LMS/GUP/S06692

2010 Verification Monitoring Report for the Gunnison, Colorado, Processing Site

September 2010

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Contents

Figures

Tables

Appendixes

Abbreviations

CDPHE	Colorado Department of Public Health and Environment
CFR	United States *Code of Federal Regulations*
COPC	constituent of potential concern
DOE	U.S. Department of Energy
DWEL	Drinking Water Equivalent Level
EPA	U. S. Environmental Protection Agency
ft	foot (feet)
ft/day	foot (feet) per day
GCAP	Ground Water Compliance Action Plan
GEMS	Geospatial Environmental Mapping System
IC	institutional control(s)
LM	Legacy Management
MCL	maximum concentration limit
mg/L	milligram(s) per liter
NRC	U.S. Nuclear Regulatory Commission
RRM	residual radioactive material
SOWP	Site Observational Work Plan
UMTRA	Uranium Mill Tailings Remedial Action
VMR	Verification Monitoring Report

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1.0 Overview

The Gunnison, Colorado, Processing Site (Gunnison site) is located in Gunnison County, Colorado, approximately 0.5 mile southwest of the City of Gunnison, between the Gunnison River and Tomichi Creek (Figure 1). Site characterization details are available in the Final Site Observational Work Plan (SOWP) (DOE 2001).

The compliance strategy for groundwater cleanup at the Gunnison site is natural flushing in conjunction with continued groundwater and surface water monitoring and institutional controls (ICs). Groundwater modeling predicts that natural flushing of the alluvial aquifer will be completed within the 100-year timeframe specified in Subpart B of Title 40 *Code of Federal Regulations* Section 192 (40 CFR 192). The U.S. Department of Energy (DOE) and the Colorado Department of Public Health and Environment (CDPHE) funded an alternate domestic water supply system in 1994, with upgrades in 2005, to service existing groundwater users in the area of potentially contaminated groundwater and to provide a potable water source for future development within the IC area.

Detailed information for the Gunnison site and water quality data through 1999 are found in the SOWP (DOE 2001). Site information and water quality data from recent years can be found in Verification Monitoring Reports (VMRs) (DOE 2007 to DOE 2009) located on the Legacy Management website at http://www.LM.doe.gov/Gunnison/Processing/Documents.aspx#vmr. Water quality data for 2010 are provided in Appendixes A through C of this report. All water quality data for the Gunnison site are archived in the SEEPro database at the DOE Office of Legacy Management (LM) in Grand Junction, Colorado. Water quality data also are available for viewing with dynamic mapping via the Geospatial Environmental Mapping System (GEMS) website at http://gems.lm.doe.gov/imf/sites/gems_continental_us/jsp/launch.jsp.

The purpose of this VMR is to present and evaluate groundwater and surface water monitoring data collected during the annual 2010 sampling event at the Gunnison site and to provide an update on the progress of the natural flushing compliance strategy. In 2010, concentrations of constituents of potential concern (COPC), uranium and manganese, in the alluvial aquifer remained above the groundwater standard and risk-based benchmark, respectively. Concentrations of uranium in the alluvial aquifer continue to confirm the site conceptual model of contaminants migrating deeper in the alluvial aquifer with distance from the millsite and provide evidence that natural flushing of the alluvial aquifer is progressing; however, residual soil contamination on former millsite may be having a localized affect in some wells. The distribution of manganese in the alluvial is limited with the highest concentrations near the benchmark value. Concentrations of COPCs in samples collected from domestic wells and Gunnison River locations remained low with no indication of site impacts.

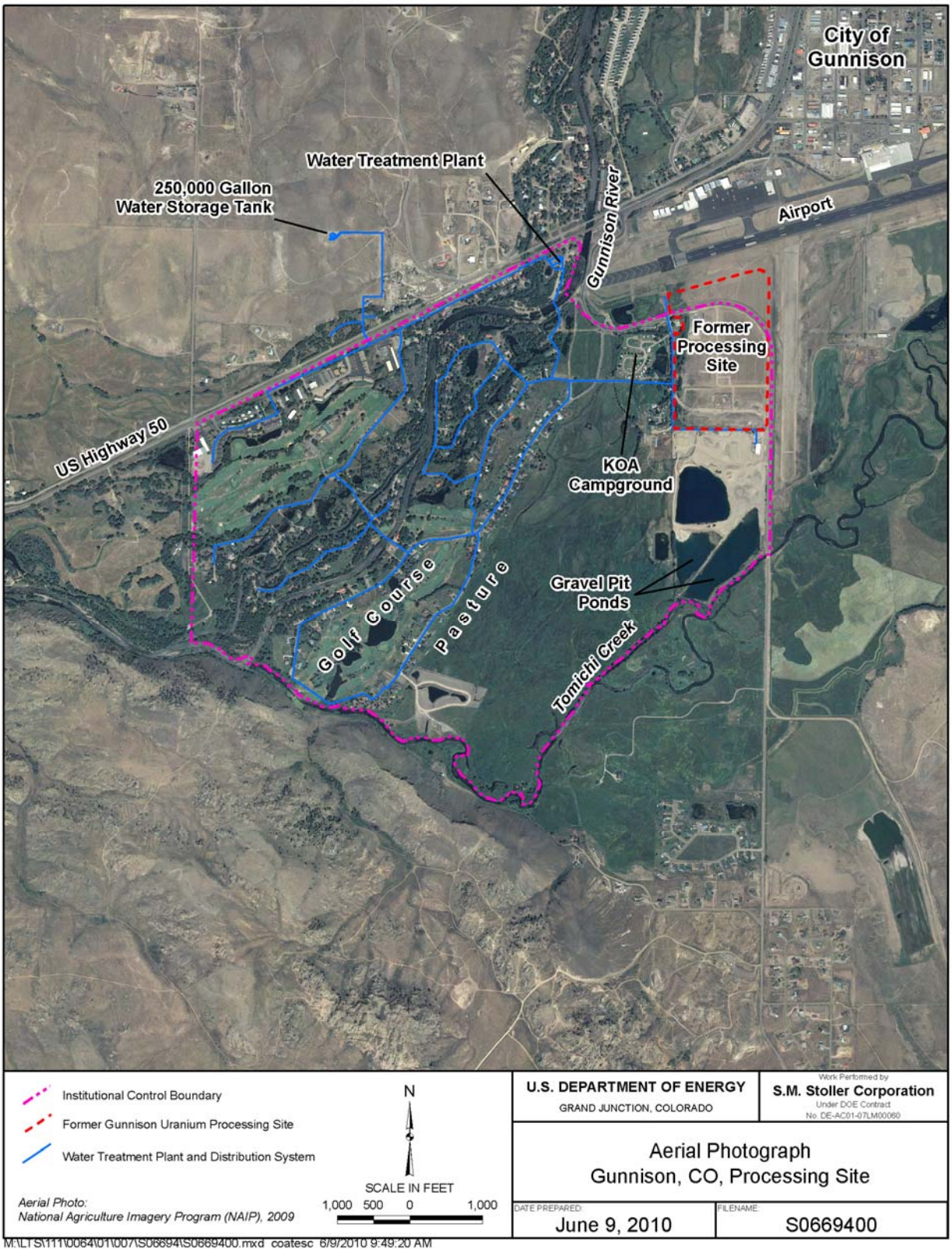


Figure 1. Aerial Photograph of the Gunnison, Colorado, Area

2.0 Site Conditions

2.1 Hydrogeology

Groundwater occurs under unconfined conditions in the alluvial (uppermost) aquifer, with an average depth to the water table of 5 feet (ft). The alluvium is composed of poorly sorted sediments ranging from clay-sized material to gravel, with cobbles and a few boulders. It ranges in thickness from 70 to 130 ft. Groundwater in the alluvial aquifer generally flows to the southwest with an average gradient of 0.005 ft/ft. Hydraulic conductivity ranges from 100 to 170 feet per day (ft/day). The average linear groundwater velocity ranges from 1.9 to 3.2 ft/day (DOE 2001).

Groundwater in the alluvial aquifer system is recharged by groundwater underflow, adjacent streams, precipitation, flood irrigation of the pasture downgradient of the site, and irrigation of the golf course and residential areas southwest of the site. Groundwater is discharged naturally to adjacent streams and by evapotranspiration. Groundwater also is discharged via dewatering activities at the adjacent sand and gravel company located south of the site.

2.2 Water Quality

Groundwater in the alluvial aquifer beneath and downgradient of the Gunnison site was contaminated by uranium processing activities. A variety of tailings-related contaminants in the subsurface and groundwater at the site were evaluated, and the potential risks to human health and the environment were assessed in the SOWP (DOE 2001). Only uranium and manganese were identified as COPCs because they exceeded a groundwater standard and risk-based benchmark, respectively.

Uranium is the primary COPC in groundwater, with concentrations measured up to 1.5 milligrams per liter (mg/L) beneath the site in the past. Currently, uranium exceeds the U.S. Environmental Protection Agency (EPA) Uranium Mill Tailings Remedial Action (UMTRA) maximum concentration limit (MCL) of 0.044 mg/L for groundwater in several monitoring wells on and adjacent to the former millsite and one monitoring well (0183) more than 4,000 ft downgradient of the site boundary. Concentrations of uranium in groundwater below the MCL, but above background, extend approximately 7,000 ft downgradient of the site boundary and have migrated beneath the Gunnison River just beyond the confluence with Tomichi Creek. The zone of contamination attenuates and migrates deeper into the aquifer as it progresses laterally in a southwesterly direction.

Manganese is also a COPC in groundwater, with concentrations measured up to 77 mg/L beneath the site in the past. There is no MCL for manganese. The EPA Drinking Water Equivalent Level (DWEL) for manganese is 1.6 mg/L (EPA 2004). The DWEL is a lifetime-exposure concentration protective of adverse, non-cancer health effects that assumes all of the exposure to a contaminant is from drinking water. Concentrations of manganese are above the DWEL beneath the site and in two downgradient monitoring wells (0113 and 0135). Manganese does not appear to be widespread in the aquifer, and concentrations beneath the site are decreasing.

2.3 Surface Remediation Activities

Uranium mill tailings and other residual radioactive material (RRM) were removed from the former millsite from 1992 through 1995 and stabilized in a disposal cell 6 miles east of the city of Gunnison. RRM beneath the site was cleaned up to just below the water table, with some contaminated material left in place per application of supplemental standards. The site was backfilled with clean fill and revegetated after RRM removal.

2.4 Institutional Controls

ICs in effect in the vicinity of the Gunnison site were finalized in 2004 and consist of deed restrictions on the original millsite property (specified in a Quit Claim Deed transferring the property from the State of Colorado to Gunnison County), a Gunnison County Resolution (Gunnison County 2004) establishing the New Domestic Well Constraint Area, and construction of a domestic water supply system. The Quit Claim Deed specifies restrictions on and approvals needed for excavation, groundwater use, and construction of habitable structures. The New Domestic Well Constraint Area is delineated by the IC boundary (Figure 1), and the Gunnison County Resolution specifies that no new wells can be constructed within the constraint area. In 2004, DOE entered into a cooperative agreement with Gunnison County, approved by the U.S. Nuclear Regulatory Commission (NRC) (DOE 2004), in which DOE (along with CDPHE) agreed to fund an extension of the domestic water supply system to account for potential future growth within the IC boundary (Figure 1). Domestic wells within the IC boundary that are not connected to the water system are monitored to ensure COPC concentrations remain low and below the MCL and DWEL for uranium and manganese, respectively.

3.0 Monitoring Program

Verification monitoring is currently being performed on an annual basis, and will continue annually for the first 5 years after NRC concurrence with the Ground Water Compliance Action Plan (GCAP) (DOE 2010), to ascertain that natural flushing is progressing as predicted by groundwater flow and transport modeling (DOE 2001). The GCAP is currently in review with NRC. A review of the monitoring program will be conducted after the first 5 years to determine if a change in the monitoring program is warranted. Ongoing monitoring requirements will be evaluated in subsequent VMRs and modified as determined by DOE and NRC.

During 2010, the monitoring network included sampling of 28 DOE monitoring wells, six surface water locations, and six domestic wells (Figure 2 and Table 1). Two domestic wells were not sampled during the April sampling event because contact was not made with the homeowners. These wells were subsequently sampled in July after contact was made with the homeowners. Samples collected from all monitoring locations were analyzed for the COPCs, uranium, and manganese. Field measurements of oxidation-reduction potential, pH, specific conductance, temperature, and turbidity were made at each location.

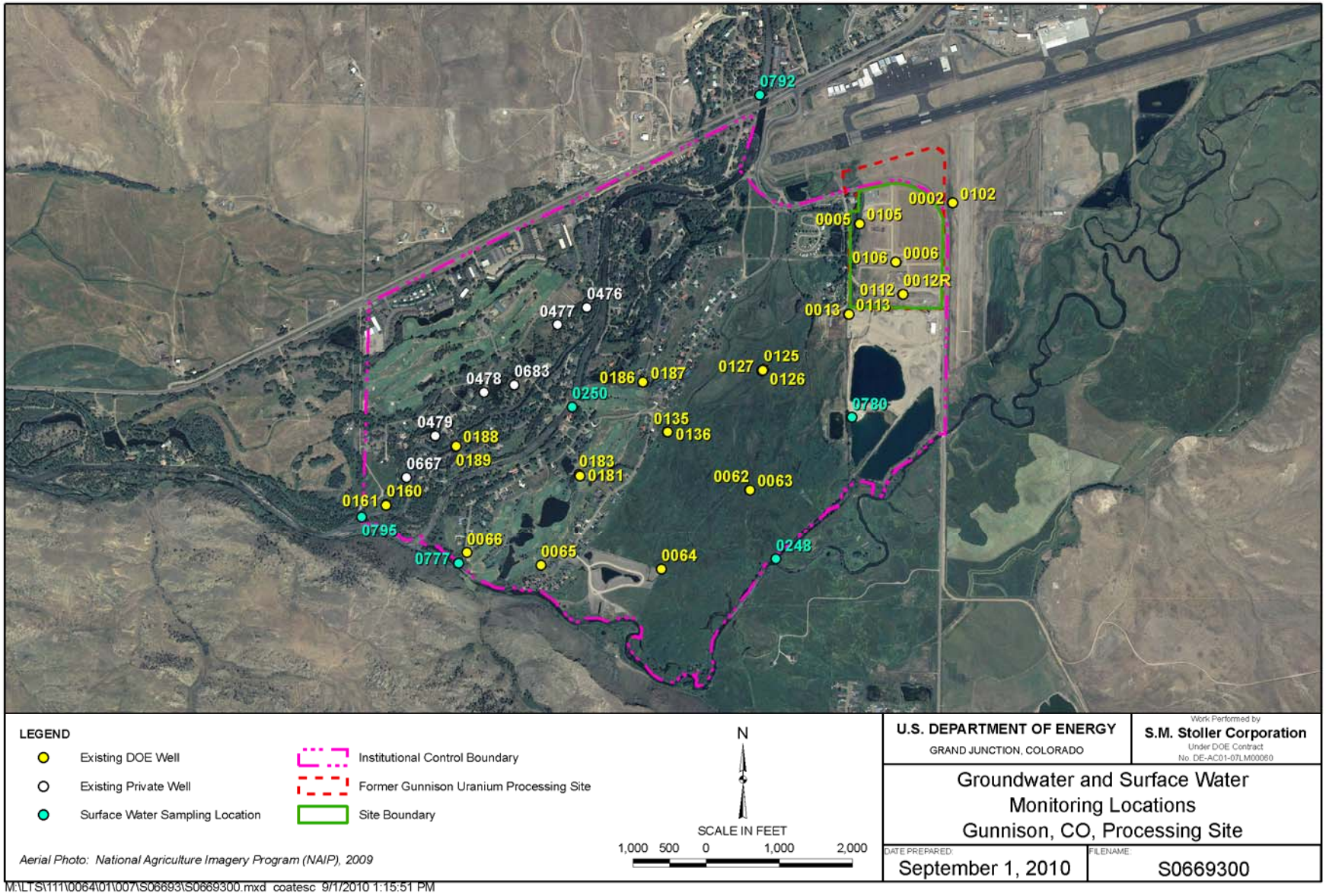


Figure 2. Groundwater and Surface Water Monitoring Locations at the Gunnison Site

Table 1. Groundwater and Surface Water Monitoring at the Gunnison Site

Monitoring Well	Aquifer Zone	Screened Interval (ft)	Location	Rationale (Uranium)
Groundwater				
0002	Shallow	10–15	Airport	Upgradient
0102	Intermediate	42–47	Airport	Upgradient
0005	Shallow	10–15	On-site	Origin of plume
0105	Intermediate	42–47	On-site	Origin of plume
0006	Shallow	10–15	On-site	Origin of plume
0106	Intermediate	34–39	On-site	Origin of plume
0012R	Shallow	6–16	On-site	Origin of plume
0112	Intermediate	40–45	On-site	Monitor plume migration
0013	Shallow	11–16	Just off-site to southwest	Monitor plume migration
0113	Intermediate	41–46	Just off-site to southwest	Monitor plume migration
0125	Shallow	18–23	Pasture	Monitor plume migration
0126	Intermediate	54–59	Pasture	Monitor plume migration
0127	Deep	94–99	Pasture	Monitor plume migration
0135	Shallow	18–23	Pasture	Monitor plume migration
0136	Intermediate	53–58	Pasture	Monitor plume migration
0064	Deep	87–97	Pasture	Monitor plume migration
0062	Intermediate	48–58	Pasture	Monitor plume migration
0063	Deep	88–98	Pasture	Monitor plume migration
0181	Shallow	18–23	Golf course	Monitor plume migration
0183	Deep	93–98	Golf course	Monitor plume migration
0065	Intermediate	50–60	Golf course	Monitor plume migration
0066	Intermediate	40–50	End of Tomichi Trail	Monitor plume migration
0186	Intermediate	53–58	End of Monte Vista Dr.	Monitor plume migration
0187	Deep	93–98	End of Monte Vista Dr.	Monitor plume migration
0188	Intermediate	53–58	West of Gunnison River	Monitor plume migration
0189	Deep	93–98	West of Gunnison River	Monitor plume migration
0160	Intermediate	51–56	West of Gunnison River	Adjacent to IC boundary
0161	Deep	93–98	West of Gunnison River	Adjacent to IC boundary
Surface Water				
0248	NA		Tomichi Creek	Downstream of gravel pit pond
0250	NA		Gunnison River	Potential aquifer discharge
0777	NA		Tomichi Creek	Potential aquifer discharge
0780	NA		Gravel pit pond	Gravel pit – aquifer discharge to pond
0792	NA		Gunnison River	Upstream of IC boundary – background
0795	NA		Gunnison River	Potential aquifer discharge
Domestic Wells		**Use**		
0476	Shallow	Potable	West of Gunnison River	Verify low COPC concentrations
0477	Shallow	Potable	West of Gunnison River	Verify low COPC concentrations
0479	Shallow	Potable	West of Gunnison River	Verify low COPC concentrations
0478	Shallow	Potable	West of Gunnison River	Verify low COPC concentrations
0667	Shallow	Potable	West of Gunnison River	Verify low COPC concentrations
0683	Shallow	Potable	West of Gunnison River	Verify low COPC concentrations

4.0 Results of 2010 Monitoring

Analytical data for uranium and manganese along with field measurements from DOE monitoring wells, domestic wells, and surface water for 2010 are provided in Appendixes A through C, respectively. Water level data collected in 2010 are provided in Appendix D. The distributions of uranium and manganese in groundwater in the alluvial aquifer, based on the 2010 sampling event, are shown in Figure 3 and Figure 4, respectively. Time-versus-concentration plots for uranium and manganese in DOE monitoring wells, domestic wells, and surface water, from 1997 (post-remedial action) through 2010, are presented in Section 4.1.

4.1 DOE Monitoring Wells

Though not separated lithologically, the alluvial aquifer (up to 130 ft thick) has been divided into three approximate depth zones to facilitate monitoring (wells are screened to monitor these zones separately) and discussion of vertical contaminant migration: (1) shallow zone from 10 to 25 ft, (2) intermediate zone from 35 to 60 ft, and (3) deep zone from 90 to 100 ft (Table 1). Time-concentration plots for uranium and manganese in DOE monitoring wells have been grouped by monitoring wells on site, and in three downgradient sectors, to show the relationship between distance downgradient of the site and depth in the aquifer.

Results from the 2010 sampling event indicate that uranium in groundwater is still generally decreasing and migrating deeper in the alluvial sequence while progressing downgradient from the former millsite, which is consistent with historical data and model predictions. Concentrations of uranium in groundwater in the shallow zone exceeded the MCL of 0.044 mg/L in two (of three) wells on the former millsite (Figure 5) and one well immediately downgradient of the site (0013) (Figure 6). The MCL was exceeded in intermediate zone well 0113 (immediately downgradient of the site), but not exceeded in any other intermediate zone well (Figure 6 and Figure 7). The MCL was exceeded in one deep zone well (0183) 4,400 ft downgradient of the site (Figure 7). In wells farthest downgradient, uranium concentrations were above background levels (upper range of background 0.009 mg/L), but the MCL was not exceeded (Figure 8). The distribution of uranium throughout the alluvial aquifer in each of the three zones is summarized in Table 2.

Concentrations of manganese in groundwater beneath the Gunnison site continue to be slightly above the DWEL of 1.6 mg/L in wells in the intermediate zone, with concentrations below the DWEL in the shallow zone (Figure 9). Downgradient of the site, the sample collected from monitoring wells 0113 in the intermediate zone and 0135 in the shallow zone had the only manganese concentration that exceeded the DWEL (Figure 10 and Figure 11). Manganese does not appear to be widespread farther downgradient in the alluvial aquifer (Figure 12).

4.2 Domestic Wells

Concentrations of uranium in groundwater in the domestic buffer zone wells (northwest of the Gunnison River) downgradient of the site are well below the MCL of 0.044 mg/L and below the action level set by CDPHE of 0.020 mg/L (Figure 13). Concentrations of manganese in groundwater in the domestic wells are far below the DWEL of 1.6 mg/L (Figure 14).

Table 2. Summary of 2010 Uranium Distribution at the Gunnison Site

Area	Zone	Wells	Uranium Concentration[a] (mg/L)
Upgradient	Shallow	0002	0.0025
	Intermediate	0102	0.0043
On Site and Just Off Site	Shallow	0005, 0006, 0012R, 0013	0.275
	Intermediate	0105, 0106, 0112, 0113	0.054
Downgradient (Before Gunnison River)	Shallow	0125, 0135, 0181	0.007
	Intermediate	0062, 0065, 0066, 0126, 0136, 0186	0.018
	Deep	0063, 0064, 0127, 0183, 0187	0.022
Downgradient (Beyond Gunnison River)	Intermediate	0160, 0188	0.032
	Deep	0161, 0189	0.018

[a] Uranium concentrations from 2010 sampling event. If more than one well is listed, the concentration is the 2010 mean value.

4.3 Surface Water

Concentrations of uranium in surface water in the Gunnison River during 2010 were very low (0.0007 to 0.0008 mg/L) and indicative of runoff conditions from the melting of the mountain snow pack. In addition, there was no discernable difference between upstream (background) and downstream uranium concentrations indicating water quality in the river was not affected by discharge of alluvial groundwater. The concentration of uranium (0.027 mg/L) in surface water in the gravel pit pond (0780) continued to be elevated above background; however, elevated uranium concentrations are expected as the pond receives discharge of alluvial groundwater (Figure 15).

Tomichi Creek was rerouted in 2006 to its original channel to establish a conservation area by the landowner. Location 0248, which is approximately 1,500 ft downstream of the gravel pit pond discharge point, is on the abandoned portion of the channel. The water in the abandoned channel is composed of discharge from the pond, flow through the diversion structure, and groundwater discharge. Concerns have been raised that low flows in the abandoned channel could concentrate uranium via evaporation and groundwater discharge. In 2010, the concentration of uranium in the sample collected from location 0248 was low (0.0059 mg/L), indicating minimal impacts from these factors. The concentration of uranium in the sample collected farther downstream on Tomichi Creek at location 0777 was slightly lower (0.0045 mg/L).

Concentrations of manganese in surface water are well below the DWEL of 1.6 mg/L (Figure 16).

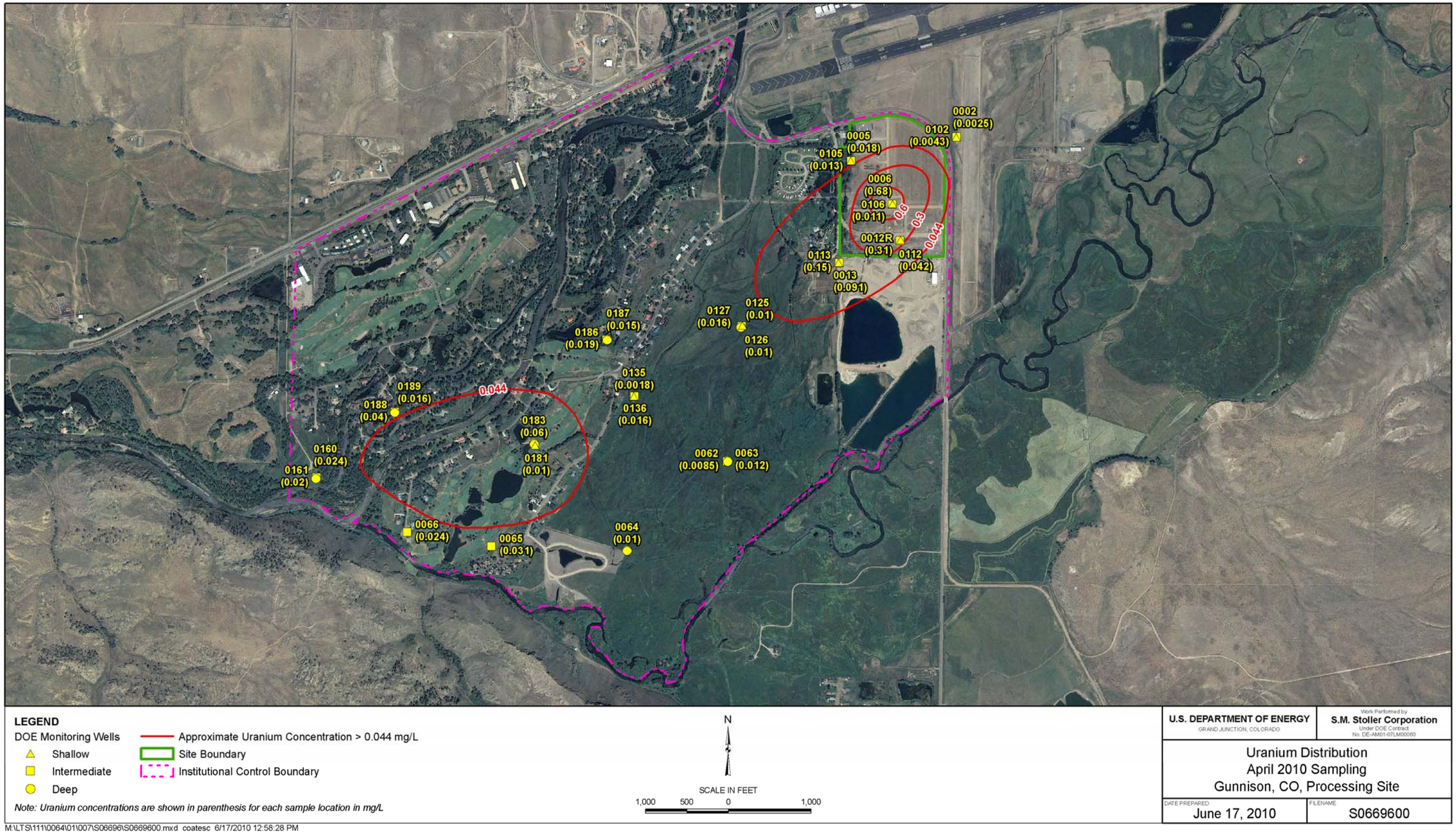


Figure 3. Uranium Distribution from April 2010 Sampling at the Gunnison Site

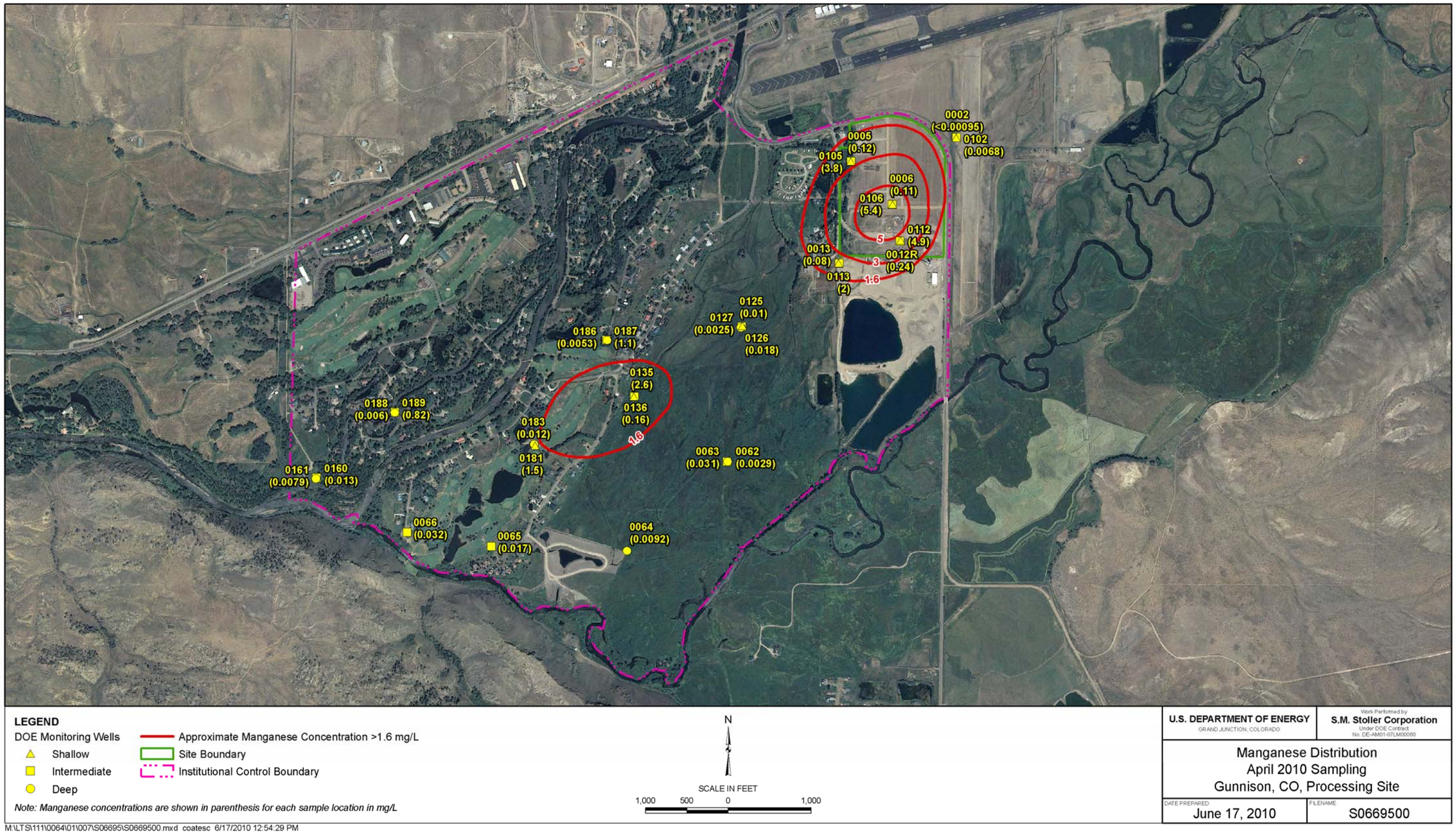
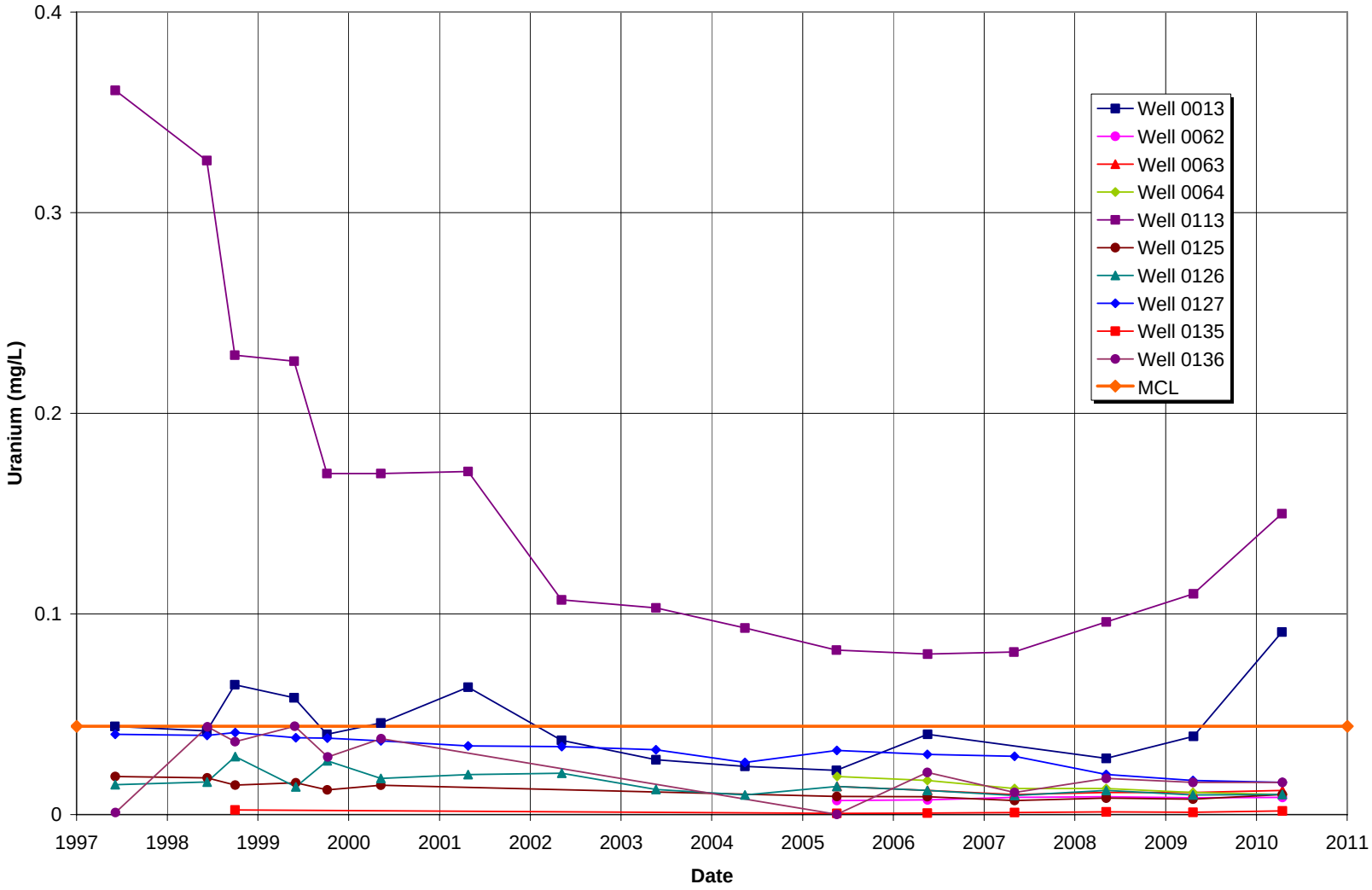


Figure 4. Manganese Distribution from April 2010 Sampling at the Gunnison Site

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

Figure 5. Uranium Concentrations in Groundwater – On-Site DOE Monitoring Wells at the Gunnison Site



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

Figure 6. Uranium Concentrations in Groundwater – Downgradient DOE Monitoring Wells – Pasture, Near the Gunnison Site

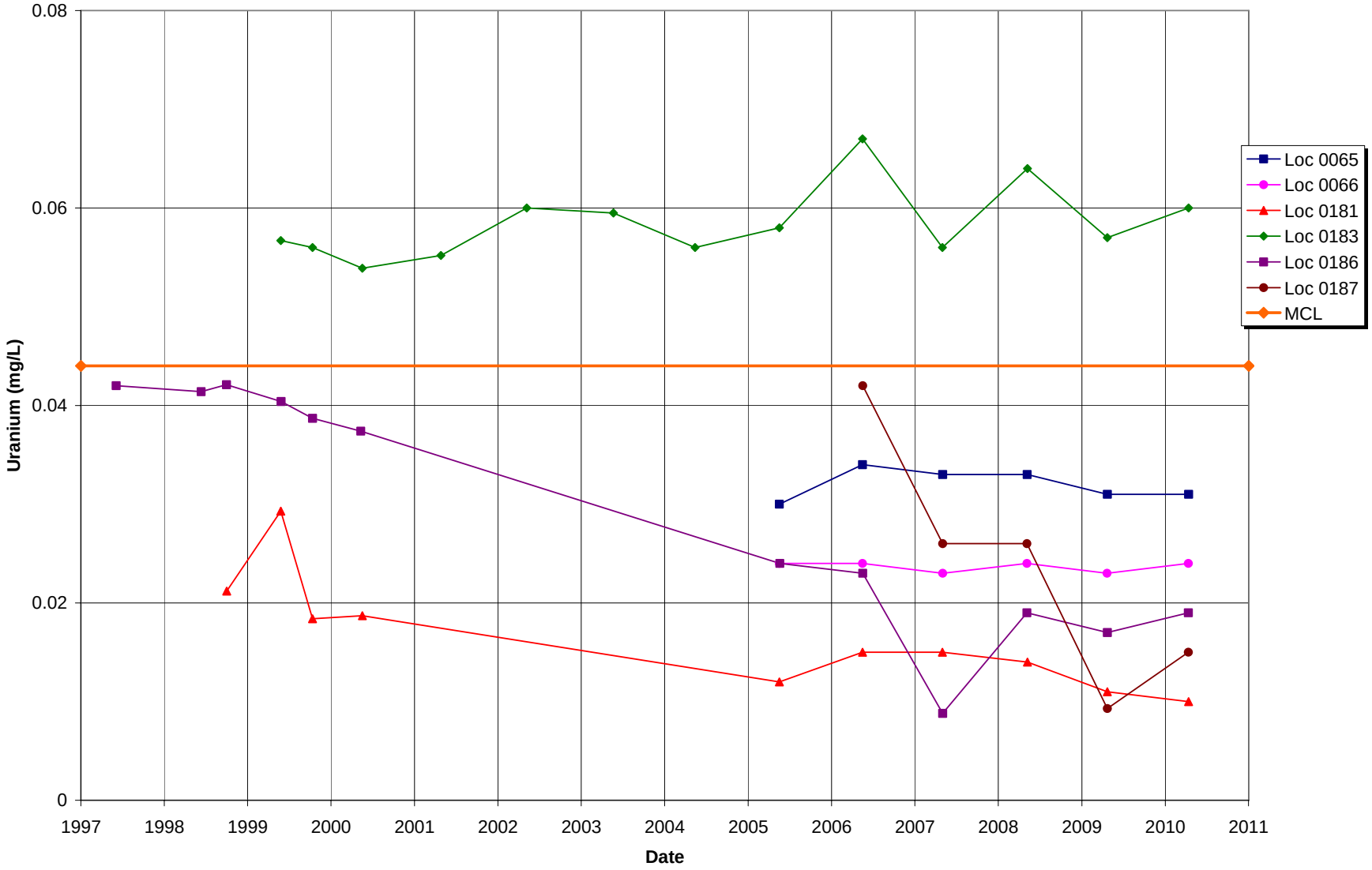


Figure 7. Uranium Concentrations in Groundwater – Downgradient DOE Monitoring Wells – Golf Course and Residential, Near the Gunnison Site

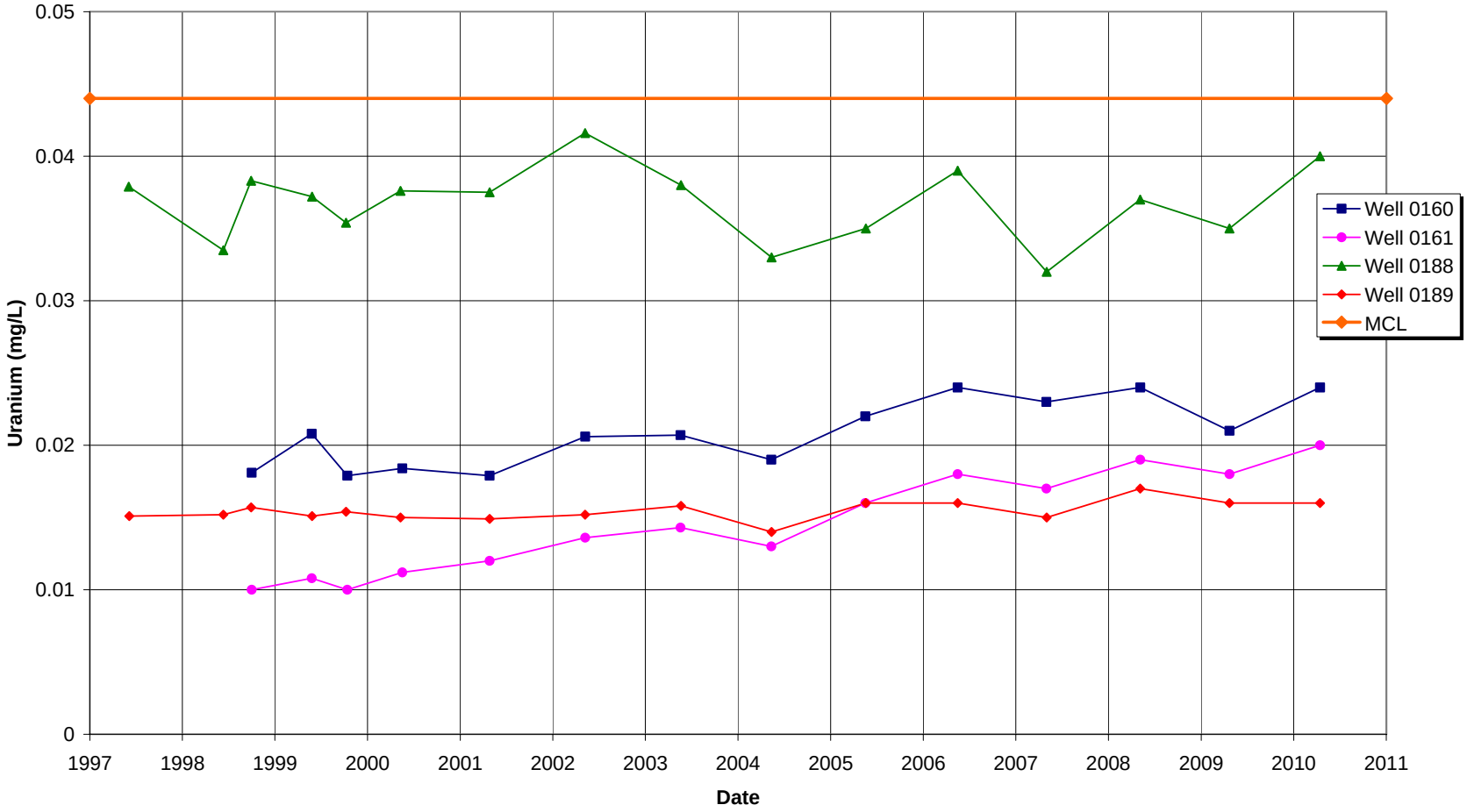
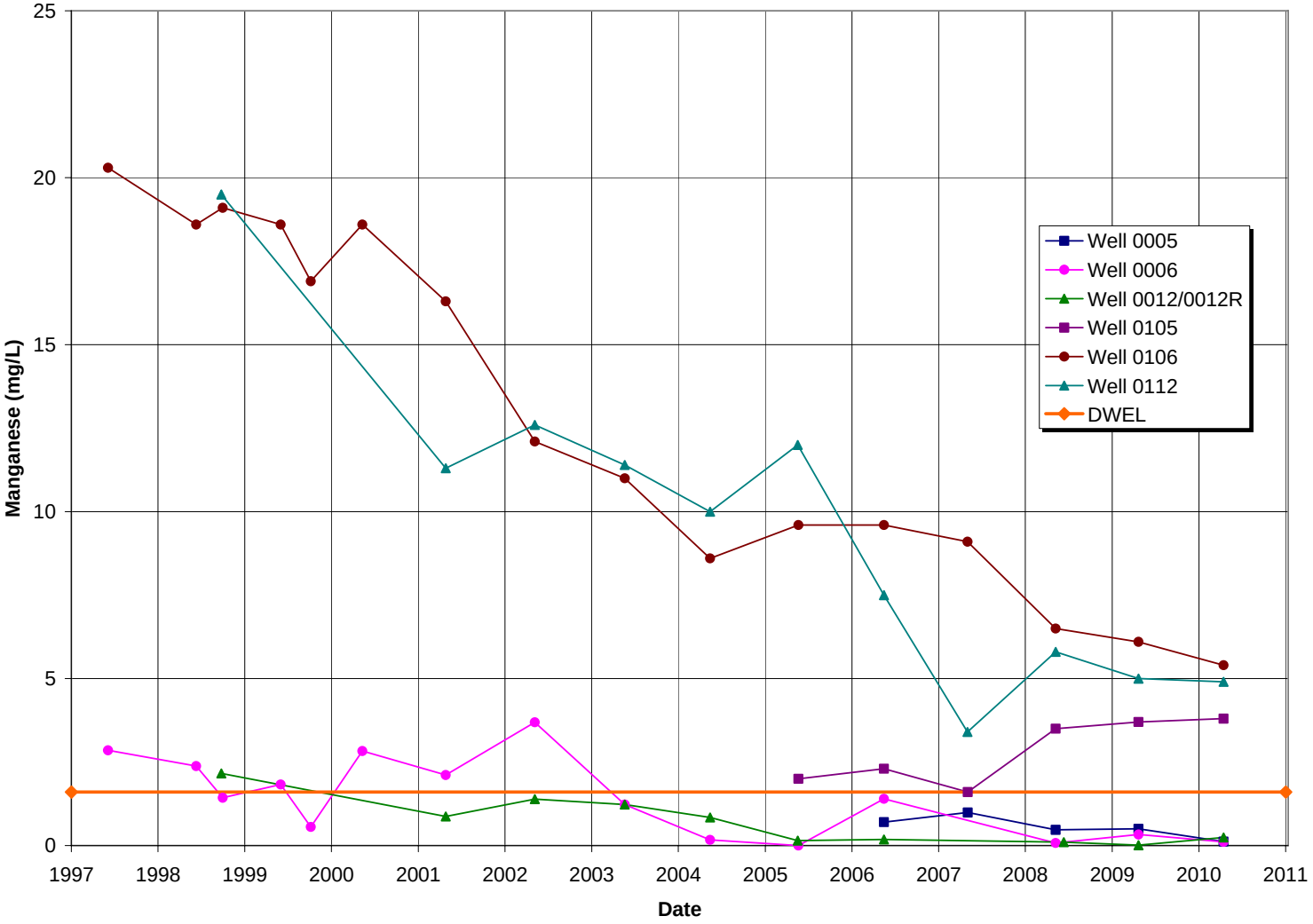
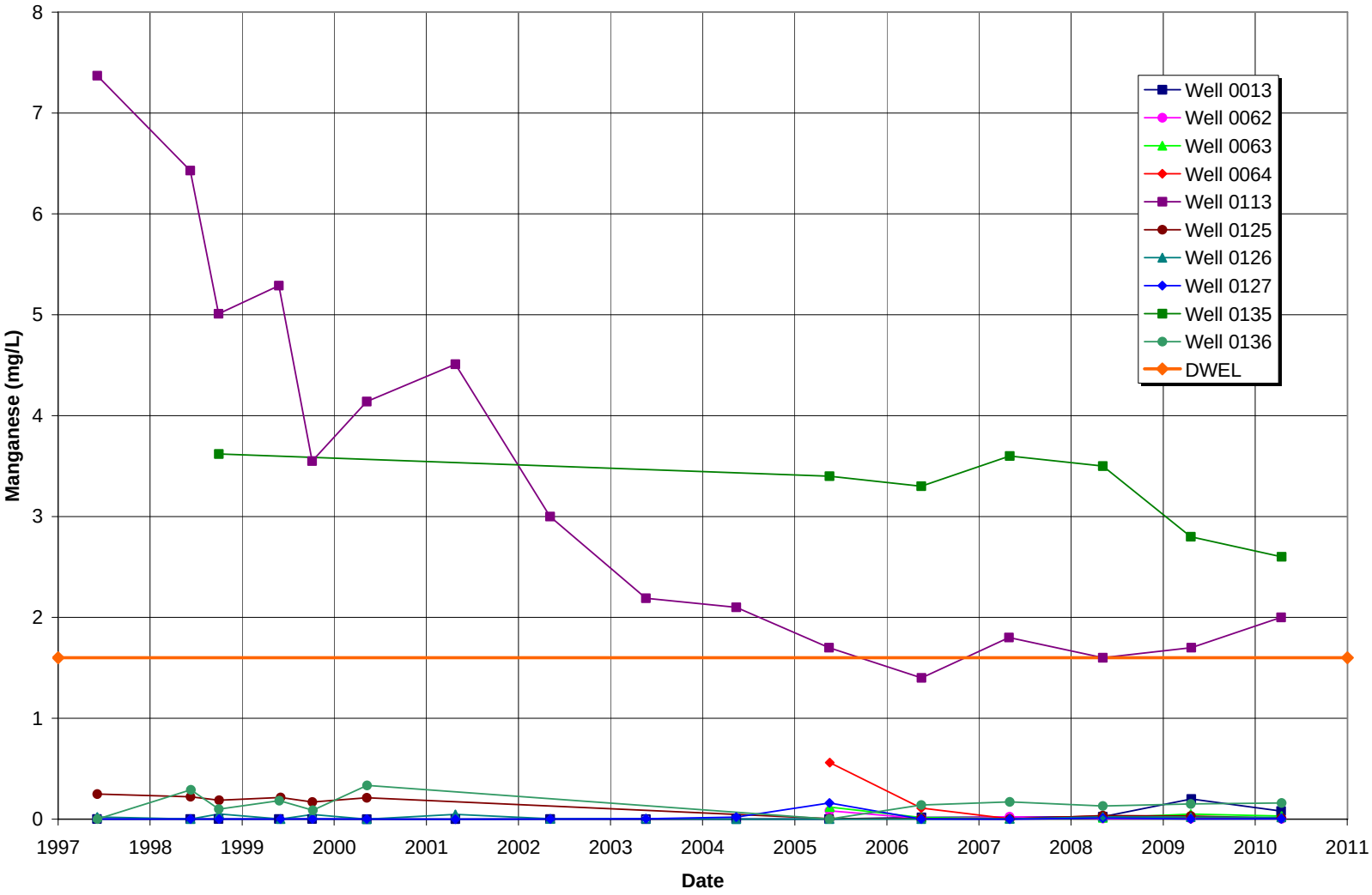


Figure 8. Uranium Concentrations in Groundwater – Downgradient DOE Monitoring Wells – West of the Gunnison River, Near the Gunnison Site



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

Figure 9. Manganese Concentrations in Groundwater – On-Site DOE Monitoring Wells at the Gunnison Site

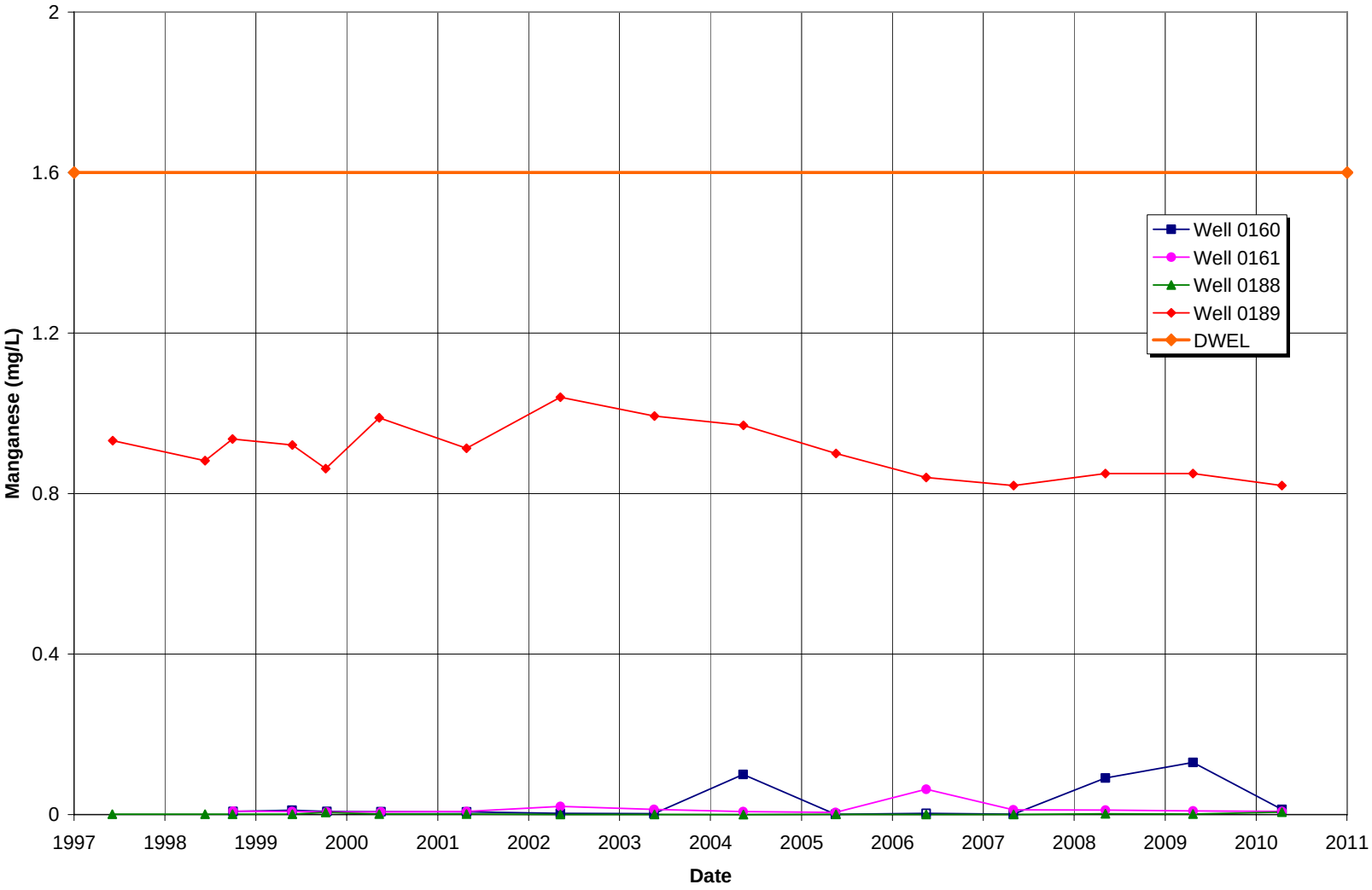


Note: A hollow symbol denotes an analytical result below the detection limit.

Figure 10. Manganese Concentrations in Groundwater – Downgradient DOE Monitoring Wells –Pasture, Near the Gunnison Site

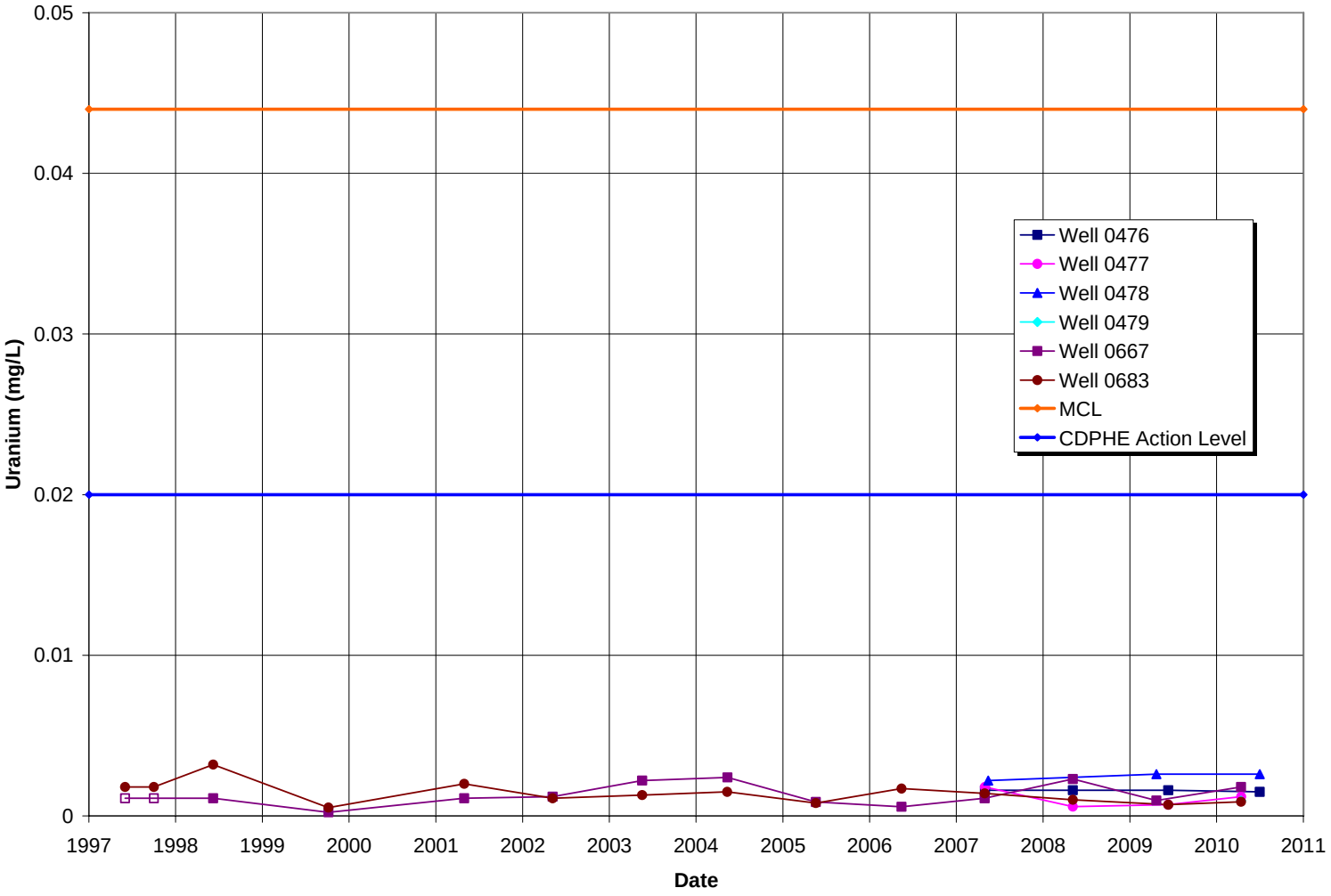
Note: A hollow symbol denotes an analytical result below the detection limit.

Figure 11. Manganese Concentrations in Groundwater – Downgradient DOE Monitoring Wells – Golf Course and Residential, Near the Gunnison Site



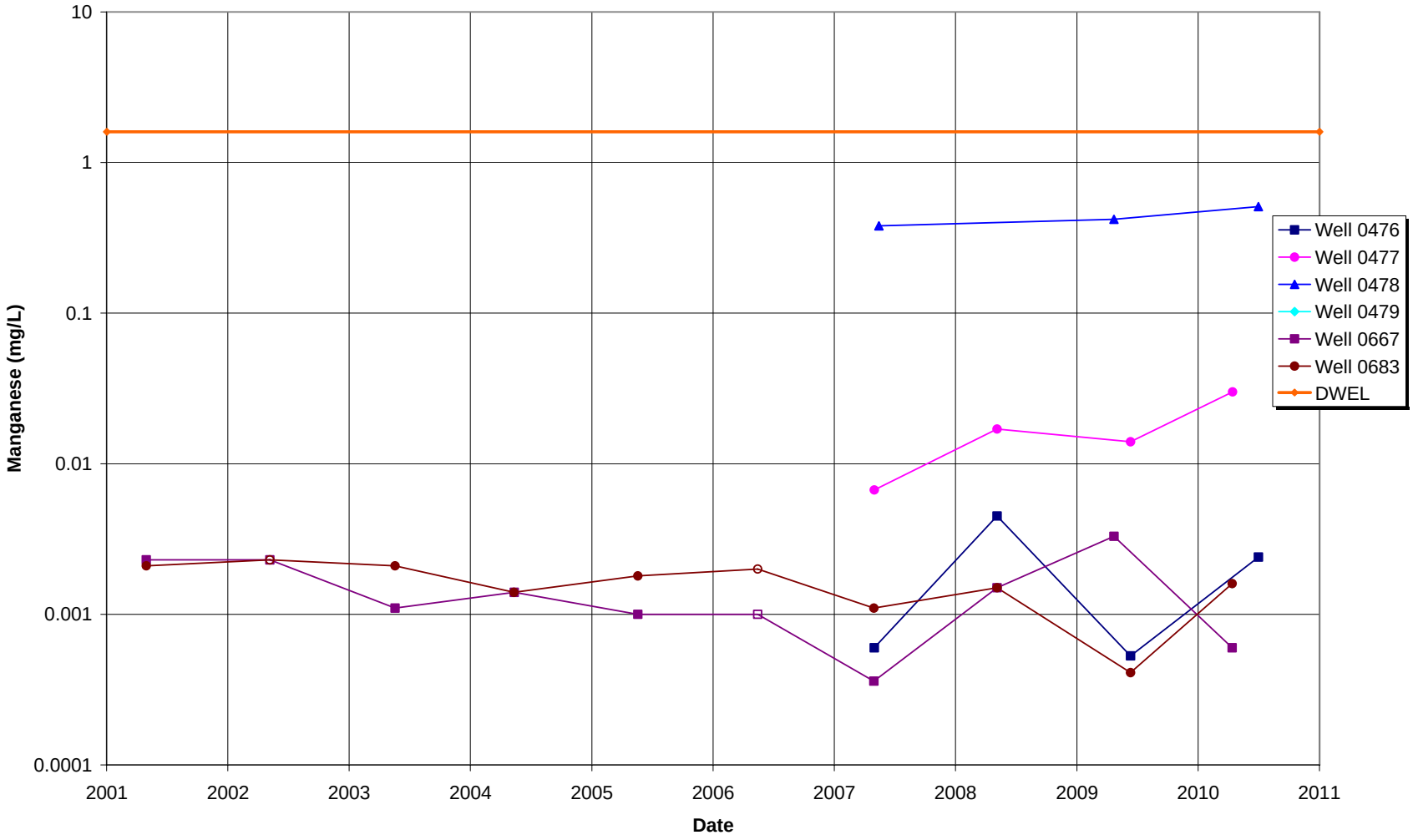
Note: A hollow symbol denotes an analytical result below the detection limit.

Figure 12. Manganese Concentrations in Groundwater – Downgradient DOE Monitoring Wells – West of the Gunnison River, Near the Gunnison Site



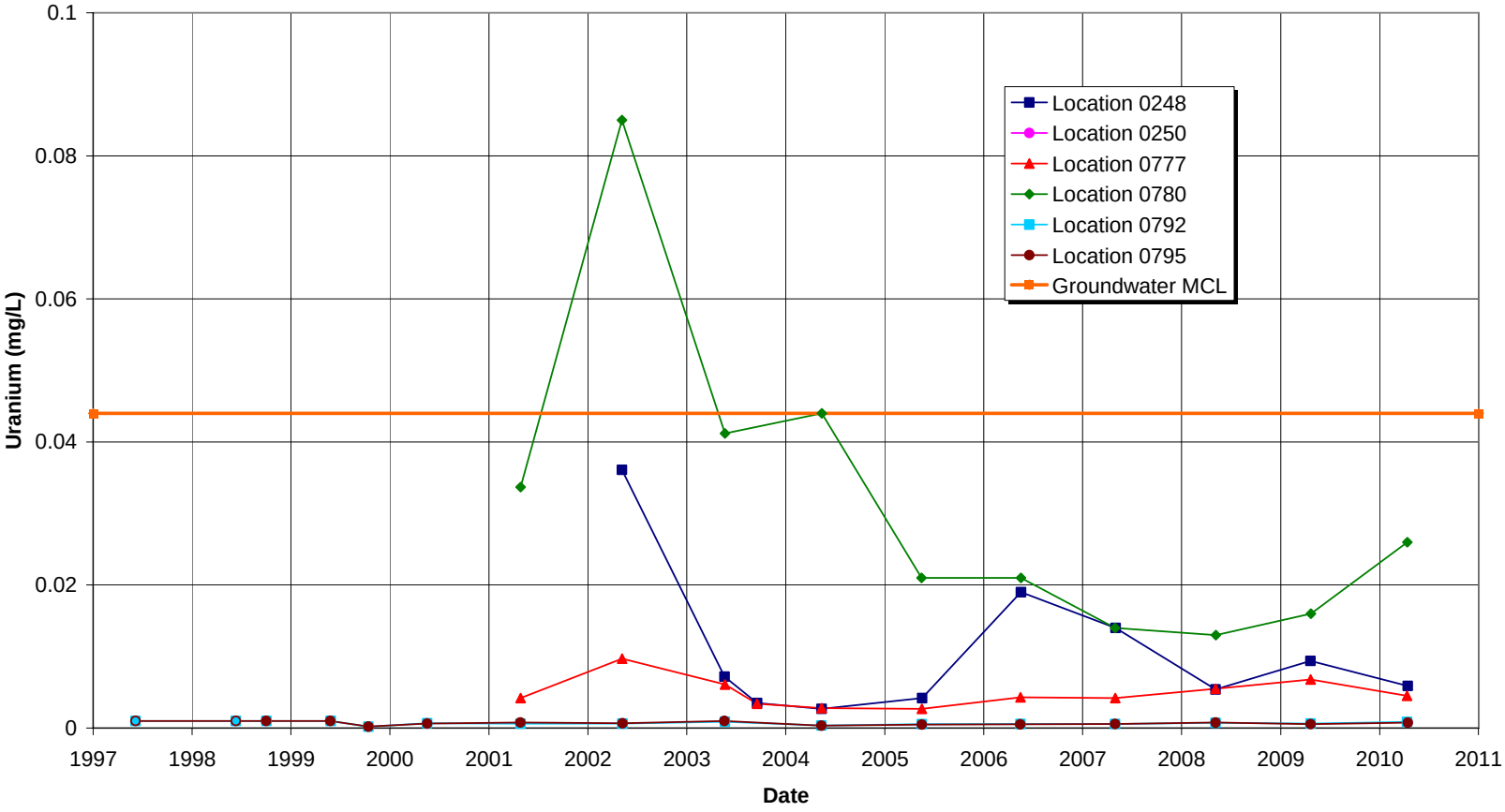
Note: A hollow symbol denotes an analytical result below the detection limit.

Figure 13. Uranium Concentrations in Groundwater – Domestic Wells Downgradient from the Gunnison Site



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

Figure 14. Manganese Concentrations in Groundwater – Domestic Wells Downgradient from the Gunnison Site



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

Figure 15. Uranium Concentrations in Surface Water Near the Gunnison Site

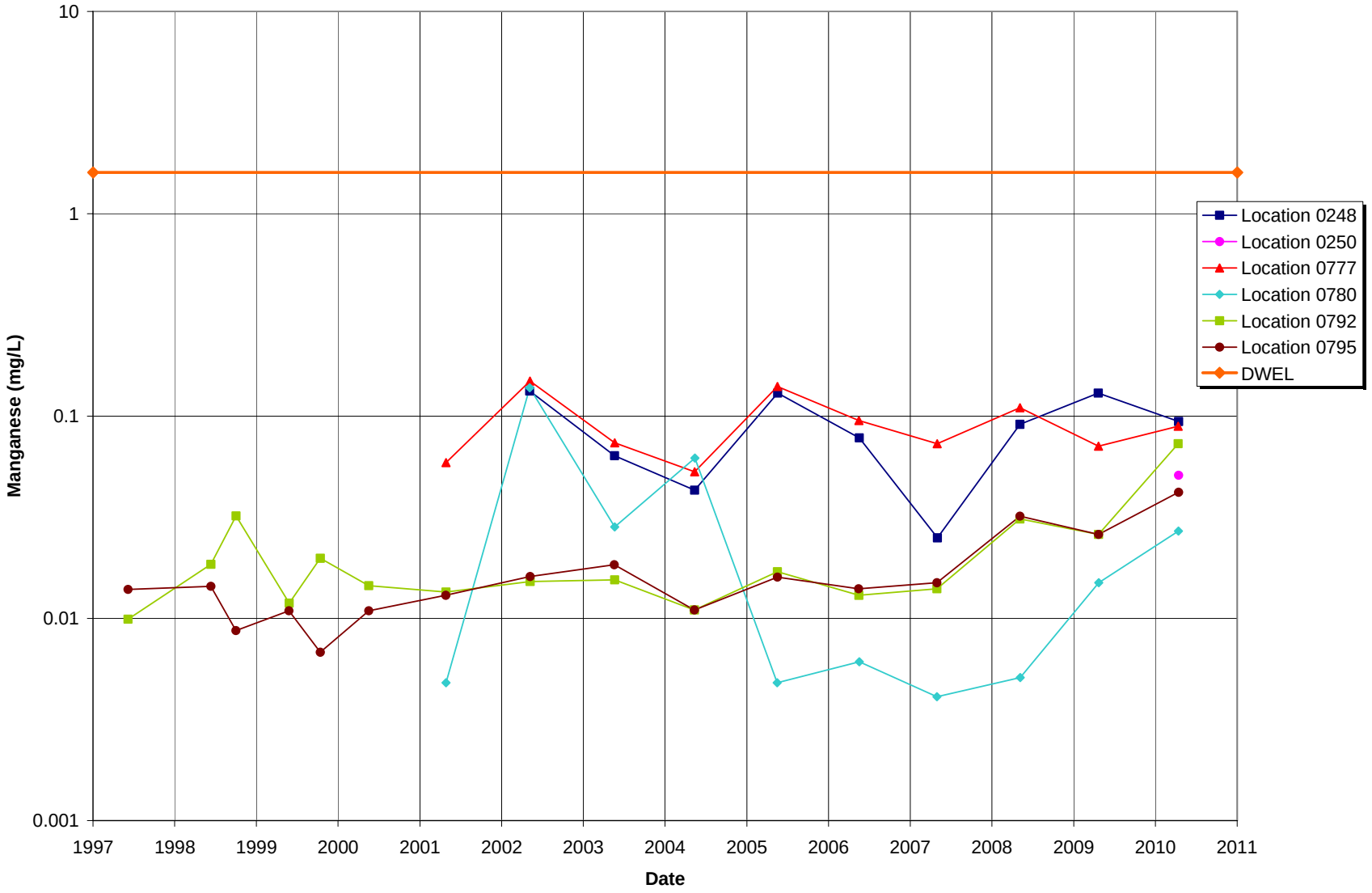


Figure 16. Manganese Concentrations in Surface Water Near the Gunnison Site

5.0 Natural Flushing Assessment

Groundwater flow and transport modeling has predicted that uranium concentrations in groundwater in the alluvial aquifer will decrease to below the EPA groundwater standard within 100 years. To assess the progress of natural flushing, a trend analysis using the Mann-Kendall test (Gilbert 1987) was performed to assess the temporal behavior of uranium concentrations. This test determines if an upward trend, a downward trend, or no trend exists. Results of the trend analysis along with 2010 uranium concentrations are shown in Table 3. Observations from Table 3 included the following:

1. Uranium concentration in shallow zone monitoring well 0006 on the former millsite remains relatively high (0.68 mg/L) with a downward trend. Uranium concentrations in this well have been highly variable (1 mg/L in 2009), which indicates a possible localized, continual source of uranium from RRM supplemental standards areas.
2. Uranium in shallow zone monitoring well 0012R located on the former millsite has a concentration (0.310 mg/L) significantly less than monitoring well 0006 and has an overall downward trend, which indicates the source contributing to the high concentrations in monitoring well 0012R is localized.
3. Upward trends in the intermediate zone (wells 0106 and 0112) on the millsite indicate that uranium is migrating vertically from the shallow zone.
4. Immediately downgradient of the former millsite, uranium trends are generally downward, which indicates that RRM on the former millsite is not having a widespread effect on the alluvial aquifer.
5. Farther downgradient, most wells show no trend (a few show downward trends), and only one monitoring well has a uranium concentration that exceeds the MCL.
6. In the monitoring wells farthest downgradient of the millsite, uranium trends are upward (although uranium concentrations are below the MCL), which indicates that natural flushing processes are effective in transporting uranium through the aquifer to these wells approximately 1.4 miles downgradient of the former millsite.

Figure 17 shows the comparison of uranium concentrations predicted by groundwater flow and transport modeling to actual concentrations determined by analysis of groundwater samples from intermediate zone monitoring well 0113. This well was selected as an indicator of natural flushing progress because of its location adjacent to and immediately downgradient of the millsite, which is in an area of the aquifer that should be the first to flush as the plume migrates off the former millsite. Additionally, data from this well will be used to assess potential aquifer-wide groundwater impacts from the RRM supplemental standard areas remaining on the millsite. As shown in this figure, uranium concentrations have historically tracked with concentrations predicted by the groundwater model but deviated from model predictions in 2010 as the concentration increased sharply. Long-term monitoring of this well will continue to determine if this increase in uranium concentration was an anomaly or indicative of impacts from the RRM supplemental standards areas on the former millsite.

Table 3. Assessment of Uranium Concentration Trends at the Gunnison Site

Location	No. of Samples	Trend[a]	2010 Result (mg/L)	Standard[b] Exceeded in 2010? (Yes/No)
0005	5	No trend	0.018	No
0006	16	Downward	0.680	Yes
0012/0012R	11	Downward	0.310	Yes
0013	15	No trend	0.091	Yes
0062	6	No trend	0.0085	No
0063	6	No trend	0.012	No
0064	6	Downward	0.010	No
0065	6	No trend	0.031	No
0066	6	No trend	0.024	No
0105	6	No trend	0.013	No
0106	16	Upward	0.011	No
0112	11	Upward	0.042	No
0113	16	Downward	0.150	Yes
0125	12	Downward	0.010	No
0126	16	Downward	0.010	No
0127	15	Downward	0.016	No
0135	7	No trend	0.0018	No
0136	12	No trend	0.016	No
0160	14	Upward	0.024	No
0161	14	Upward	0.020	No
0181	10	Downward	0.010	No
0183	13	No trend	0.060	Yes
0186	12	Downward	0.019	No
0187	5	No trend	0.015	No
0188	16	No trend	0.040	No
0189	15	Upward	0.016	No

[a] Data from 1997 to 2010.
[b] 0.044 mg/L from 40 CFR 192.

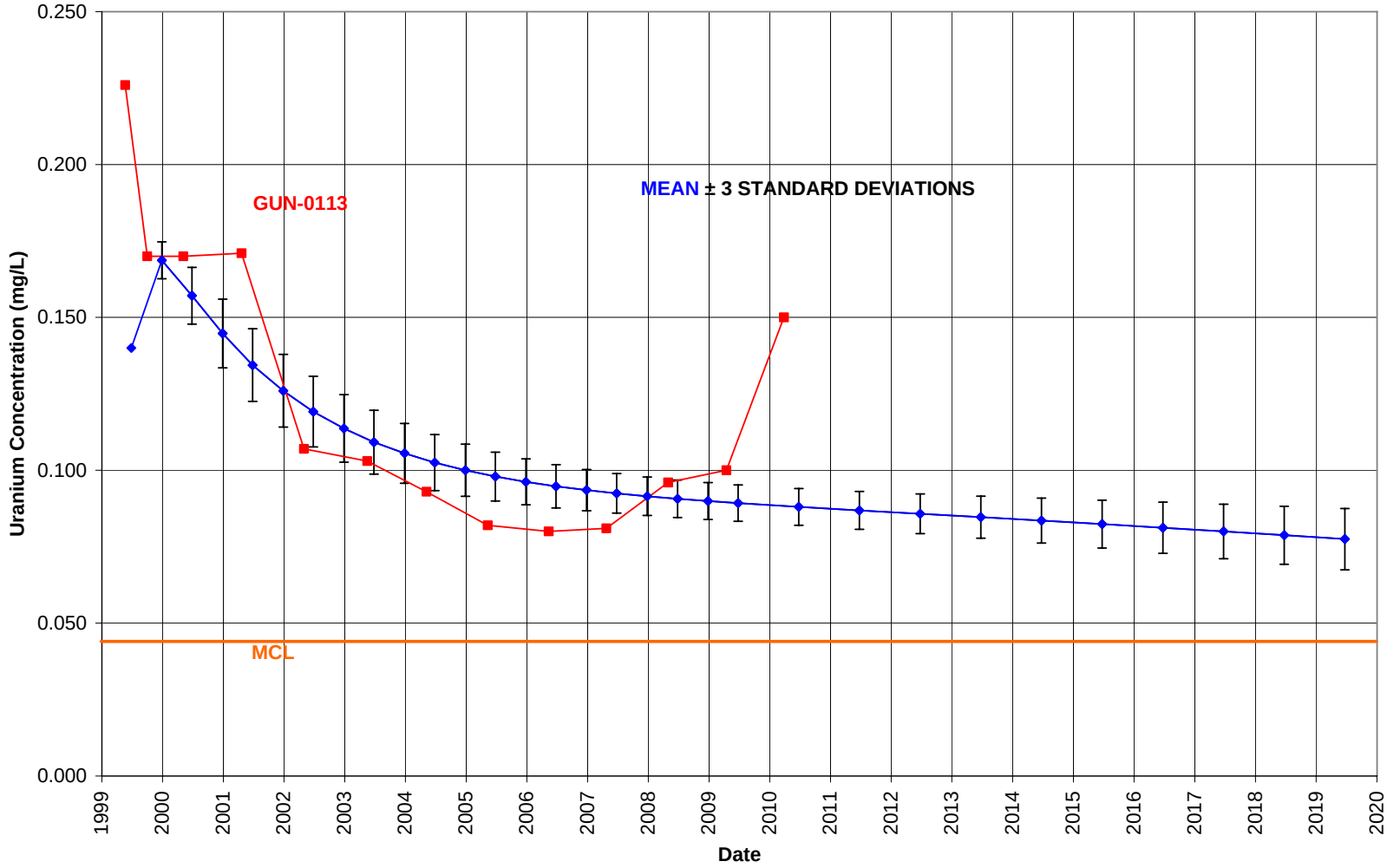


Figure 17. Uranium Concentration – Predicted and Actual – In DOE Monitoring Well 0113 at the Gunnison Site

6.0 Conclusions

Concentrations of manganese in the alluvial groundwater are still above the DWEL; however, the distribution and magnitude of manganese concentrations is limited. Samples from only five wells in the monitoring network exceed the DWEL, with concentrations less than 4 times the DWEL.

Concentrations of uranium in the alluvial groundwater beneath the former millsite are still above the MCL. The uranium concentration in one on-site well completed in the shallow zone remains high but has a downward trend. Highly variable uranium concentrations in this well indicate that residual soil contamination has a localized effect. If concentrations continue to remain high in the short term, compliance with the 100-year regulatory timeframe for natural flushing at this well will be unlikely.

Concentrations of uranium in the alluvial groundwater immediately downgradient of the former millsite are generally decreasing with time, indicating that natural flushing is progressing. Concentrations of uranium in groundwater farther downgradient of the site and deeper in the alluvial aquifer are still elevated and increasing in some areas, as expected, as the plume migrates downgradient. Contaminant distribution continues to confirm the site conceptual model of contaminants migrating deeper in the alluvial aquifer with distance from the millsite.

Uranium concentrations in the domestic wells sampled near the processing site were all below the MCL and the CDPHE action level. Manganese concentrations in these wells were all below the DWEL.

The uranium concentrations in the Gunnison River and Tomichi Creek locations indicate minimal impacts from contaminated groundwater discharge. Uranium concentration at the gravel pit pond (0780) is elevated when compared to background, which is expected because the gravel pit receives discharge of contaminated groundwater. Uranium concentrations in the pond have decreased over time indicating flushing of the alluvial aquifer.

Groundwater in the alluvial aquifer and surface water in the vicinity of the Gunnison site will continue to be monitored annually to assess the progress of natural flushing. The next update to this report will be compiled after groundwater and surface water monitoring in April 2011.

7.0 References

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Appendix A

Groundwater Quality Data by Parameter for DOE Monitoring Wells

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CLASSIC GROUND WATER QUALITY DATA BY PARAMETER WITH ZONE (USEE201) FOR SITE GUN01, Gunnison Processing Site
REPORT DATE: 6/8/2010 5:04 pm

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Manganese	mg/L	0002	WL	04/13/2010	N001	AL	U	0.00095	B	UF	#	0.00011	-
	mg/L	0005	WL	04/14/2010	N001	AL	O	0.120		F	#	0.00011	-
	mg/L	0006	WL	04/14/2010	N001	AL	O	0.110		F	#	0.00011	-
	mg/L	0006	WL	04/14/2010	N002	AL	O	0.110		F	#	0.00011	-
	mg/L	0012R	WL	04/14/2010	N001	AL		0.240		F	#	0.00011	-
	mg/L	0013	WL	04/13/2010	N001	AL	D	0.080		F	#	0.00011	-
	mg/L	0062	WL	04/15/2010	N001	AL	O	0.0029	B	F	#	0.00011	-
	mg/L	0063	WL	04/15/2010	N001	AL	O	0.031		F	#	0.00011	-
	mg/L	0064	WL	04/15/2010	N001	AL	O	0.0092		F	#	0.00011	-
	mg/L	0065	WL	04/13/2010	N001	AL	O	0.017		F	#	0.00011	-
	mg/L	0066	WL	04/12/2010	N001	AL	O	0.032		F	#	0.00011	-
	mg/L	0102	WL	04/13/2010	N001	AL	U	0.0068		F	#	0.00011	-
	mg/L	0105	WL	04/14/2010	N001	AL	O	3.800		F	#	0.00011	-
	mg/L	0106	WL	04/14/2010	N001	AL	O	5.400		F	#	0.00011	-
	mg/L	0112	WL	04/14/2010	N001	AL	O	4.900		F	#	0.00011	-
	mg/L	0113	WL	04/13/2010	N001	AL	D	2.000		F	#	0.00011	-
	mg/L	0125	WL	04/14/2010	N001	AL	D	0.010		F	#	0.00011	-
	mg/L	0126	WL	04/14/2010	N001	AL	D	0.018		F	#	0.00011	-
	mg/L	0127	WL	04/14/2010	N001	AL	D	0.0025	B	F	#	0.00011	-
	mg/L	0135	WL	04/15/2010	N001	AL	D	2.600		F	#	0.00011	-
	mg/L	0136	WL	04/15/2010	0001	AL	D	0.160		FQ	#	0.00011	-
	mg/L	0160	WL	04/14/2010	N001	AL	D	0.013		F	#	0.00011	-
	mg/L	0161	WL	04/14/2010	N001	AL	D	0.0079		F	#	0.00011	-
	mg/L	0181	WL	04/13/2010	N001	AL	D	1.500		F	#	0.00011	-
	mg/L	0183	WL	04/13/2010	N001	AL	D	0.012		F	#	0.00011	-
	mg/L	0186	WL	04/12/2010	N001	AL	D	0.0053		F	#	0.00011	-

CLASSIC GROUND WATER QUALITY DATA BY PARAMETER WITH ZONE (USEE201) FOR SITE GUN01, Gunnison Processing Site
REPORT DATE: 6/8/2010 5:04 pm

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Manganese	mg/L	0187	WL	04/12/2010	N001	AL	D	1.100		F	#	0.00011	-
	mg/L	0187	WL	04/12/2010	N002	AL	D	1.100		F	#	0.00011	-
	mg/L	0188	WL	04/14/2010	N001	AL	D	0.006		F	#	0.00011	-
	mg/L	0189	WL	04/14/2010	N001	AL	D	0.820		FQ	#	0.00011	-
Oxidation Reduction Potential	mV	0002	WL	04/13/2010	N001	AL	U	203.3		F	#	-	-
	mV	0005	WL	04/14/2010	N001	AL	O	96.3		F	#	-	-
	mV	0006	WL	04/14/2010	N001	AL	O	91.1		F	#	-	-
	mV	0012R	WL	04/14/2010	N001	AL		91.8		F	#	-	-
	mV	0013	WL	04/13/2010	N001	AL	D	115.6		F	#	-	-
	mV	0062	WL	04/15/2010	N001	AL	O	190.0		F	#	-	-
	mV	0063	WL	04/15/2010	N001	AL	O	180.2		F	#	-	-
	mV	0064	WL	04/15/2010	N001	AL	O	153.6		F	#	-	-
	mV	0065	WL	04/13/2010	N001	AL	O	81.8		F	#	-	-
	mV	0066	WL	04/12/2010	N001	AL	O	173.6		F	#	-	-
	mV	0102	WL	04/13/2010	N001	AL	U	166.4		F	#	-	-
	mV	0105	WL	04/14/2010	N001	AL	O	107.0		F	#	-	-
	mV	0106	WL	04/14/2010	N001	AL	O	96.9		F	#	-	-
	mV	0112	WL	04/14/2010	N001	AL	O	83.6		F	#	-	-
	mV	0113	WL	04/13/2010	N001	AL	D	126.4		F	#	-	-
	mV	0125	WL	04/14/2010	N001	AL	D	-0.1		F	#	-	-
	mV	0126	WL	04/14/2010	N001	AL	D	20.8		F	#	-	-
	mV	0127	WL	04/14/2010	N001	AL	D	34.0		F	#	-	-
	mV	0135	WL	04/15/2010	N001	AL	D	30.0		F	#	-	-
	mV	0136	WL	04/15/2010	N001	AL	D	69.9		FQ	#	-	-
	mV	0160	WL	04/14/2010	N001	AL	D	88.9		F	#	-	-

CLASSIC GROUND WATER QUALITY DATA BY PARAMETER WITH ZONE (USEE201) FOR SITE GUN01, Gunnison Processing Site
REPORT DATE: 6/8/2010 5:04 pm

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Oxidation Reduction Potential	mV	0161	WL	04/14/2010	N001	AL	D	86.6		F	#	-	-
	mV	0181	WL	04/13/2010	N001	AL	D	117.0		F	#	-	-
	mV	0183	WL	04/13/2010	N001	AL	D	100.2		F	#	-	-
	mV	0186	WL	04/12/2010	N001	AL	D	25.9		F	#	-	-
	mV	0187	WL	04/12/2010	N001	AL	D	23.8		F	#	-	-
	mV	0188	WL	04/14/2010	N001	AL	D	-13.3		F	#	-	-
	mV	0189	WL	04/14/2010	N001	AL	D	32.5		FQ	#	-	-
pH	s.u.	0002	WL	04/13/2010	N001	AL	U	7.36		F	#	-	-
	s.u.	0005	WL	04/14/2010	N001	AL	O	7.24		F	#	-	-
	s.u.	0006	WL	04/14/2010	N001	AL	O	6.94		F	#	-	-
	s.u.	0012R	WL	04/14/2010	N001	AL		6.93		F	#	-	-
	s.u.	0013	WL	04/13/2010	N001	AL	D	7.28		F	#	-	-
	s.u.	0062	WL	04/15/2010	N001	AL	O	7.49		F	#	-	-
	s.u.	0063	WL	04/15/2010	N001	AL	O	7.54		F	#	-	-
	s.u.	0064	WL	04/15/2010	N001	AL	O	7.43		F	#	-	-
	s.u.	0065	WL	04/13/2010	N001	AL	O	7.46		F	#	-	-
	s.u.	0066	WL	04/12/2010	N001	AL	O	7.16		F	#	-	-
	s.u.	0102	WL	04/13/2010	N001	AL	U	7.49		F	#	-	-
	s.u.	0105	WL	04/14/2010	N001	AL	O	6.71		F	#	-	-
	s.u.	0106	WL	04/14/2010	N001	AL	O	6.00		F	#	-	-
	s.u.	0112	WL	04/14/2010	N001	AL	O	6.31		F	#	-	-
	s.u.	0113	WL	04/13/2010	N001	AL	D	7.09		F	#	-	-
	s.u.	0125	WL	04/14/2010	N001	AL	D	7.32		F	#	-	-
	s.u.	0126	WL	04/14/2010	N001	AL	D	7.21		F	#	-	-
	s.u.	0127	WL	04/14/2010	N001	AL	D	7.23		F	#	-	-

CLASSIC GROUND WATER QUALITY DATA BY PARAMETER WITH ZONE (USEE201) FOR SITE GUN01, Gunnison Processing Site
REPORT DATE: 6/8/2010 5:04 pm

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
pH	s.u.	0135	WL	04/15/2010	N001	AL	D	6.95		F	#	-	-
	s.u.	0136	WL	04/15/2010	N001	AL	D	7.99		FQ	#	-	-
	s.u.	0160	WL	04/14/2010	N001	AL	D	6.73		F	#	-	-
	s.u.	0161	WL	04/14/2010	N001	AL	D	6.74		F	#	-	-
	s.u.	0181	WL	04/13/2010	N001	AL	D	7.14		F	#	-	-
	s.u.	0183	WL	04/13/2010	N001	AL	D	6.77		F	#	-	-
	s.u.	0186	WL	04/12/2010	N001	AL	D	8.23		F	#	-	-
	s.u.	0187	WL	04/12/2010	N001	AL	D	6.57		F	#	-	-
	s.u.	0188	WL	04/14/2010	N001	AL	D	7.28		F	#	-	-
	s.u.	0189	WL	04/14/2010	N001	AL	D	6.24		FQ	#	-	-
Specific Conductance	umhos/cm	0002	WL	04/13/2010	N001	AL	U	552		F	#	-	-
	umhos/cm	0005	WL	04/14/2010	N001	AL	O	424		F	#	-	-
	umhos/cm	0006	WL	04/14/2010	N001	AL	O	2151		F	#	-	-
	umhos/cm	0012R	WL	04/14/2010	N001	AL		1238		F	#	-	-
	umhos/cm	0013	WL	04/13/2010	N001	AL	D	840		F	#	-	-
	umhos/cm	0062	WL	04/15/2010	N001	AL	O	517		F	#	-	-
	umhos/cm	0063	WL	04/15/2010	N001	AL	O	487		F	#	-	-
	umhos/cm	0064	WL	04/15/2010	N001	AL	O	466		F	#	-	-
	umhos/cm	0065	WL	04/13/2010	N001	AL	O	699		F	#	-	-
	umhos/cm	0066	WL	04/12/2010	N001	AL	O	699		F	#	-	-
	umhos/cm	0102	WL	04/13/2010	N001	AL	U	573		F	#	-	-
	umhos/cm	0105	WL	04/14/2010	N001	AL	O	506		F	#	-	-
	umhos/cm	0106	WL	04/14/2010	N001	AL	O	1816		F	#	-	-
	umhos/cm	0112	WL	04/14/2010	N001	AL	O	909		F	#	-	-
	umhos/cm	0113	WL	04/13/2010	N001	AL	D	621		F	#	-	-
	umhos/cm	0125	WL	04/14/2010	N001	AL	D	480		F	#	-	-

CLASSIC GROUND WATER QUALITY DATA BY PARAMETER WITH ZONE (USEE201) FOR SITE GUN01, Gunnison Processing Site
REPORT DATE: 6/8/2010 5:04 pm

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Specific Conductance	umhos/cm	0126	WL	04/14/2010	N001	AL	D	615		F	#	-	-
	umhos/cm	0127	WL	04/14/2010	N001	AL	D	698		F	#	-	-
	umhos/cm	0135	WL	04/15/2010	N001	AL	D	392		F	#	-	-
	umhos/cm	0136	WL	04/15/2010	N001	AL	D	649		FQ	#	-	-
	umhos/cm	0160	WL	04/14/2010	N001	AL	D	813		F	#	-	-
	umhos/cm	0161	WL	04/14/2010	N001	AL	D	810		F	#	-	-
	umhos/cm	0181	WL	04/13/2010	N001	AL	D	504		F	#	-	-
	umhos/cm	0183	WL	04/13/2010	N001	AL	D	1101		F	#	-	-
	umhos/cm	0186	WL	04/12/2010	N001	AL	D	543		F	#	-	-
	umhos/cm	0187	WL	04/12/2010	N001	AL	D	834		F	#	-	-
	umhos/cm	0188	WL	04/14/2010	N001	AL	D	814		F	#	-	-
	umhos/cm	0189	WL	04/14/2010	N001	AL	D	2053		FQ	#	-	-
Temperature	C	0002	WL	04/13/2010	N001	AL	U	6.22		F	#	-	-
	C	0005	WL	04/14/2010	N001	AL	O	4.70		F	#	-	-
	C	0006	WL	04/14/2010	N001	AL	O	6.26		F	#	-	-
	C	0012R	WL	04/14/2010	N001	AL		6.73		F	#	-	-
	C	0013	WL	04/13/2010	N001	AL	D	6.15		F	#	-	-
	C	0062	WL	04/15/2010	N001	AL	O	6.80		F	#	-	-
	C	0063	WL	04/15/2010	N001	AL	O	8.66		F	#	-	-
	C	0064	WL	04/15/2010	N001	AL	O	8.97		F	#	-	-
	C	0065	WL	04/13/2010	N001	AL	O	7.47		F	#	-	-
	C	0066	WL	04/12/2010	N001	AL	O	8.62		F	#	-	-
	C	0102	WL	04/13/2010	N001	AL	U	8.52		F	#	-	-
	C	0105	WL	04/14/2010	N001	AL	O	7.65		F	#	-	-
	C	0106	WL	04/14/2010	N001	AL	O	8.37		F	#	-	-
	C	0112	WL	04/14/2010	N001	AL	O	9.25		F	#	-	-

CLASSIC GROUND WATER QUALITY DATA BY PARAMETER WITH ZONE (USEE201) FOR SITE GUN01, Gunnison Processing Site
REPORT DATE: 6/8/2010 5:04 pm

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Temperature	C	0113	WL	04/13/2010	N001	AL	D	8.62		F	#	-	-
	C	0125	WL	04/14/2010	N001	AL	D	9.22		F	#	-	-
	C	0126	WL	04/14/2010	N001	AL	D	9.42		F	#	-	-
	C	0127	WL	04/14/2010	N001	AL	D	9.48		F	#	-	-
	C	0135	WL	04/15/2010	N001	AL	D	7.56		F	#	-	-
	C	0136	WL	04/15/2010	N001	AL	D	8.43		FQ	#	-	-
	C	0160	WL	04/14/2010	N001	AL	D	7.17		F	#	-	-
	C	0161	WL	04/14/2010	N001	AL	D	8.45		F	#	-	-
	C	0181	WL	04/13/2010	N001	AL	D	6.39		F	#	-	-
	C	0183	WL	04/13/2010	N001	AL	D	8.57		F	#	-	-
	C	0186	WL	04/12/2010	N001	AL	D	8.46		F	#	-	-
	C	0187	WL	04/12/2010	N001	AL	D	8.31		F	#	-	-
	C	0188	WL	04/14/2010	N001	AL	D	8.13		F	#	-	-
	C	0189	WL	04/14/2010	N001	AL	D	8.33		FQ	#	-	-
Turbidity	NTU	0002	WL	04/13/2010	N001	AL	U	1.42		F	#	-	-
	NTU	0005	WL	04/14/2010	N001	AL	O	5.01		F	#	-	-
	NTU	0006	WL	04/14/2010	N001	AL	O	4.14		F	#	-	-
	NTU	0012R	WL	04/14/2010	N001	AL		4.87		F	#	-	-
	NTU	0013	WL	04/13/2010	N001	AL	D	2.31		F	#	-	-
	NTU	0062	WL	04/15/2010	N001	AL	O	0.88		F	#	-	-
	NTU	0063	WL	04/15/2010	N001	AL	O	9.48		F	#	-	-
	NTU	0064	WL	04/15/2010	N001	AL	O	3.68		F	#	-	-
	NTU	0065	WL	04/13/2010	N001	AL	O	6.45		F	#	-	-
	NTU	0066	WL	04/12/2010	N001	AL	O	6.05		F	#	-	-
	NTU	0102	WL	04/13/2010	N001	AL	U	3.27		F	#	-	-
	NTU	0105	WL	04/14/2010	N001	AL	O	2.01		F	#	-	-

CLASSIC GROUND WATER QUALITY DATA BY PARAMETER WITH ZONE (USEE201) FOR SITE GUN01, Gunnison Processing Site
REPORT DATE: 6/8/2010 5:04 pm

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Turbidity	NTU	0106	WL	04/14/2010	N001	AL	O	8.02		F	#	-	-
	NTU	0112	WL	04/14/2010	N001	AL	O	9.77		F	#	-	-
	NTU	0113	WL	04/13/2010	N001	AL	D	2.69		F	#	-	-
	NTU	0125	WL	04/14/2010	N001	AL	D	0.77		F	#	-	-
	NTU	0126	WL	04/14/2010	N001	AL	D	2.56		F	#	-	-
	NTU	0127	WL	04/14/2010	N001	AL	D	1.42		F	#	-	-
	NTU	0135	WL	04/15/2010	N001	AL	D	1.35		F	#	-	-
	NTU	0136	WL	04/15/2010	N001	AL	D	29.4		FQ	#	-	-
	NTU	0160	WL	04/14/2010	N001	AL	D	2.66		F	#	-	-
	NTU	0161	WL	04/14/2010	N001	AL	D	3.40		F	#	-	-
	NTU	0181	WL	04/13/2010	N001	AL	D	9.76		F	#	-	-
	NTU	0183	WL	04/13/2010	N001	AL	D	9.82		F	#	-	-
	NTU	0186	WL	04/12/2010	N001	AL	D	7.63		F	#	-	-
	NTU	0187	WL	04/12/2010	N001	AL	D	1.31		F	#	-	-
	NTU	0188	WL	04/14/2010	N001	AL	D	5.29		F	#	-	-
	NTU	0189	WL	04/14/2010	N001	AL	D	2.84		FQ	#	-	-
Uranium	mg/L	0002	WL	04/13/2010	N001	AL	U	0.0025		F	#	1.8E-06	-
	mg/L	0005	WL	04/14/2010	N001	AL	O	0.018		F	#	1.8E-06	-
	mg/L	0006	WL	04/14/2010	N001	AL	O	0.680		F	#	3.5E-05	-
	mg/L	0006	WL	04/14/2010	N002	AL	O	0.690		F	#	3.5E-05	-
	mg/L	0012R	WL	04/14/2010	N001	AL		0.310		F	#	3.5E-05	-
	mg/L	0013	WL	04/13/2010	N001	AL	D	0.091		F	#	1.8E-05	-
	mg/L	0062	WL	04/15/2010	N001	AL	O	0.0085		F	#	1.8E-06	-
	mg/L	0063	WL	04/15/2010	N001	AL	O	0.012		F	#	1.8E-06	-
	mg/L	0064	WL	04/15/2010	N001	AL	O	0.010		F	#	1.8E-06	-
	mg/L	0065	WL	04/13/2010	N001	AL	O	0.031		F	#	1.8E-06	-

CLASSIC GROUND WATER QUALITY DATA BY PARAMETER WITH ZONE (USEE201) FOR SITE GUN01, Gunnison Processing Site
REPORT DATE: 6/8/2010 5:04 pm

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Uranium	mg/L	0066	WL	04/12/2010	N001	AL	O	0.024		F	#	1.8E-06	-
	mg/L	0102	WL	04/13/2010	N001	AL	U	0.0043		F	#	1.8E-06	-
	mg/L	0105	WL	04/14/2010	N001	AL	O	0.013		F	#	1.8E-06	-
	mg/L	0106	WL	04/14/2010	N001	AL	O	0.011		F	#	1.8E-06	-
	mg/L	0112	WL	04/14/2010	N001	AL	O	0.042		F	#	1.8E-06	-
	mg/L	0113	WL	04/13/2010	N001	AL	D	0.150		F	#	8.8E-06	-
	mg/L	0125	WL	04/14/2010	N001	AL	D	0.010		F	#	1.8E-06	-
	mg/L	0126	WL	04/14/2010	N001	AL	D	0.010		F	#	1.8E-06	-
	mg/L	0127	WL	04/14/2010	N001	AL	D	0.016		F	#	1.8E-06	-
	mg/L	0135	WL	04/15/2010	N001	AL	D	0.0018		F	#	1.8E-06	-
	mg/L	0136	WL	04/15/2010	0001	AL	D	0.016		FQ	#	1.8E-06	-
	mg/L	0160	WL	04/14/2010	N001	AL	D	0.024		F	#	1.8E-06	-
	mg/L	0161	WL	04/14/2010	N001	AL	D	0.020		F	#	8.8E-06	-
	mg/L	0181	WL	04/13/2010	N001	AL	D	0.010		F	#	1.8E-06	-
	mg/L	0183	WL	04/13/2010	N001	AL	D	0.060		F	#	1.8E-06	-
	mg/L	0186	WL	04/12/2010	N001	AL	D	0.019		F	#	1.8E-06	-
	mg/L	0187	WL	04/12/2010	N001	AL	D	0.015		F	#	1.8E-06	-
	mg/L	0187	WL	04/12/2010	N002	AL	D	0.014		F	#	1.8E-06	-
	mg/L	0188	WL	04/14/2010	N001	AL	D	0.040		F	#	1.8E-06	-
	mg/L	0189	WL	04/14/2010	N001	AL	D	0.016		FQ	#	1.8E-06	-

CLASSIC GROUND WATER QUALITY DATA BY PARAMETER WITH ZONE (USEE201) FOR SITE GUN01, Gunnison Processing Site
REPORT DATE: 6/8/2010 5:04 pm

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE200 WHERE site_code='GUN01' AND location_code in('0002','0005','0006','0012R','0013','0062','0063','0064','0065','0066','0102','0105','0106','0112','0113','0125','0126','0127','0135','0136','0160','0161','0181','0183','0186','0187','0188','0189') AND quality_assurance = TRUE AND (data_validation_qualifiers IS NULL OR data_validation_qualifiers NOT LIKE '%R%' AND data_validation_qualifiers NOT LIKE '%X%') AND DATE_SAMPLED between #4/1/2010# and #4/30/2010#

SAMPLE ID CODES: 000X = Filtered sample. N00X = Unfiltered sample. X = replicate number.

LOCATION TYPES: WL WELL

ZONES OF COMPLETION: a zone of completion with a "-" is cross-screened and, therefore, has two zones of completion (1st zone - 2nd zone).
AL ALLUVIUM

FLOW CODES: D DOWN GRADIENT O ON-SITE U UPGRADIENT

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 compund (TIC).
P	> 25% difference in detected pesticide or Arochlor 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 used.	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.	U	Parameter analyzed for but was not detected.	X	Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

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Appendix B

Groundwater Quality Data by Parameter for Domestic Wells

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CLASSIC GROUNDWATER QUALITY DATA BY PARAMETER WITH ZONE (USEE201) FOR SITE GUN01, Gunnison Processing Site
REPORT DATE: 9/1/2010 9:00 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Manganese	mg/L	0476	WL	07/01/2010	N001			0.0024	B		#	0.00011	-
	mg/L	0477	WL	04/14/2010	N001			0.030			#	0.00011	-
	mg/L	0478	WL	07/01/2010	N001			0.510			#	0.00011	-
	mg/L	0479	WL	04/13/2010	N001			0.0016	B	U	#	0.00011	-
	mg/L	0667	WL	04/13/2010	N001	AL	N	0.0006	B	U	#	0.00011	-
	mg/L	0683	WL	04/13/2010	N001	AL	N	0.0016	B		#	0.00011	-
Oxidation Reduction Potential	mV	0476	WL	07/01/2010	N001			180			#	-	-
	mV	0477	WL	04/14/2010	N001			47.1			#	-	-
	mV	0478	WL	07/01/2010	N001			175			#	-	-
	mV	0479	WL	04/13/2010	N001			123.5			#	-	-
	mV	0667	WL	04/13/2010	N001	AL	N	111.7			#	-	-
	mV	0683	WL	04/13/2010	N001	AL	N	179.6			#	-	-
pH	s.u.	0476	WL	07/01/2010	N001			7.16			#	-	-
	s.u.	0477	WL	04/14/2010	N001			7.40			#	-	-
	s.u.	0478	WL	07/01/2010	N001			7.10			#	-	-
	s.u.	0479	WL	04/13/2010	N001			7.35			#	-	-
	s.u.	0667	WL	04/13/2010	N001	AL	N	7.73			#	-	-
	s.u.	0683	WL	04/13/2010	N001	AL	N	6.93			#	-	-
Specific Conductance	umhos/cm	0476	WL	07/01/2010	N001			230			#	-	-
	umhos/cm	0477	WL	04/14/2010	N001			230			#	-	-
	umhos/cm	0478	WL	07/01/2010	N001			290			#	-	-
	umhos/cm	0479	WL	04/13/2010	N001			209			#	-	-
	umhos/cm	0667	WL	04/13/2010	N001	AL	N	217			#	-	-
	umhos/cm	0683	WL	04/13/2010	N001	AL	N	324			#	-	-
Temperature	C	0476	WL	07/01/2010	N001			15.7			#	-	-

CLASSIC GROUNDWATER QUALITY DATA BY PARAMETER WITH ZONE (USEE201) FOR SITE GUN01, Gunnison Processing Site
REPORT DATE: 9/1/2010 9:00 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	SAMPLE: ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Temperature	C	0477	WL	04/14/2010	N001			11.62			#	-	-
	C	0478	WL	07/01/2010	N001			20.1			#	-	-
	C	0479	WL	04/13/2010	N001			14.28			#	-	-
	C	0667	WL	04/13/2010	N001	AL	N	8.91			#	-	-
	C	0683	WL	04/13/2010	N001	AL	N	14.36			#	-	-
Turbidity	NTU	0476	WL	07/01/2010	N001			2.25			#	-	-
	NTU	0477	WL	04/14/2010	N001			2.17			#	-	-
	NTU	0478	WL	07/01/2010	N001			2.59			#	-	-
	NTU	0479	WL	04/13/2010	N001			1.82			#	-	-
	NTU	0667	WL	04/13/2010	N001	AL	N	1.89			#	-	-
	NTU	0683	WL	04/13/2010	N001	AL	N	2.03			#	-	-
Uranium	mg/L	0476	WL	07/01/2010	N001			0.0015			#	2.9E-05	-
	mg/L	0477	WL	04/14/2010	N001			0.0012			#	1.8E-06	-
	mg/L	0478	WL	07/01/2010	N001			0.0026			#	2.9E-05	-
	mg/L	0479	WL	04/13/2010	N001			0.00095			#	1.8E-06	-
	mg/L	0667	WL	04/13/2010	N001	AL	N	0.0018			#	1.8E-06	-
	mg/L	0683	WL	04/13/2010	N001	AL	N	0.00088			#	1.8E-06	-

CLASSIC GROUNDWATER QUALITY DATA BY PARAMETER WITH ZONE (USEE201) FOR SITE GUN01, Gunnison Processing Site
REPORT DATE: 9/1/2010 9:00 am

PARAMETER	UNITS	LOCATION CODE	LOCATION TYPE	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

RECORDS: SELECTED FROM USEE200 WHERE site_code='GUN01' AND location_code in('0476','0477','0478','0479','0667','0683') AND (data_validation_qualifiers IS NULL OR data_validation_qualifiers NOT LIKE '%R%' AND data_validation_qualifiers NOT LIKE '%X%') AND DATE_SAMPLED between #4/1/2010# and #7/30/2010#

SAMPLE ID CODES: 000X = Filtered sample. N00X = Unfiltered sample. X = replicate number.

LOCATION TYPES: WL WELL

ZONES OF COMPLETION: a zone of completion with a "-" is cross-screened and, therefore, has two zones of completion (1st zone - 2nd zone).

AL ALLUVIUM

FLOW CODES: N UNKNOWN

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 compund (TIC).
P	> 25% difference in detected pesticide or Arochlor 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 used.	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.	U	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

Surface Water Quality Data by Parameter

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SURFACE WATER QUALITY DATA BY PARAMETER (USEE800) FOR SITE GUN01, Gunnison Processing Site
REPORT DATE: 6/8/2010 4:48 pm

PARAMETER	UNITS	LOCATION CODE	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Manganese	mg/L	0248	04/14/2010	0001	0.094			#	0.00011	-
	mg/L	0250	04/14/2010	N001	0.051			#	0.00011	-
	mg/L	0777	04/12/2010	0001	0.089			#	0.00011	-
	mg/L	0780	04/13/2010	0001	0.027			#	0.00011	-
	mg/L	0792	04/12/2010	N001	0.073			#	0.00011	-
	mg/L	0795	04/14/2010	N001	0.042			#	0.00011	-
Oxidation Reduction Potential	mV	0248	04/14/2010	N001	73.6			#	-	-
	mV	0250	04/14/2010	N001	155.1			#	-	-
	mV	0777	04/12/2010	N001	108.7			#	-	-
	mV	0780	04/13/2010	N001	149.6			#	-	-
	mV	0792	04/12/2010	N001	5.4			#	-	-
	mV	0795	04/14/2010	N001	43.8			#	-	-
pH	s.u.	0248	04/14/2010	N001	7.49			#	-	-
	s.u.	0250	04/14/2010	N001	7.66			#	-	-
	s.u.	0777	04/12/2010	N001	8.10			#	-	-
	s.u.	0780	04/13/2010	N001	8.31			#	-	-
	s.u.	0792	04/12/2010	N001	7.82			#	-	-
	s.u.	0795	04/14/2010	N001	7.84			#	-	-
Specific Conductance	umhos/cm	0248	04/14/2010	N001	227			#	-	-
	umhos/cm	0250	04/14/2010	N001	197			#	-	-
	umhos/cm	0777	04/12/2010	N001	222			#	-	-
	umhos/cm	0780	04/13/2010	N001	461			#	-	-
	umhos/cm	0792	04/12/2010	N001	129			#	-	-
	umhos/cm	0795	04/14/2010	N001	196			#	-	-
Temperature	C	0248	04/14/2010	N001	7.58			#	-	-
	C	0250	04/14/2010	N001	1.16			#	-	-
	C	0777	04/12/2010	N001	9.41			#	-	-
	C	0780	04/13/2010	N001	6.02			#	-	-
	C	0792	04/12/2010	N001	11.76			#	-	-
	C	0795	04/14/2010	N001	5.29			#	-	-
Turbidity	NTU	0248	04/14/2010	N001	19.0			#	-	-
	NTU	0250	04/14/2010	N001	5.73			#	-	-
	NTU	0777	04/12/2010	N001	61.5			#	-	-
	NTU	0780	04/13/2010	N001	19.6			#	-	-
	NTU	0792	04/12/2010	N001	8.49			#	-	-
	NTU	0795	04/14/2010	N001	6.08			#	-	-

SURFACE WATER QUALITY DATA BY PARAMETER (USEE800) FOR SITE GUN01, Gunnison Processing Site
REPORT DATE: 6/8/2010 4:48 pm

PARAMETER	UNITS	LOCATION CODE	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Uranium	mg/L	0248	04/14/2010	0001	0.0059			#	1.8E-06	-
	mg/L	0250	04/14/2010	N001	0.0007			#	1.8E-06	-
	mg/L	0777	04/12/2010	0001	0.0045			#	1.8E-06	-
	mg/L	0780	04/13/2010	0001	0.026			#	1.8E-06	-
	mg/L	0792	04/12/2010	N001	0.0008			#	1.8E-06	-
	mg/L	0795	04/14/2010	N001	0.0007			#	1.8E-06	-

RECORDS: SELECTED FROM USEE800 WHERE site_code='GUN01' AND quality_assurance = TRUE AND (data_validation_qualifiers IS NULL OR data_validation_qualifiers NOT LIKE '%R%' AND data_validation_qualifiers NOT LIKE '%X%') AND DATE_SAMPLED between #4/1/2010# and #4/30/2010#

SAMPLE ID CODES: 000X = Filtered sample. N00X = Unfiltered sample. X = replicate number.

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 compund (TIC).
P	> 25% difference in detected pesticide or Arochlor 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 used.
J	Estimated value.
N	Presumptive evidence that analyte is present. The analyte is "tentatively identified".
R	Unusable result.
X	Location is undefined.
G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.
Q	Qualitative result due to sampling technique
U	Parameter analyzed for but was not detected.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

Appendix D

Water Level Data for 2010

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STATIC WATER LEVELS (USEE700) FOR SITE GUN01, Gunnison Processing Site
REPORT DATE: 6/8/2010 4:49 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT)	MEASUREMENT		DEPTH FROM TOP OF CASING (FT)	WATER ELEVATION (FT)	WATER LEVEL FLAG
			DATE	TIME			
0002	U	7646.75	04/13/2010	08:50	5.90	7640.85	
0005	O	7644.66	04/14/2010	09:20	7.17	7637.49	
0006	O	7647.23	04/14/2010	10:15	11.63	7635.60	
0012R		7645.95	04/14/2010	11:15	12.13	7633.82	
0013	D	7643.75	04/13/2010	11:15	12.41	7631.34	
0062	O	7630.61	04/15/2010	09:15	6.48	7624.13	
0063	O	7630.34	04/15/2010	10:35	7.54	7622.80	
0064	O	7620.76	04/15/2010	11:40	6.76	7614.00	
0065	O	7610.27	04/13/2010	17:15	2.04	7608.23	
0066	O	7606.22	04/12/2010	14:50	2.01	7604.21	
0102	U	7647.30	04/13/2010	09:30	6.64	7640.66	
0105	O	7646.11	04/14/2010	09:00	9.18	7636.93	
0106	O	7647.22	04/14/2010	09:55	11.78	7635.44	
0112	O	7645.74	04/14/2010	10:55	12.53	7633.21	
0113	D	7643.83	04/13/2010	10:50	12.50	7631.33	
0125	D	7633.52	04/14/2010	17:00	6.51	7627.01	
0126	D	7634.14	04/14/2010	17:30	6.65	7627.49	
0127	D	7634.64	04/14/2010	18:00	8.52	7626.12	
0135	D	7627.03	04/15/2010	12:45	5.95	7621.08	
0136	D	7626.24	04/15/2010	12:20	5.63	7620.61	
0160	D	7604.39	04/14/2010	12:20	5.69	7598.70	
0161	D	7605.63	04/14/2010	12:40	7.17	7598.46	
0181	D	7616.38	04/13/2010	14:30	2.65	7613.73	
0183	D	7616.27	04/13/2010	16:40	4.49	7611.78	
0186	D	7627.21	04/12/2010	16:05	6.34	7620.87	
0187	D	7625.91	04/12/2010	17:00	5.93	7619.98	
0188	D	7613.65	04/14/2010	13:40	6.80	7606.85	
0189	D	7613.56	04/14/2010	13:20	7.75	7605.81	

STATIC WATER LEVELS (USEE700) FOR SITE GUN01, Gunnison Processing Site
REPORT DATE: 6/8/2010 4:49 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT)	MEASUREMENT		DEPTH FROM TOP OF CASING (FT)	WATER ELEVATION (FT)	WATER LEVEL FLAG
			DATE	TIME			

RECORDS: SELECTED FROM USEE700 WHERE site_code='GUN01' AND LOG_DATE between #4/1/2010# and #4/30/2010#

FLOW CODES: D DOWN GRADIENT O ON-SITE U UPGRADIENT

WATER LEVEL FLAGS: