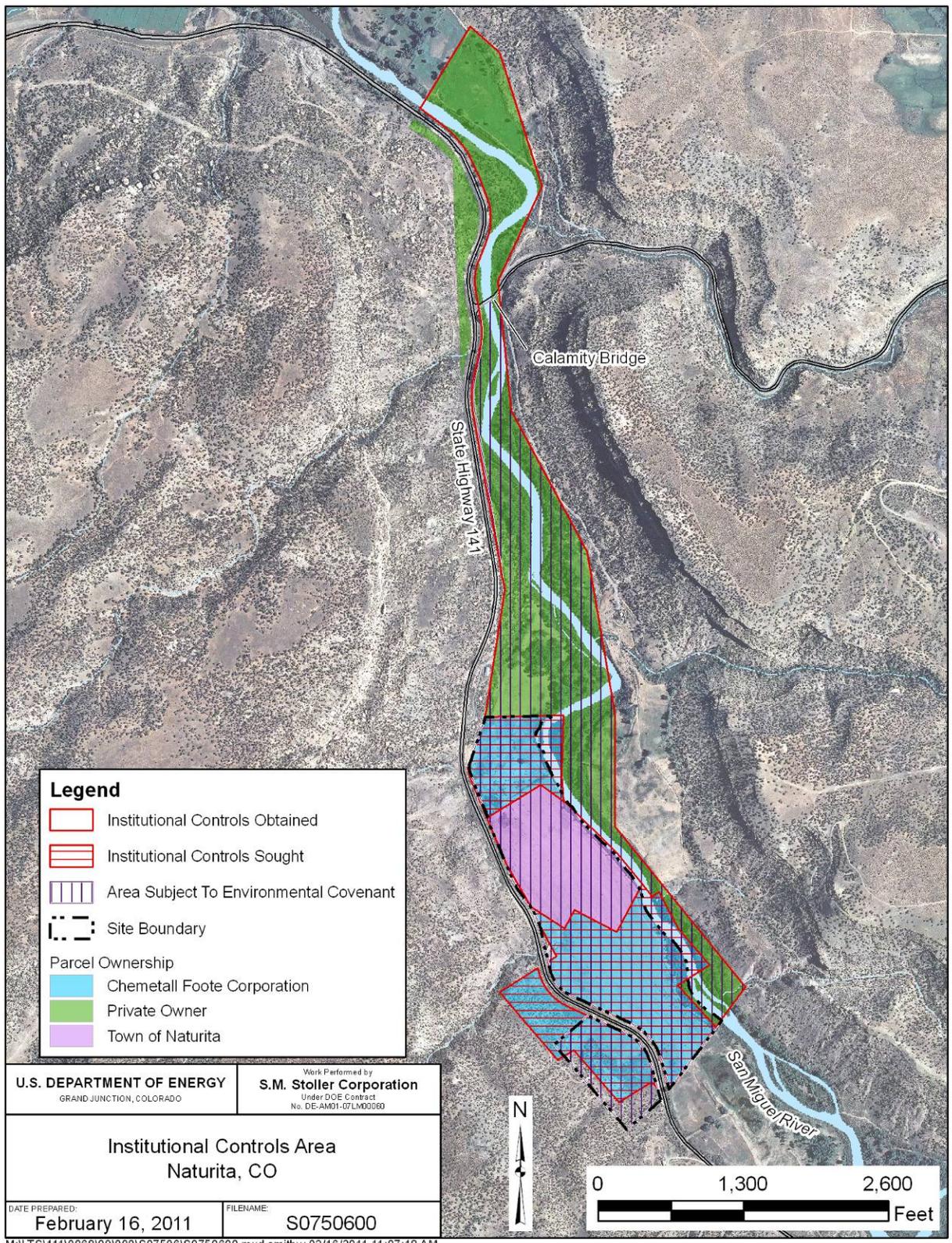


Figure 4. Institutional Controls Area, Naturita Processing Site

3.0 Monitoring Program

The monitoring program ensures continued protection of human health and the environment. Table 1 provides monitoring requirements; Figure 2 shows monitoring locations. Monitoring wells 0715 and 0718 were recently added to the monitoring network in an attempt to better understand the movement of alluvial groundwater downgradient of the site boundary, and surface location 0538 was recently removed from the network because surface water no longer exists at this location except during periods of high river stage.

Table 1. Summary of Monitoring Requirements

Location	Monitoring Purpose	Analytes	Frequency
Well DM1	Background groundwater	Arsenic, uranium, vanadium, total dissolved solids, field parameters	Annually for 5 years after NRC approval of the GCAP; afterward, every 3 years for 30 years
Well NAT01-1	Point-of-compliance (POC) well, added at NRC's request to monitor vanadium concentration migrating toward river		
Well NAT02	POC well for uranium and vanadium plume		
Well NAT08	POC well for maximum vanadium concentration		
Well NAT26	POC well for maximum uranium concentration		
Well MAU07	POC well; last well before groundwater enters the San Miguel River		
Well MAU08	POC well for uranium plume		
Well 0715	Alluvium on east side of San Miguel River, downgradient of site boundary		
Well 0718	Alluvial well immediately upstream of Calamity Bridge		
Surface 0531	Upgradient San Miguel River		
Surface 0533	Point-of-exposure (POE) location, downgradient San Miguel River		
Surface SM2	POE location, crossgradient of uranium plume		
Surface SM4	POE location, crossgradient of vanadium plume		

As mentioned, the arsenic MCL in 40 CFR 192 is 0.05 mg/L, and the proposed ACLs for uranium and vanadium in groundwater are 3.0 mg/L and 6.0 mg/L, respectively. The ACLs are to be met at the points of compliance, which are considered to be all wells in the monitoring network. Points of exposure are any points along the San Miguel River and the alluvium downgradient of the area protected under institutional controls or environmental covenants. Meeting ACLs at points of compliance will result in acceptable concentrations at the points of exposure.

Monitoring is currently conducted annually. The sampling frequency will be once every year for the first 5 years following NRC's acceptance of the GCAP. Thereafter, sampling will be conducted every 3 years for the next 30 years. At that time, future risks and the monitoring plan will be reevaluated. Within areas covered by institutional controls, contaminants are expected to remain above levels suitable for unrestricted use for over 100 years. However, if concentrations in these areas decline to acceptable levels, the need for continued monitoring will be reevaluated.

4.0 Results of 2010 Monitoring

Appendix A presents groundwater data collected in 2010, and Appendix B presents surface water data. Appendix C includes time-concentration plots for groundwater uranium and vanadium for the monitoring period. However, the vanadium plot for background, vicinity property, and downgradient wells only shows data from 2002 through 2010 because previous data were all below detection limits and cannot be accurately compared to recent data with lower detection limits.

Monitoring conducted since the completion of surface remediation showed an initial decline in both uranium and vanadium, followed by a more gradual decline. In 2010, the well with the highest concentration of uranium (1.2 mg/L) was NAT26. With the exception of the background well (DM1), uranium concentrations in all wells, including the downgradient wells, exceeded the MCL of 0.044 mg/L.

Well NAT08 had the highest concentration of vanadium in 2010 (2.1 mg/L). Concentrations in NAT02 (0.63 mg/L) also exceeded the RBC for vanadium of 0.33 mg/L, but all other wells were below the standard.

Arsenic concentrations in all wells have remained below the MCL of 0.05 mg/L since 2003. Only one well—NAT08 (0.024 mg/L)—exceeded the Safe Drinking Water Act standard of 0.01 mg/L for arsenic in 2010.

Surface water samples from the San Miguel River continue to indicate that the site has no measurable impact on river water quality. Concentrations of COPCs in samples from site locations (SM2 and SM4) and the downgradient location (0533) are similar to those from the upgradient, background location (0531), and all values are below MCLs or the RBC for vanadium.

5.0 Conclusions

The compliance strategy selected for groundwater at the Naturita processing site continues to be protective of human health and the environment. No complete exposure pathways exist for contaminated groundwater. Arsenic in groundwater remains below the MCL in 40 CFR 192, and only one sample exceeds the revised Safe Drinking Water Act standard. Vanadium and uranium concentrations in groundwater remain below the proposed ACLs. All surface water sample results in 2010 were similar to values at the background location. Potential exposure routes by livestock and wildlife to contaminants in pooled surface water at Seep 0538 no longer exist. No changes in the monitoring program are recommended at this time.

In 2010, uranium concentrations in downgradient wells 0715 (0.067 mg/L) and 0718 (0.066 mg/L) exceeded the MCL for uranium. The historical deposition of millsite tailings during river flooding and the subsequent leaching or movement of those tailings is the probable reason for elevated uranium in these locations (DOE 2002a). Arsenic is below the MCL at these two locations.

6.0 References

40 CFR 192. U.S. Environmental Protection Agency, “Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings,” *Code of Federal Regulations*, July 1, 2009.

DOE (U.S. Department of Energy), 1995. *Baseline Risk Assessment of Ground Water Contamination at the Uranium Mill Tailings Site near Naturita, Colorado*, DOE/AL/62350-195, Rev. 1, Albuquerque Operation Office, Albuquerque, New Mexico.

DOE (U.S. Department of Energy), 2002a. *Ground Water Compliance Action Plan for the Naturita, Colorado, UMTRA Project Site*, GJO-2002-355-TAC, GJO-GWNAT 1.0, Grand Junction Office, Grand Junction, Colorado, September.

DOE (U.S. Department of Energy), 2002b. *Site Observational Work Plan for the Naturita, Colorado, UMTRA Project Site*, GJO-2001-234-TAR, MAC-GWNAT 1.1, Grand Junction Office, Grand Junction, Colorado, May.

EPA (U.S. Environmental Protection Agency), 2002. “Updated Risk-Based Concentration Table,” from Jennifer Hubbard, available on the EPA Region III Internet Website at http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm.

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Appendix A

Groundwater Quality Data by Parameter

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GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 2/11/2011 12:34 pm

PARAMETER	UNITS	LOCATION CODE	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UNCERTAINTY
				DATE	ID			LAB	DATA	QA		
Alkalinity, Total (As CaCO ₃)	mg/L	0715	WL	7/28/2010	N001	5.49 -10.42	210	F	-1	-	-	
	mg/L	0718	WL	7/27/2010	N001	8.6 -18.6	364	F	-1	-	-	
	mg/L	DM1	WL	7/28/2010	N001	2.67 -7.67	179	F	-1	-	-	
	mg/L	MAU07	WL	7/27/2010	N001	2.92 -7.92	400	F	-1	-	-	
	mg/L	MAU08	WL	7/27/2010	N001	6.17 -11.17	483	F	-1	-	-	
	mg/L	NAT01-1	WL	7/27/2010	N001	17 -17.5	321	F	-1	-	-	
	mg/L	NAT02	WL	7/27/2010	N001	6.42 -11.42	211	F	-1	-	-	
	mg/L	NAT08	WL	7/27/2010	N001	6.3 -11.3	310	F	-1	-	-	
	mg/L	NAT26	WL	7/27/2010	N001	10.67 -15.67	442	F	-1	-	-	
Arsenic	mg/L	0715	WL	7/28/2010	N001	5.49 -10.42	0.0044	F	-1	0.00003	-	
	mg/L	0718	WL	7/27/2010	N001	8.6 -18.6	0.0031	F	-1	0.000015	-	
	mg/L	DM1	WL	7/28/2010	N001	2.67 -7.67	0.0017	F	-1	0.000015	-	
	mg/L	MAU07	WL	7/27/2010	N001	2.92 -7.92	0.0047	F	-1	0.000015	-	
	mg/L	MAU08	WL	7/27/2010	N001	6.17 -11.17	0.00048	F	-1	0.000015	-	
	mg/L	NAT01-1	WL	7/27/2010	N001	17 -17.5	0.0082	F	-1	0.000015	-	
	mg/L	NAT01-1	WL	7/27/2010	N002	17 -17.5	0.0081	F	-1	0.000015	-	
	mg/L	NAT02	WL	7/27/2010	N001	6.42 -11.42	0.006	F	-1	0.00015	-	
	mg/L	NAT08	WL	7/27/2010	N001	6.3 -11.3	0.024	F	-1	0.0015	-	
mg/L	NAT26	WL	7/27/2010	N001	10.67 -15.67	0.00036	F	-1	0.000015	-		
Oxidation Reduction Potential	mV	0715	WL	7/28/2010	N001	5.49 -10.42	-26.1	F	-1	-	-	
	mV	0718	WL	7/27/2010	N001	8.6 -18.6	-30.2	F	-1	-	-	
	mV	DM1	WL	7/28/2010	N001	2.67 -7.67	-22.9	F	-1	-	-	
	mV	MAU07	WL	7/27/2010	N001	2.92 -7.92	-14.1	F	-1	-	-	
	mV	MAU08	WL	7/27/2010	N001	6.17 -11.17	12.8	F	-1	-	-	
	mV	NAT01-1	WL	7/27/2010	N001	17 -17.5	-7.7	F	-1	-	-	
	mV	NAT02	WL	7/27/2010	N001	6.42 -11.42	-17.5	F	-1	-	-	
	mV	NAT08	WL	7/27/2010	N001	6.3 -11.3	-12	F	-1	-	-	
	mV	NAT26	WL	7/27/2010	N001	10.67 -15.67	62.4	F	-1	-	-	

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE NAT01, Naturita Processing Site
 REPORT DATE: 2/11/2011 12:34 pm

PARAMETER	UNITS	LOCATION CODE	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION	
				DATE	ID			LAB	DATA	QA	LIMIT	UNCERTAINTY
Specific Conductance	umhos/cm	0715	WL	7/28/2010	N001	5.49 -10.42	954	F	-1	-	-	
	umhos/cm	0718	WL	7/27/2010	N001	8.6 -18.6	1987	F	-1	-	-	
	umhos/cm	DM1	WL	7/28/2010	N001	2.67 -7.67	654	F	-1	-	-	
	umhos/cm	MAU07	WL	7/27/2010	N001	2.92 -7.92	2198	F	-1	-	-	
	umhos/cm	MAU08	WL	7/27/2010	N001	6.17 -11.17	3129	F	-1	-	-	
	umhos/cm	NAT01-1	WL	7/27/2010	N001	17 -17.5	1997	F	-1	-	-	
	umhos/cm	NAT02	WL	7/27/2010	N001	6.42 -11.42	1021	F	-1	-	-	
	umhos/cm	NAT08	WL	7/27/2010	N001	6.3 -11.3	1727	F	-1	-	-	
Temperature	umhos/cm	NAT26	WL	7/27/2010	N001	10.67 -15.67	3541	F	-1	-	-	
	C	0715	WL	7/28/2010	N001	5.49 -10.42	16.42	F	-1	-	-	
	C	0718	WL	7/27/2010	N001	8.6 -18.6	14.24	F	-1	-	-	
	C	DM1	WL	7/28/2010	N001	2.67 -7.67	18.61	F	-1	-	-	
	C	MAU07	WL	7/27/2010	N001	2.92 -7.92	18.69	F	-1	-	-	
	C	MAU08	WL	7/27/2010	N001	6.17 -11.17	17.16	F	-1	-	-	
	C	NAT01-1	WL	7/27/2010	N001	17 -17.5	15.65	F	-1	-	-	
	C	NAT02	WL	7/27/2010	N001	6.42 -11.42	18.31	F	-1	-	-	
Total Dissolved Solids	C	NAT08	WL	7/27/2010	N001	6.3 -11.3	16.43	F	-1	-	-	
	C	NAT26	WL	7/27/2010	N001	10.67 -15.67	15.59	F	-1	-	-	
	mg/L	0715	WL	7/28/2010	N001	5.49 -10.42	690	F	-1	20	-	
	mg/L	0718	WL	7/27/2010	N001	8.6 -18.6	1500	F	-1	40	-	
	mg/L	DM1	WL	7/28/2010	N001	2.67 -7.67	420	F	-1	20	-	
	mg/L	MAU07	WL	7/27/2010	N001	2.92 -7.92	1700	F	-1	40	-	
	mg/L	MAU08	WL	7/27/2010	N001	6.17 -11.17	2200	F	-1	40	-	
	mg/L	NAT01-1	WL	7/27/2010	N001	17 -17.5	1500	F	-1	40	-	
Turbidity	mg/L	NAT01-1	WL	7/27/2010	N002	17 -17.5	1500	F	-1	40	-	
	mg/L	NAT02	WL	7/27/2010	N001	6.42 -11.42	730	F	-1	20	-	
	mg/L	NAT08	WL	7/27/2010	N001	6.3 -11.3	1300	F	-1	40	-	
	mg/L	NAT26	WL	7/27/2010	N001	10.67 -15.67	2600	F	-1	40	-	
	NTU	0715	WL	7/28/2010	N001	5.49 -10.42	6.9	F	-1	-	-	
	NTU	0718	WL	7/27/2010	N001	8.6 -18.6	9.47	F	-1	-	-	
	NTU	DM1	WL	7/28/2010	N001	2.67 -7.67	3	F	-1	-	-	
	NTU	MAU07	WL	7/27/2010	N001	2.92 -7.92	5.43	F	-1	-	-	
NTU	MAU08	WL	7/27/2010	N001	6.17 -11.17	6.22	F	-1	-	-		

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE NAT01, Naturita Processing Site
 REPORT DATE: 2/11/2011 12:34 pm

PARAMETER	UNITS	LOCATION CODE	LOC TYPE, SUBTYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UNCERTAINTY
								LAB	DATA	QA		
Turbidity	NTU	NAT01-1	WL	7/27/2010	N001	17 -17.5	4.52	F	-1	-	-	
	NTU	NAT02	WL	7/27/2010	N001	6.42 -11.42	9.27	F	-1	-	-	
	NTU	NAT08	WL	7/27/2010	N001	6.3 -11.3	4.45	F	-1	-	-	
	NTU	NAT26	WL	7/27/2010	N001	10.67 -15.67	2.79	F	-1	-	-	
Uranium	mg/L	0715	WL	7/28/2010	N001	5.49 -10.42	0.067	F	-1	0.000058	-	
	mg/L	0718	WL	7/27/2010	N001	8.6 -18.6	0.066	F	-1	0.000058	-	
	mg/L	DM1	WL	7/28/2010	N001	2.67 -7.67	0.0029	F	-1	0.000029	-	
	mg/L	MAU07	WL	7/27/2010	N001	2.92 -7.92	0.54	F	-1	0.000029	-	
	mg/L	MAU08	WL	7/27/2010	N001	6.17 -11.17	0.73	F	-1	0.000058	-	
	mg/L	NAT01-1	WL	7/27/2010	N001	17 -17.5	0.64	F	-1	0.000058	-	
	mg/L	NAT01-1	WL	7/27/2010	N002	17 -17.5	0.63	F	-1	0.000058	-	
	mg/L	NAT02	WL	7/27/2010	N001	6.42 -11.42	0.16	F	-1	0.000029	-	
	mg/L	NAT08	WL	7/27/2010	N001	6.3 -11.3	0.34	F	-1	0.00029	-	
mg/L	NAT26	WL	7/27/2010	N001	10.67 -15.67	1.2	F	-1	0.00015	-		
Vanadium	mg/L	0715	WL	7/28/2010	N001	5.49 -10.42	0.0029	JF	-1	0.00003	-	
	mg/L	0718	WL	7/27/2010	N001	8.6 -18.6	0.00032	UF	-1	0.000015	-	
	mg/L	DM1	WL	7/28/2010	N001	2.67 -7.67	0.00023	UF	-1	0.000015	-	
	mg/L	MAU07	WL	7/27/2010	N001	2.92 -7.92	0.00043	UF	-1	0.000015	-	
	mg/L	MAU08	WL	7/27/2010	N001	6.17 -11.17	0.00037	UF	-1	0.000015	-	
	mg/L	NAT01-1	WL	7/27/2010	N001	17 -17.5	0.0023	F	-1	0.000015	-	
	mg/L	NAT01-1	WL	7/27/2010	N002	17 -17.5	0.0022	F	-1	0.000015	-	
	mg/L	NAT02	WL	7/27/2010	N001	6.42 -11.42	0.63	F	-1	0.00015	-	
	mg/L	NAT08	WL	7/27/2010	N001	6.3 -11.3	2.1	F	-1	0.0015	-	
mg/L	NAT26	WL	7/27/2010	N001	10.67 -15.67	0.00063	JF	-1	0.000015	-		
pH	s.u.	0715	WL	7/28/2010	N001	5.49 -10.42	7.22	F	-1	-	-	
	s.u.	0718	WL	7/27/2010	N001	8.6 -18.6	7.02	F	-1	-	-	
	s.u.	DM1	WL	7/28/2010	N001	2.67 -7.67	6.87	F	-1	-	-	
	s.u.	MAU07	WL	7/27/2010	N001	2.92 -7.92	6.89	F	-1	-	-	
	s.u.	MAU08	WL	7/27/2010	N001	6.17 -11.17	7.08	F	-1	-	-	
	s.u.	NAT01-1	WL	7/27/2010	N001	17 -17.5	7.01	F	-1	-	-	
	s.u.	NAT02	WL	7/27/2010	N001	6.42 -11.42	7.25	F	-1	-	-	
	s.u.	NAT08	WL	7/27/2010	N001	6.3 -11.3	7.09	F	-1	-	-	
s.u.	NAT26	WL	7/27/2010	N001	10.67 -15.67	7.15	F	-1	-	-		

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE NAT01, Naturita Processing Site
 REPORT DATE: 2/11/2011 12:34 pm

PARAMETER	UNITS	LOCATIO N CODE	LOC TYPE, SUBTYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTIO N LIMIT	UNCERTAINTY
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RECORDS AND (data_validation_qualifiers IS NULL OR data_validation_qualifiers NOT LIKE '%R%' AND data_validation_qualifiers NOT LIKE '%X%') AND cas in
 (ALKALINITY,'07440-38-2','07439-98-7','ORP','PH','EC','TMP','TDS,TURBIDITY,'07440-61-1','07440-62-2') AND DATE_SAMPLED between #1/1/2010#
 and #1/1/2011#

SAMPLE IDE CODE 000X = Filtered sample. N00X = Unfiltered sample. X = replicate number.

LOCATION TYPES: WL WELL

LOCATION SUBTYPES:

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- J Estimated
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- P > 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.

DATA QUALIFIERS:

- | | | | | | |
|---|--|---|---|---|--|
| F | Low flow sampling method. | G | Possible grout contamination, pH > 9. | J | Estimated value. |
| L | Less than 3 bore volumes purged prior to sampling. | N | Presumptive evidence that analyte is present.
The analyte is "tentatively identified." | Q | Qualitative result due to
sampling technique. |
| R | Unusable result. | P | Parameter analyzed for but was not detected. | X | Location is undefined. |

Appendix B

Surface Water Quality Data by Parameter

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GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE NAT01, Naturita Processing Site
 REPORT DATE: 2/11/2011 12:35 pm

PARAMETER	UNITS	LOCATIO	LOC TYPE	SAMPLE:			QUALIFIERS:		DETECTIO	DEPTH	UNCERTAINTY	
		N	SUBTYPE	DATE	ID	RESULT	LAB	DATA	N	RANGE:		
Alkalinity, Total (As CaCO3)	mg/L	0531	SL	7/27/2010	N001	195			-1	0	0	
	mg/L	0533	SL	7/27/2010	N001	136			-1	0	0	
	mg/L	SM2	SL	7/27/2010	N001	168			-1	0	0	
	mg/L	SM4	SL	7/27/2010	N001	151			-1	0	0	
Arsenic	mg/L	0531	SL	7/27/2010	N001	0.0017			-1	0.000015	0	0
	mg/L	0533	SL	7/27/2010	N001	0.0017			-1	0.000015	0	0
	mg/L	SM2	SL	7/27/2010	N001	0.0019			-1	0.000015	0	0
	mg/L	SM4	SL	7/27/2010	N001	0.0018			-1	0.000015	0	0
Oxidation Reduction Potential	mV	0531	SL	7/27/2010	N001	14.2			-1	0	0	
	mV	0533	SL	7/27/2010	N001	-24.9			-1	0	0	
	mV	SM2	SL	7/27/2010	N001	-15.7			-1	0	0	
	mV	SM4	SL	7/27/2010	N001	-27			-1	0	0	
Specific Conductance	umhos/cm	0531	SL	7/27/2010	N001	611			-1	0	0	
	umhos/cm	0533	SL	7/27/2010	N001	779			-1	0	0	
	umhos/cm	SM2	SL	7/27/2010	N001	732			-1	0	0	
	umhos/cm	SM4	SL	7/27/2010	N001	790			-1	0	0	
Temperature	C	0531	SL	7/27/2010	N001	24.2			-1	0	0	
	C	0533	SL	7/27/2010	N001	27.64			-1	0	0	
	C	SM2	SL	7/27/2010	N001	27.17			-1	0	0	
	C	SM4	SL	7/27/2010	N001	29.16			-1	0	0	

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE NAT01, Naturita Processing Site
 REPORT DATE: 2/11/2011 12:35 pm

PARAMETER	UNITS	LOCATIO N	LOC TYPE SUBTYPE	SAMPLE:		QUALIFIERS:		DETECTIO N	DEPTH RANGE:	UNCERTAINTY
				DATE	ID RESULT	LAB	DATA			
Total Dissolved Solids	mg/L	0531	SL	7/27/2010	N001 420			-1 20	0	0
	mg/L	0533	SL	7/27/2010	N001 570			-1 20	0	0
	mg/L	SM2	SL	7/27/2010	N001 520			-1 20	0	0
	mg/L	SM4	SL	7/27/2010	N001 580			-1 20	0	0
Turbidity	NTU	0531	SL	7/27/2010	N001 8.53			-1	0	0
	NTU	0533	SL	7/27/2010	N001 5.31			-1	0	0
	NTU	SM2	SL	7/27/2010	N001 9.55			-1	0	0
	NTU	SM4	SL	7/27/2010	N001 7.58			-1	0	0
Uranium	mg/L	0531	SL	7/27/2010	N001 0.0016			-1 0.0000029	0	0
	mg/L	0533	SL	7/27/2010	N001 0.0025			-1 0.0000029	0	0
	mg/L	SM2	SL	7/27/2010	N001 0.0022			-1 0.0000029	0	0
	mg/L	SM4	SL	7/27/2010	N001 0.0026			-1 0.0000029	0	0
Vanadium	mg/L	0531	SL	7/27/2010	N001 0.00063		J	-1 0.000015	0	0
	mg/L	0533	SL	7/27/2010	N001 0.00097		J	-1 0.000015	0	0
	mg/L	SM2	SL	7/27/2010	N001 0.00086		J	-1 0.000015	0	0
	mg/L	SM4	SL	7/27/2010	N001 0.0009		J	-1 0.000015	0	0
pH	s.u.	0531	SL	7/27/2010	N001 8.47			-1	0	0
	s.u.	0533	SL	7/27/2010	N001 8.51			-1	0	0
	s.u.	SM2	SL	7/27/2010	N001 8.54			-1	0	0
	s.u.	SM4	SL	7/27/2010	N001 8.51			-1	0	0

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE NAT01, Naturita Processing Site
REPORT DATE: 2/11/2011 12:34 pm

PARAMETER	UNITS	LOCATIO N CODE	LOC TYPE, SUBTYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTIO N LIMIT	UNCERTAINTY
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RECORDS AND (data_validation_qualifiers IS NULL OR data_validation_qualifiers NOT LIKE '%R%' AND data_validation_qualifiers NOT LIKE '%X%') AND cas in (ALKALINITY,'07440-38-2','07439-98-7','ORP','PH','EC','TMP','TDS,TURBIDITY,'07440-61-1','07440-62-2') AND DATE_SAMPLED between #1/1/2010# and #1/1/2011#

SAMPLE IDE CODE 000X = Filtered sample. N00X = Unfiltered sample. X = replicate number.

LOCATION TYPES: SURFACE LOCATION

LOCATION SUBTYPES:

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
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- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
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- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.

DATA QUALIFIERS:

- | | | | | | |
|---|--|---|--|---|---|
| F | Low flow sampling method. | G | Possible grout contamination, pH > 9. | J | Estimated value. |
| L | Less than 3 bore volumes purged prior to sampling. | N | Presumptive evidence that analyte is present. The analyte is "tentatively identified." | Q | Qualitative result due to sampling technique. |
| R | Unusable result. | P | Parameter analyzed for but was not detected. | X | Location is undefined. |

QA QUALIFIER: # = validated according to Quality Assurance guidelines

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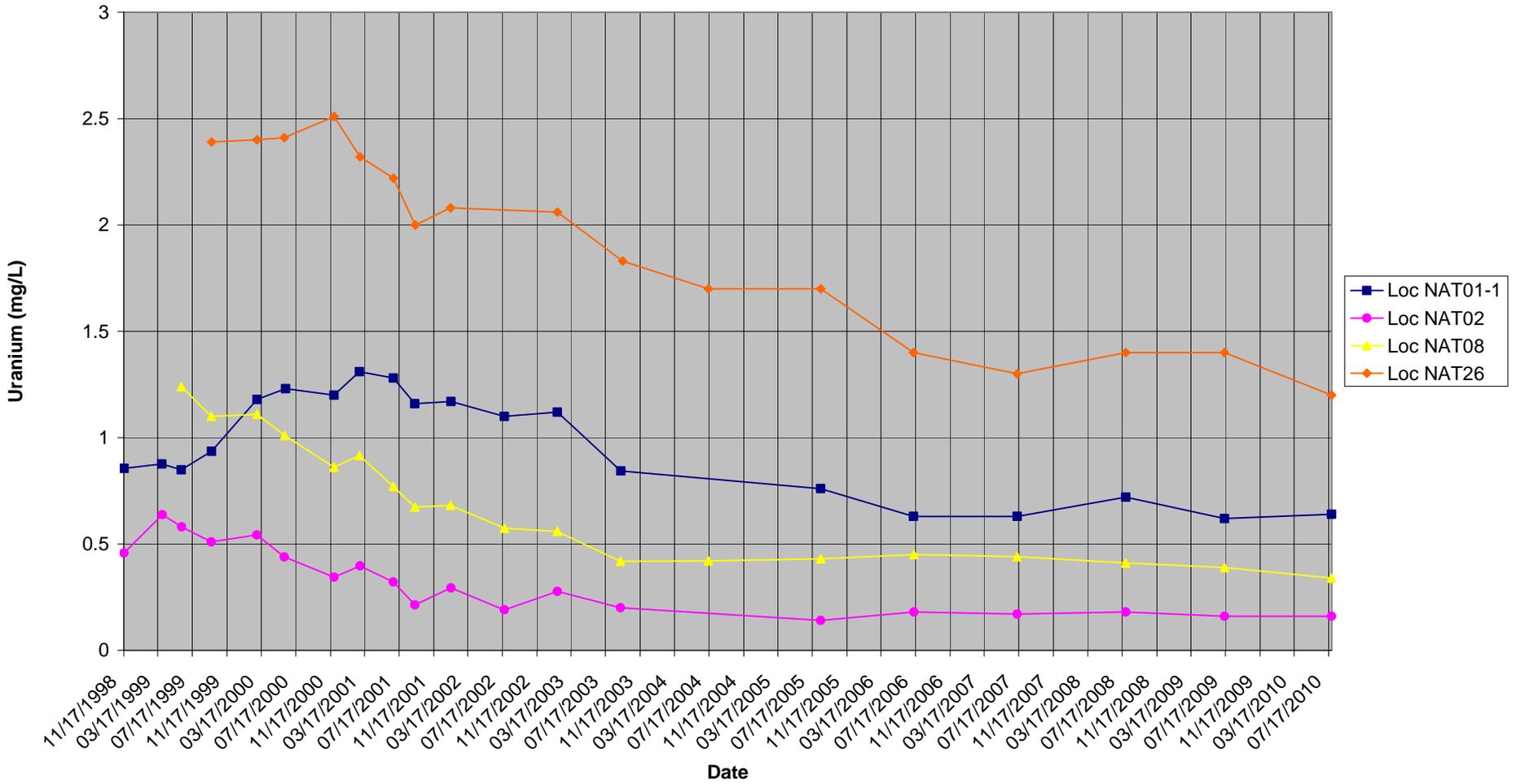
Appendix C

Time-Concentration Plots for Uranium and Vanadium

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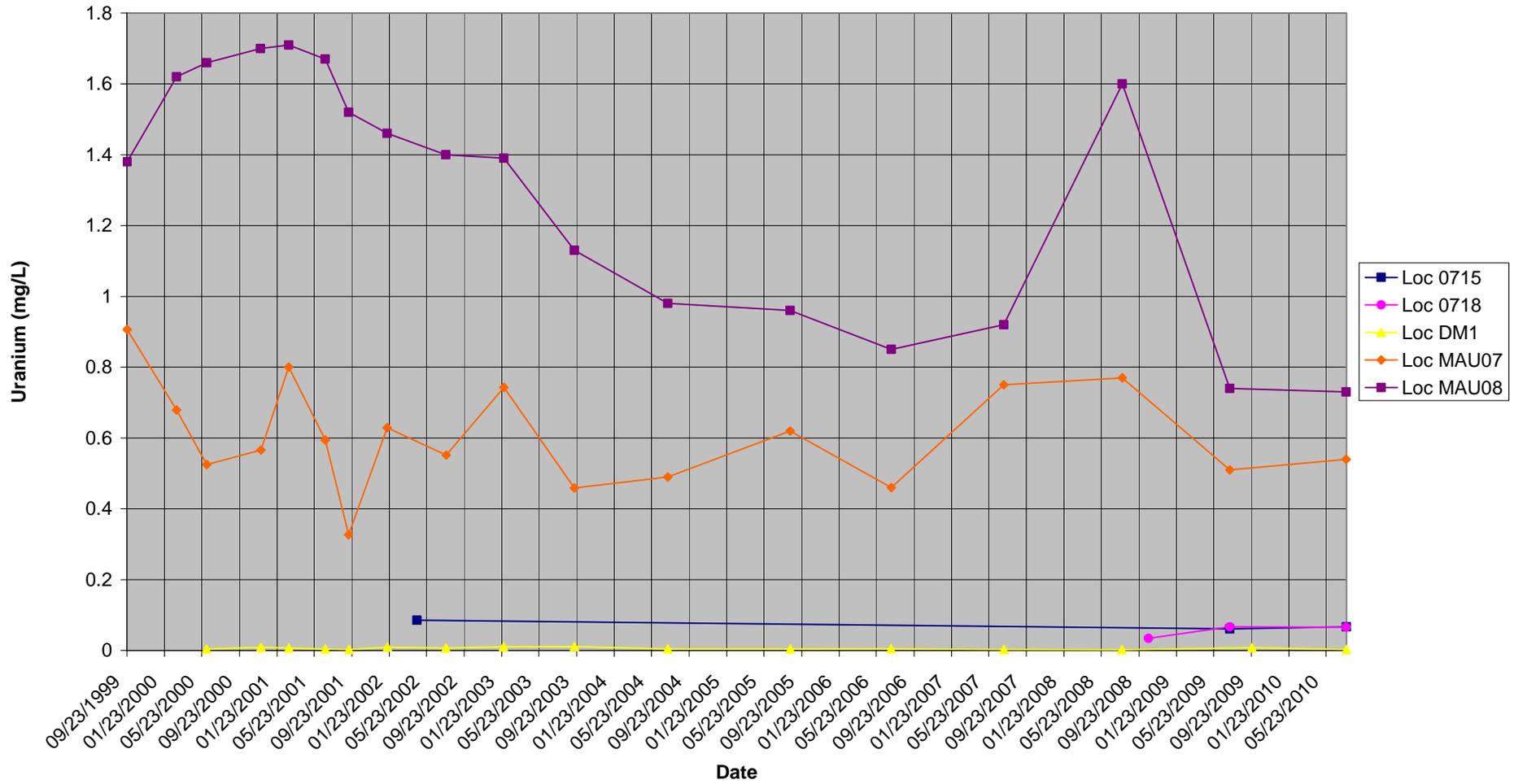
Naturita Processing Site

Uranium Concentration, Former Millsite Wells

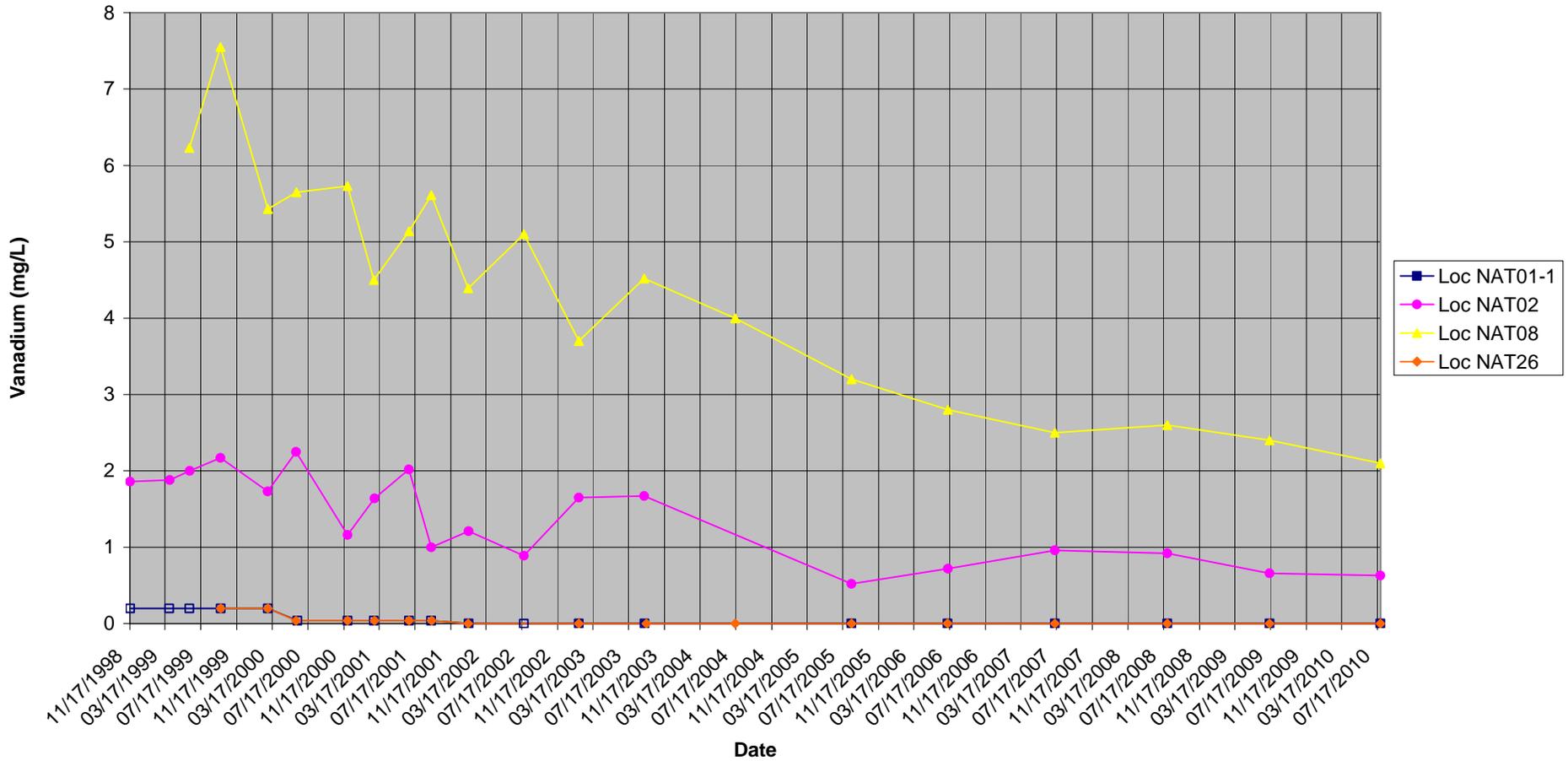


Naturita Processing Site

Uranium Concentration, Background, Vicinity Property, and Downgradient Wells



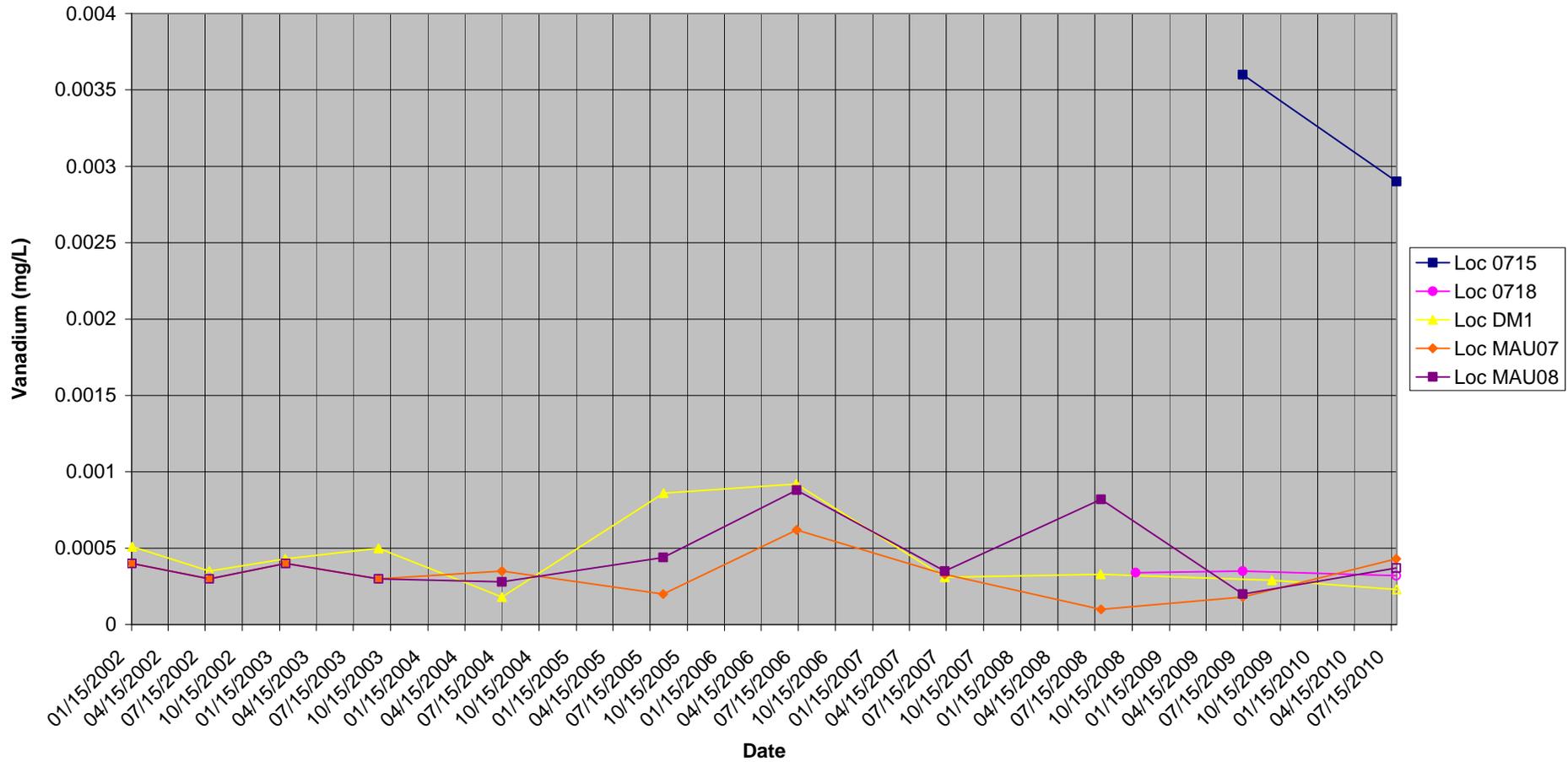
Naturita Processing Site Vanadium Concentration, Former Millsite Wells



Note: A hollow symbol denotes an analytical result below the detection limit.

Naturita Processing Site

Vanadium Concentration, Background, Vicinity Property, and Downgradient Wells



Note: A hollow symbol denotes an analytical result below the detection limit.