LMS/GUP/S06004

Final
Groundwater Compliance Action Plan for the Gunnison, Colorado, Processing Site

April 2010

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Abbreviations

ACL	alternate concentration limit
CDPHE	Colorado Department of Public Health and Environment
CFR	*Code of Federal Regulations*
COPC	constituent of potential concern
DOE	U.S. Department of Energy
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
ft	foot (feet)
GCAP	Groundwater Compliance Action Plan
IC	institutional control
MCL	maximum concentration limit
mg/L	milligram(s) per liter
NRC	U.S. Nuclear Regulatory Commission
PEIS	Programmatic Environmental Impact Statement
RRM	residual radioactive material
SOWP	Site Observational Work Plan
UMTRA	Uranium Mill Tailings Remedial Action (Project)

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1.0 Introduction

This Groundwater Compliance Action Plan (GCAP) presents the compliance strategy for groundwater cleanup at the Gunnison, Colorado, Processing Site (Gunnison site) (Figure 1). The groundwater cleanup is mandated by the Uranium Mill Tailings Radiation Control Act. The compliance strategy is based on U.S. Department of Energy (DOE) evaluation of information included in the Site Observational Work Plan (SOWP) (DOE 2001). This GCAP serves as a stand-alone modification to the Remedial Action Plan (DOE 1992) to address groundwater restoration and compliance with the U.S. Environmental Protection Agency (EPA) groundwater protection standards for the Uranium Mill Tailings Remedial Action (UMTRA) Project Title I sites. This GCAP is the U.S. Nuclear Regulatory Commission (NRC) concurrence document for compliance with groundwater cleanup standards in Title 40 *Code of Federal Regulations* Part 192 (40 CFR 192) Subpart B for the Gunnison site.

This final version of the Gunnison GCAP updates the draft version (DOE 2005) by addressing comments from NRC. Updates to the plan include an additional surface water sampling location on the south fork of the Gunnison River, a revised network of domestic wells that include only locations used as potable water and are not connected to the county water system, language requiring an assessment every 10 years that evaluates adherence to the compliance strategy, and new well installation, if needed.

This final GCAP has been submitted to NRC for approval and to the Colorado Department of Public Health and Environment (CDPHE) for concurrence, and it provides the guidance for long-term monitoring activities at the Gunnison site.

National Environmental Policy Act issues and environmental concerns are addressed in the Environmental Assessment (EA) (DOE 2002). The final EA and Finding of No Significant Impact have been completed and distributed.

Section 2.0 of this document provides a summary assessment of environmental data relevant for development of the groundwater compliance strategy. Section 3.0 discusses development of the groundwater compliance strategy, and Section 4.0 addresses implementation of the compliance strategy.

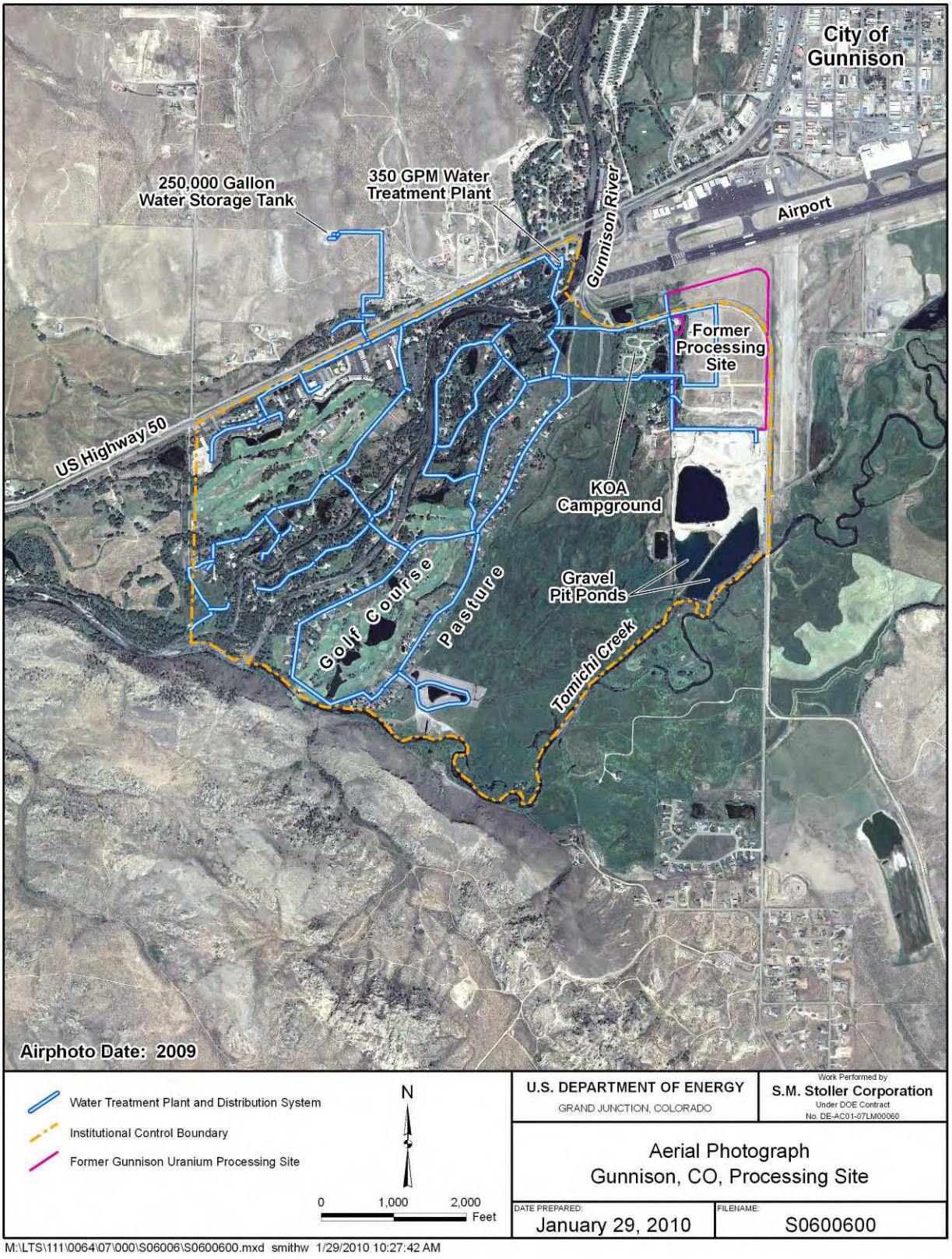

Figure 1. Aerial Photograph of the Gunnison Area

2.0 Assessment of Environmental Data

2.1 Hydrogeology

The Gunnison site is 0.5 mile southwest of the city of Gunnison, between the Gunnison River and Tomichi Creek, in Gunnison County, Colorado (Figure 1). Site characterization details are available in the SOWP (DOE 2001).

The site is underlain by alluvium that consists of poorly sorted sediments ranging from clay-sized material through gravel, with cobbles and occasional boulders. The alluvium ranges in thickness from 70 to 130 feet (ft). Groundwater is present in the alluvial (uppermost) aquifer at an average depth of 5 ft below ground surface. 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 ft/day, and the average linear groundwater velocity ranges from 1.9 to 3.2 ft/day.

Groundwater in the alluvial aquifer system is recharged by groundwater underflow, adjacent streams, precipitation, flood irrigation of the pasture downgradient from the site, and irrigation of the golf course and residential areas southwest of the site. Groundwater is discharged naturally to adjacent streams, by evapotranspiration, and by the gravel pit dewatering operations south of the site.

2.2 Groundwater Quality

Groundwater in the alluvial aquifer beneath and downgradient from the Gunnison site was contaminated by former uranium-milling activities. Uranium mill tailings and other residual radioactive materials (RRM) were removed from the former mill site 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 a depth just below the water table, and some contaminated material was left in place. Clean fill was placed above these areas to prevent radiation from emanating to the surface. Details of groundwater quality at the Gunnison site are available in the SOWP (DOE 2001) and the Verification Monitoring Report (DOE 2009).

Uranium is the primary constituent of potential concern (COPC) in groundwater; concentrations exceed the maximum concentration limit (MCL) of 0.044 milligram per liter (mg/L) beneath the site and also several thousand feet downgradient from the site boundary (Figure 2). Concentrations of uranium in groundwater below the MCL, but above background, extend approximately 7,000 ft downgradient from 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 at the Gunnison site (Figure 3), although manganese is not regulated, and no MCL has been established. Therefore, manganese will be monitored as a best management practice and compared to the EPA Drinking Water Equivalent Level (DWEL) of 1.6 mg/L (EPA 2004). The DWEL is a lifetime-exposure concentration protective of adverse, noncancer 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 (Figure 3). Manganese does not appear to be widespread in the aquifer, and concentrations beneath the site are decreasing.

The following observations are based on results of groundwater and surface water sampling during 2009 (DOE 2009):

- Concentrations of uranium in groundwater beneath the former mill site were still above the MCL.
- Uranium concentration in shallow zone monitoring well 0006 on the former mill site remains high (1 mg/L) with no statistical trend, which indicates a possible localized, continual source of uranium from RRM supplemental standards areas.
- Uranium in groundwater is generally decreasing downgradient of the former mill site and migrating deeper into the alluvial sequence while progressing downgradient, which is consistent with historical data and model predictions.
- Concentrations of COPCs in groundwater in the domestic wells near the site are below the MCL and the CDPHE action level of 0.020 mg/L for uranium (DOE 2009), and far below the DWEL for manganese.
- The low concentrations of uranium in surface water in the Gunnison River during 2009 (0.0005 and 0.0006 mg/L) indicate dilution by runoff from the melting of the mountain snowpack.
- The concentration of uranium in surface water in the gravel pit pond was 0.016 mg/L, which was elevated with respect to background groundwater quality, as expected, but was near the historical low concentration of 0.013 mg/L.
- Concentrations of uranium in Tomichi Creek were low (<0.01 mg/L), indicating minimal impact from discharge from the gravel-pit pond, groundwater discharge, and concentration due to evaporation.
- Concentrations of manganese in surface water are well below the DWEL of 1.6 mg/L.

2.3 Land and Water Use

The Gunnison site is owned by Gunnison County (Appendix A). Adjacent properties are owned by Gunnison County, United Companies, and other private parties. United Companies (formerly Valco, Inc.) is involved in commercial aggregate mining operations just south of the Gunnison site. Some of the adjacent area most likely will be subject to residential development in the future. A domestic water supply system, funded by DOE and the State of Colorado, was constructed in 1994 to provide drinking water to potentially impacted users in the institutional control (IC) boundary (Figure 1). DOE and the State of Colorado also funded additional enhancements to the domestic water supply system during 2004; construction of these enhancements was completed in November 2009. Effective and enforceable ICs are in place and include restrictions on the former mill site via a quitclaim deed (Appendix A) and a Domestic Well Constraint Area (Appendix B).

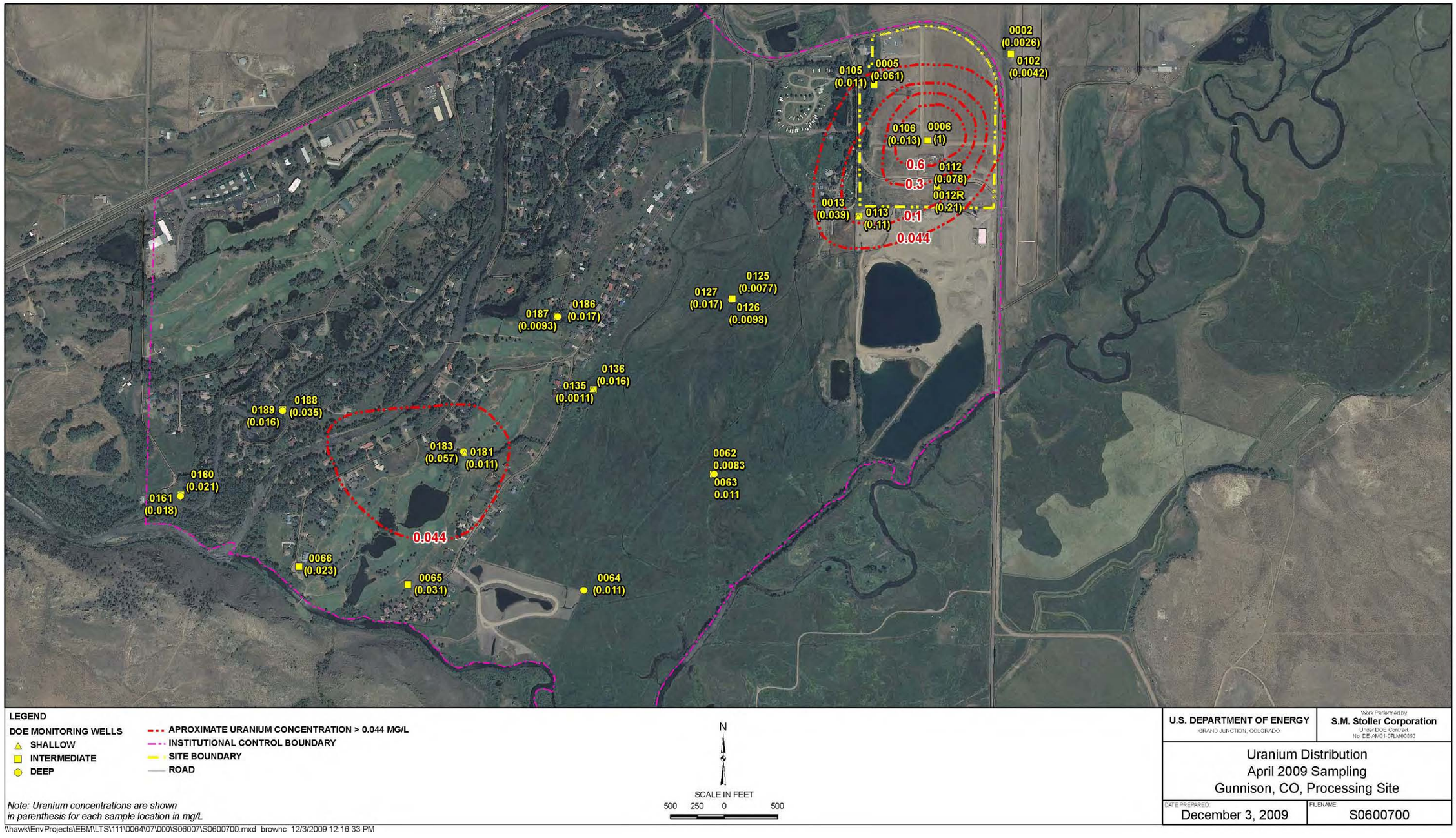

Figure 2. Distribution of Uranium at the Gunnison Site

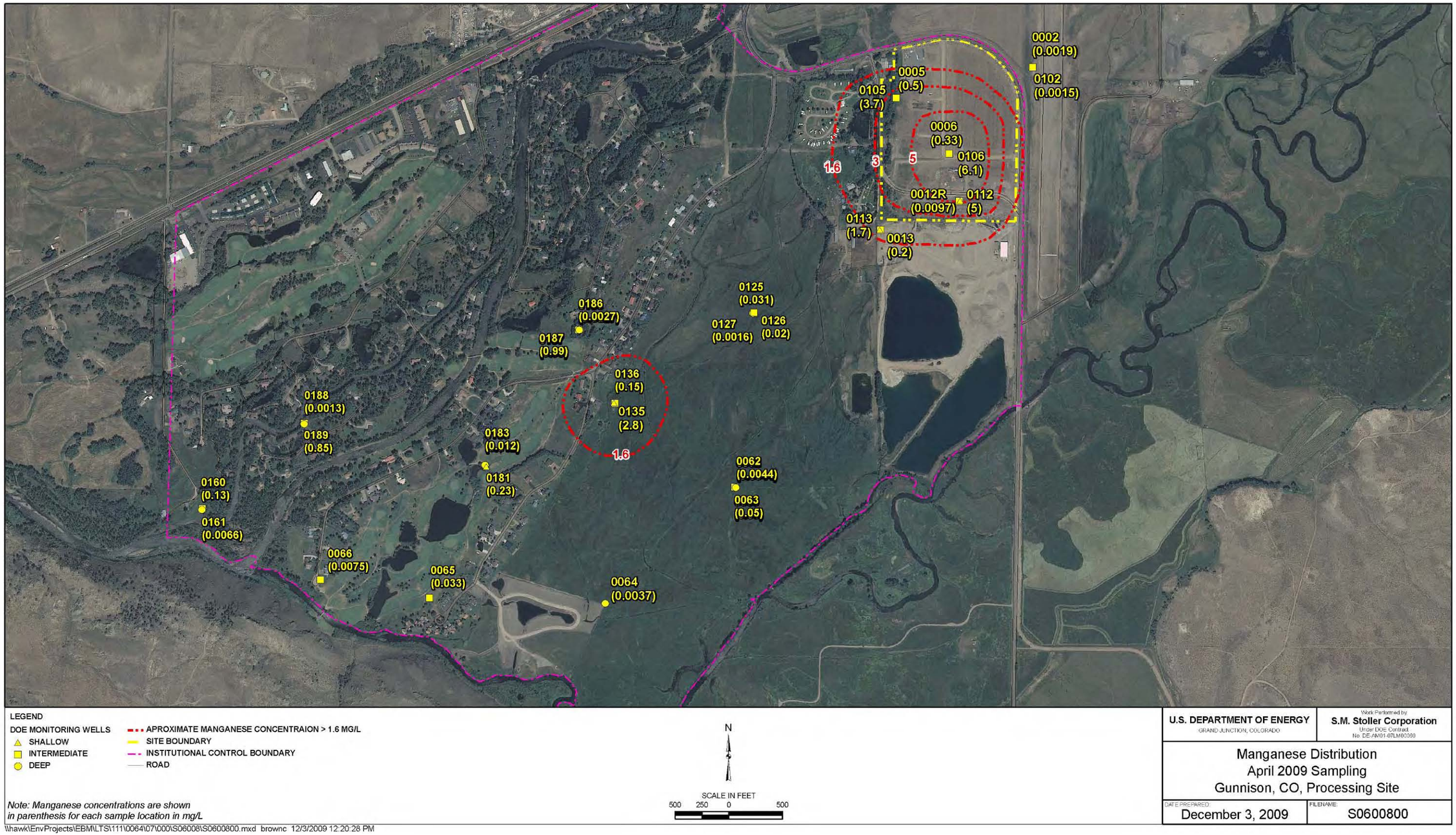

Figure 3. Distribution of Manganese at the Gunnison Site

3.0 Groundwater Compliance Strategy

3.1 Selection Framework

The groundwater compliance strategy for the Gunnison site (Subpart B of 40 CFR 192) is based on the compliance strategy selection framework following the steps presented in the Programmatic Environmental Impact Statement (PEIS) (DOE 1996). DOE's goal is to implement a cost-effective groundwater compliance strategy at the Gunnison site that is protective of human health and the environment and returns contaminated groundwater to its maximum beneficial use. After evaluating existing site information and following the decision framework in the PEIS, DOE selected a compliance strategy of natural flushing for groundwater cleanup at the Gunnison site. The compliance strategy is being implemented in conjunction with continued groundwater and surface water monitoring to observe the effectiveness of the strategy, and ICs are being maintained and verified during the natural flushing period to restrict access to contaminated groundwater. The compliance strategy is based on the decision framework in Figure 4 and is explained in Table 1.

To enhance this groundwater compliance strategy, DOE and the State of Colorado constructed an alternate domestic water supply system in 1994 to service all existing groundwater users in the area and potential future users (Figure 1). DOE and the State funded an addition to the domestic water supply system in 2004.

This natural flushing compliance strategy for the Gunnison site is protective of human health and the environment and fulfills the requirements for Subpart B of 40 CFR 192.

3.2 Applicability of Natural Flushing

Groundwater in the alluvial aquifer beneath and downgradient of the Gunnison site qualifies for natural flushing because groundwater flow and transport modeling has predicted that site-related concentrations of uranium will decrease to levels below the MCL within 100 years.

The groundwater flow and transport model was developed to evaluate whether natural processes would reduce site-related uranium concentrations to regulatory levels in the alluvial aquifer within 100 years. Only uranium was modeled, as it appeared to be the most representative and widespread site-related contaminant in groundwater. Because uranium is the primary indicator of site contamination, it is the basis for verifying the compliance strategy for groundwater cleanup at the Gunnison site. Results of the modeling are summarized below, and details are presented in Section 5.4 and Appendix H of the SOWP (DOE 2001).

Two versions of the model were developed to address conditions at the site. The steady-state flow and transport model predicted that uranium concentrations would decrease to 0.042 mg/L after 100 years, which is below the standard of 0.044 mg/L. The steady-state stochastic flow and transport model was used to quantify the uncertainty in flow and transport parameters. Similar results were predicted by the stochastic model, which predicted maximum concentrations (based on the average of 200 computer simulations) would be below the standard at 0.043 mg/L after 100 years. The stochastic simulations predicted that after 100 years there is a moderate probability (40 percent) that the maximum concentration will be greater than the standard over a small area of the alluvial aquifer.

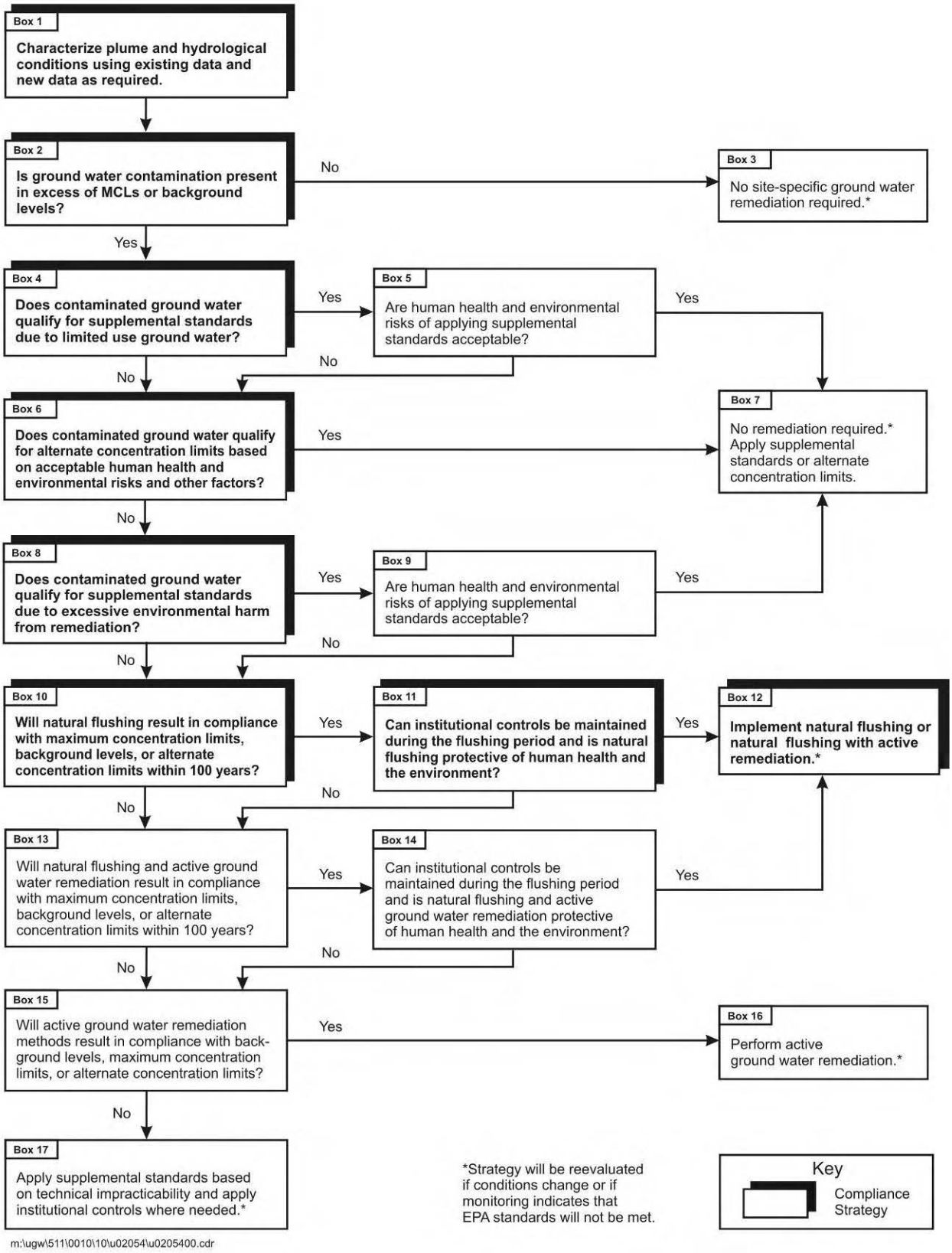

Figure 4. Compliance Strategy Decision Framework

Table 1. Compliance Strategy Selection Process for Groundwater at the Gunnison Processing Site

Box from Figure 4	Action or Question	Result or Decision
1	Characterize plume and hydrological conditions.	See conceptual site model presented in the SOWP (DOE 2001). Move to Box 2.
2	Is groundwater contamination present in excess of MCLs or background levels?	Uranium and manganese exceed the MCL and background, respectively, at one or more monitoring points. Move to Box 4.
4	Does contaminated groundwater qualify for supplemental standards due to limited use groundwater?	The groundwater does not qualify for limited use because the background total dissolved solids concentration is less than 10,000 mg/L, the aquifer will yield more than 150 gallons per day, and background COPC concentrations are low. Move to Box 6.
6	Does contaminated groundwater qualify for alternate concentration limits (ACLs)?	Groundwater flow and transport modeling indicate that natural flushing will be effective and ACLs are not needed. Move to Box 8.
8	Does contaminated groundwater qualify for supplemental standards due to excessive environmental harm from remediation?	Although the applicability has not been formally addressed, it is unlikely that remedial action would cause excessive harm to the environment. Move to Box 10.
10	Will natural flushing result in compliance with MCLs, background levels, or ACLs within 100 years?	Yes. Groundwater flow and transport modeling have predicted that concentrations of uranium will be below the MCL within 100 years. Move to Box 11.
11	Can institutional controls be maintained during the natural flushing period, and is natural flushing protective of human health and the environment?	Yes. ICs have been negotiated and implemented and a domestic water supply system has been constructed to provide drinking water. Move to Box 12.
12	Compliance strategy.	Implement natural flushing in conjunction with monitoring and ICs.

Based on modeling results, natural flushing is an acceptable compliance strategy that allows natural processes to reduce the groundwater contaminants to levels below the MCL beneath and downgradient from the site within 100 years. Even though there is a moderate probability that the maximum concentration of uranium in groundwater may be above the standard over a small area of the aquifer after 100 years, the natural flushing strategy is reasonable because (1) there is no current or projected unacceptable risk to human health and the environment because of durable and enforceable ICs, and the water supply system, installed in 1994 and enhanced in 2004, provided for the elimination of the only potential pathway (which was ingestion of contaminated groundwater as a drinking water source); (2) the uncertainties involved in characterization of a natural system and simulating the system with numerical modeling are recognized and manageable; (3) monitoring groundwater at the site will provide data to verify the modeling predictions, ascertain that natural flushing is meeting compliance expectations, and ensure protection of human health and the environment; and (4) contingency remedies will be considered and implemented if the selected compliance strategy is not effective in meeting cleanup objectives within the 100-year time frame allowed.

Figure 5 shows a comparison of uranium concentrations in alluvial aquifer groundwater just off the southwest corner of the site (well 0113) with uranium concentrations predicted by groundwater flow and transport modeling. This well was selected as an indicator of natural flushing progress because of its location adjacent to and immediately downgradient of the mill site, which is in an area of the aquifer that should be the first to flush as the plume migrates off

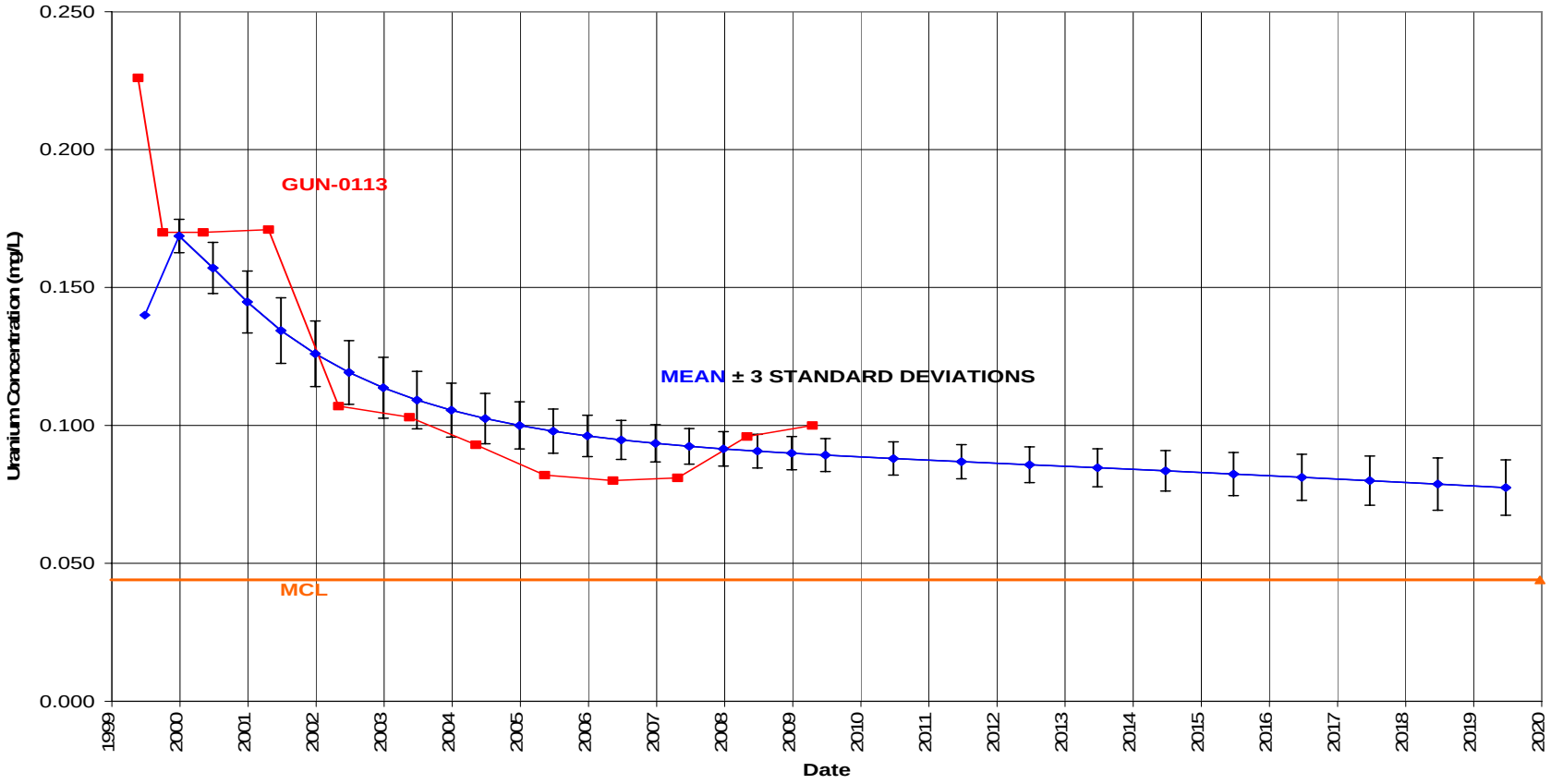

Figure 5. Predicted and Actual Uranium Concentration Versus Time in Well 0113

the mill site. Additionally, data from this well will be used to assess potential aquifer-wide groundwater impacts from the RRM supplemental standard areas remaining on the mill site. As shown in this figure, recent concentrations are similar to concentrations predicted by the groundwater model and are trending downward, which indicates that natural flushing processes have been effective and that RRM remaining on the mill site is not a substantial enough source of groundwater contamination to have a significant affect on the alluvial aquifer downgradient of the site.

3.3 Human Health and Environmental Risk

No unacceptable risks to human health and the environment are associated with current and projected conditions near the Gunnison site as long as ICs are maintained and monitoring continues. ICs in place prohibit new well installation and provide a potable water source within the IC boundary to limit consumption of groundwater. Domestic wells being used as potable water are included in the long-term monitoring program to verify protection of human health. Current gravel-mining operations within the IC area expose contaminated groundwater in a pond formed in a former gravel pit; however, this pond presents no unacceptable ecological risk, as documented in the SOWP (DOE 2001). Consequently, the proposed compliance strategy of natural flushing in conjunction with continued monitoring and ICs will be protective of human health and the environment.

4.0 Compliance Strategy Implementation

The natural flushing compliance strategy allowed in Subpart B of 40 CFR 192 for the Gunnison site will be implemented in conjunction with groundwater and surface water monitoring and ICs.

4.1 Monitoring Program

The long-term monitoring network for the Gunnison site includes 28 DOE monitoring wells, 6 surface water locations, and 6 domestic wells (Figure 6 and Table 2). Samples collected from all monitoring locations will be analyzed for the COPCs (uranium and manganese). Field measurements of oxidation-reduction potential, pH, specific conductance, temperature, and turbidity will be made at each location. Sampling procedures and protocols, including quality assurance and quality control measures, are specified in the *Sampling and Analysis Plan for the U.S. Department of Energy Office of Legacy Management Sites* (LMS/PLN/S04351).

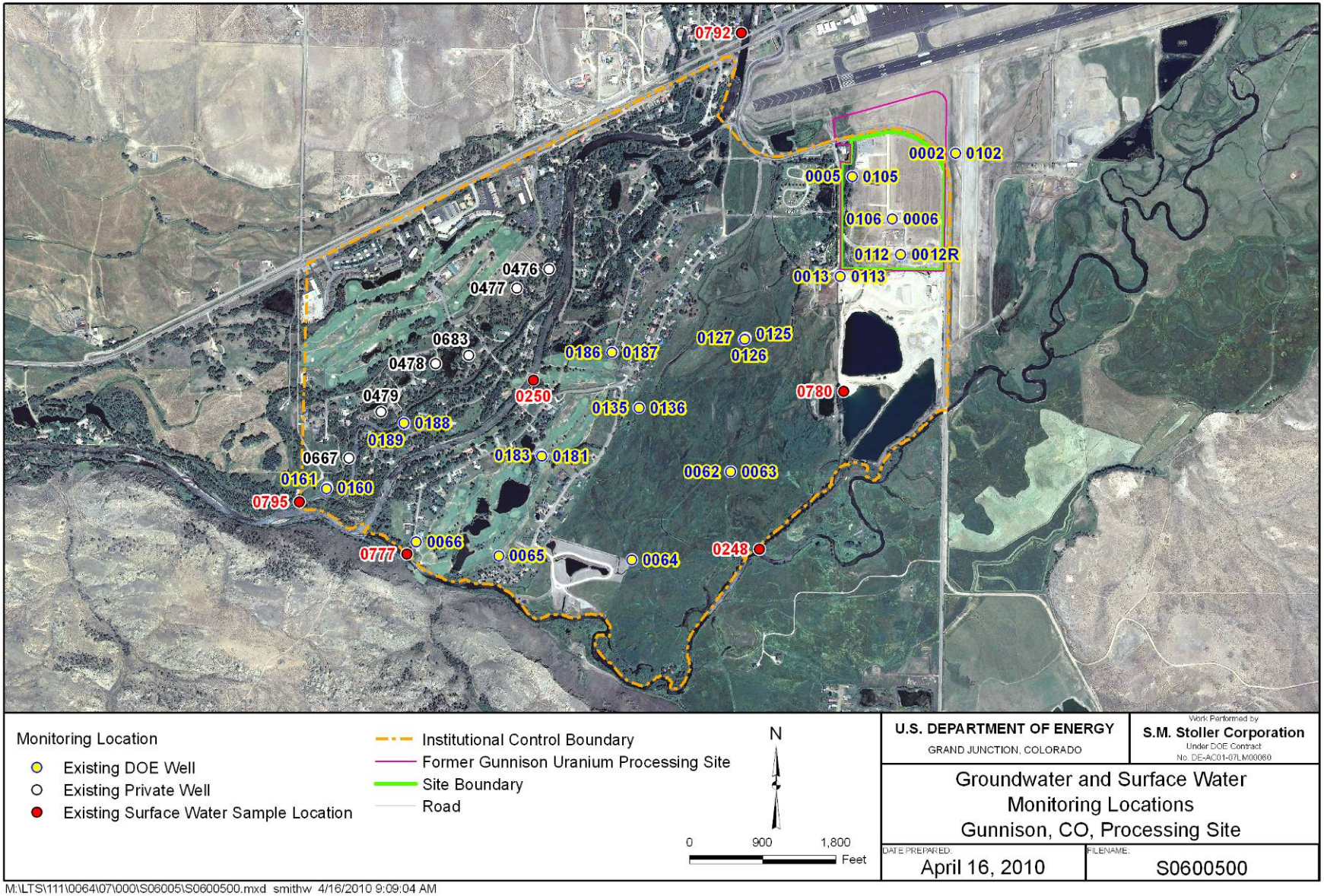

Figure 6. Groundwater and Surface Water Monitoring Locations at the Gunnison Site

Table 2. Groundwater and Surface Water Monitoring at the Gunnison Site

Monitoring Location	Aquifer Zone	Screened Interval (ft)	Location	Rationale (Uranium)
Groundwater (DOE Wells)				
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 – south fork	Monitor potential aquifer discharge
0777	NA		Tomichi Creek	Monitor potential aquifer discharge
0780	NA		Gravel pit pond	Gravel pit discharge
0792	NA		Gunnison River	Upstream of IC boundary
0795	NA		Gunnison River	Downstream of IC boundary
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
0478	Shallow	Potable	West of Gunnison River	Verify low COPC concentrations
0479	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

Verification monitoring of COPCs in groundwater in the alluvial aquifer and surface water in the vicinity of the Gunnison site will be performed annually for the first 10 years after NRC concurrence with the final GCAP (this document) to ensure continued protection of human health and the environment and to collect data to assess the natural flushing compliance strategy. Monitoring data will be presented and evaluated in annual Verification Monitoring Reports. A comprehensive review of the monitoring data will be conducted every 10 years to assess adherence to model predictions and to determine the effectiveness and viability of the compliance strategy. As monitoring data are collected and assessed, modifications to the long-term monitoring program may be warranted, including additional well installation or change in monitoring frequency, which will be determined by DOE and the regulators. Changes to the long-term monitoring program will be documented in the Long-Term Management Plan for the Gunnison site.

4.2 Institutional Controls

Alluvial groundwater is contaminated beneath and downgradient from the Gunnison site on property controlled by Gunnison County and private landowners. ICs applied in conjunction with the natural flushing compliance strategy are restrictions to ensure protection of human health and the environment by limiting access to the contaminated groundwater. ICs in effect near the Gunnison processing site consist of deed restrictions on the original uranium mill site property (currently owned by Gunnison County), a Gunnison County Resolution establishing the New Well Constraint Area for the Dos Rios area of the county, and construction of a domestic water supply system. DOE entered into an NRC-approved cooperative agreement (DOE 2004) with Gunnison County in which DOE agreed to fund (along with CDPHE) an extension of the domestic water supply system, and the county agreed to restrict new well installation within the IC boundary.

ICs are in place within the boundary of the former mill site through deed restrictions that became effective when the State of Colorado transferred ownership to Gunnison County via a quitclaim deed in December 1999 (Appendix A). The deed restrictions prohibit use of contaminated groundwater, control excavation of contaminated soil, and stipulate that radon mitigation measures are required for habitable structures. Gunnison County is in the process of constructing an industrial park at the former mill site. Because the former mill site is within the service area of the Dos Rios water system, the planned industrial park will have a source of domestic water available. As stipulated in the quitclaim deed, DOE and the State of Colorado will have oversight and approval authority on the industrial park construction plans regarding handling of groundwater and soil during construction and radon mitigation measures in habitable structures.

In order to restrict the use of contaminated groundwater in the vicinity of the Gunnison site, Gunnison County approved a resolution establishing the New Domestic Well Constraint Area for the Dos Rios area of the county (Resolution No. 59, Series 2004) (Appendix B). The resolution prohibits new domestic wells within the IC boundary and ensures that each property owner has access to a domestic water supply provided by the Dos Rios Water Treatment System. The IC boundary is based on scientific evidence that it encompasses the plume of contamination and potential migration of the plume (Figure 1). DOE and CDPHE contemplated alternative treatment systems and found that prohibiting new domestic wells within the IC area was the

preferred alternative. It was determined that this solution was in the best interest of public health, safety, and welfare.

5.0 References

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EPA (U. S. Environmental Protection Agency), 2004. *2004 Edition of the Drinking Water Standards and Health Advisories*, EPA 822-R-04-005, Office of Water Resource Center, January.

Sampling and Analysis Plan for the U.S. Department of Energy Office of Legacy Management Sites, LMS/PLN/S04351, continually updated, prepared by S.M. Stoller Corporation for the U.S. Department of Energy Office of Legacy Management, Grand Junction, Colorado.

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Appendix A

Quitclaim Deed

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QUIT CLAIM DEED

The Colorado Department of Public Health and the Environment ("Grantor"), whose address is 4300 Cherry Creek Drive South, Denver, Colorado,,80222-1530, City and County of Denver, State of Colorado, pursuant to 42 U.S.C § 7914 (e) (1) (B) and C.R.S. § 25-11-303, hereby donates and quit claims to the County of Gunnison ("Grantee"), whose address is 200 E. Virginia, Gunnison, Colorado, 81230, City and County of Gunnison, State of Colorado, the following real property in the County of Gunnison, State of Colorado, to wit: A parcel of land in Gunnison County, State of Colorado, containing Sixty and ninety two hundredths (60.92) acres, more or less, described as follows:

Township 49 North, Range 1 West, N.M.P.M.

A tract of land situated in the S½SW¼ of Section 2 and the NE¼NW¼ of Section 11 more particularly described as follows:

Commencing at the North quarter corner of said Section 11; thence South 89°34'00" West along the North line of said Section 11, a distance of 30.91 feet to the Westerly right-of-way line of the existing county road; thence North 00°07'00" West along said right-of-way line 742.17 feet ; thence North 53°22'00" West, 231.90 feet, to the POINT OF BEGINNING; thence Southeasterly along said right-of-way along a curve to the right, having a radius of 144.71 feet, 268.98 feet, chord bearing South 53°22'00" East, 231.90 feet; thence South 00°07'00" East along said right-of-way line, 742.17 feet, to the North line of said Section 11; thence South 00°08'00" East along said right-of-way line, to the South line of said NE¼NW¼; thence South 89°41'00" West along said South line, 1,271.72 feet ; thence North 01°06'00" West, 1320.03 feet to said North line of Section 11; thence North 89°34'00" East along said North line, 112.00 feet ; thence North 00°31'00" East, 219.42 feet ;thence North 89°09'00" West, 166.32 feet ; thence North 13°56'00" West 99.16 feet ; thence North 06°14'00" West, 211.88 feet to the Southerly right-of-way line of said existing county road; thence Northeasterly along said right-of-way line, to the POINT OF BEGINNING

Subject to: (i) any coal, oil, gas, or other mineral rights in any person; (ii) existing rights-of-way for roads, railroads, telephone lines, transmission lines, utilities, ditches, conduits, or pipelines on, over, or across said lands; (iii) court liens, judgments, or financial encumbrances such as deeds of trust for which a formal consent or order has been obtained from a court for the lien holder; (iv) other rights, interests, reservation or exceptions of record; and the following terms, conditions, rights, reservations and covenants:

Grantor reserves to: (i) itself, the U. S. Department of Energy, their employees, agents and contractors the right of access to the property as may be necessary to complete activities under the Uranium Mill Tailings Radiation Control Act of 1978, 42 U.S.C. § 7901 et seq. ("UMTRCA") and for other lawful purposes, until such time as Grantor and the U.S. Department of Energy determine that all remedial activities are complete; and (ii) to itself any non-tributary groundwater underlying this parcel, the right to develop tributary groundwater, and the right to surface access for groundwater development.

Grantee covenants to hold harmless the Grantor and the Department of Energy for any liability associated with disruption of any public purpose ventures on the property conveyed by this deed, the disruption of any improvement on said property made by the Grantee, its successors and assigns, and any temporary or permanent limitations to the use of the property, should the Grantor and the Department of Energy be required to perform additional surface remedial activities on the property conveyed by this deed.

Grantee covenants (i) to comply with the applicable provisions of UMTRCA, 42 U.S.C. #7901 et. seq., as amended; (ii) not to use ground water from the site for any purpose; and not to construct wells or any means of exposing ground water to the surface unless prior written approval for such use is given by the Grantor and the U.S. Department of Energy; (iii) not to sell or transfer the land to anyone other than a governmental entity within the state; (iv) that any sale or transfer of the property described in this deed shall have prior written approval from the Grantor and the U.S. Department of Energy; and that any deed or other document created for such sale or transfer and any subsequent sale or transfer will include information stating that the property was once used as a uranium milling site and all other information regarding the extent of residual radioactive materials removed from the property as required by Section 104(d) of the Uranium Mill Tailings, 42 U.S.C. sec. 7014(d), and as set forth in the Annotation attached hereto; (v) not to perform construction and/or excavation or soil removal of any kind on the property without permission from the Grantor and the U.S. Department of Energy unless prior written approval of construction plans (e.g., facilities type and location), is given by the Grantor and the U.S. Department of Energy; (vi) that any habitable structures constructed on the property shall employ a radon ventilation system or other radon mitigation measures; and (vii) that its use of the property shall not adversely impact groundwater quality, nor interfere in any way, with groundwater remediation under UMTRCA activities; and (viii) to use the

property and any profits or benefits derived therefrom only for public purposes as required by UMTRCA sec. 104(e)(1)(C), 42 U.S.C. 7914(e)(1)(C).

These covenants are made in favor and to the benefit of Grantor, shall run with the land and be binding upon Grantee and its successors and assigns, and shall be enforceable by Grantor, and its successors and assigns;

Grantee acknowledges that the property was once used as a uranium milling site, and that the Grantor makes no representations or warranties that the property is suitable for Grantee's purposes;

IN WITNESS WHEREOF:

GRANTOR:

APPROVED AS TO FORM:

David Kreutzer - Assistant Attorney General

STATE OF COLORADO
Bill Owens, Governor
Acting by and through
The Department of Public Health and Environment

By: _____
Executive Director

By: _____
Program Approval

ACCEPTANCE OF DEED
AND COVENANTS

GRANTEE:
Board of County Commissioners
Gunnison County, CO
(Full Legal Name or Agency)

By: _____
(Name)

Title: Chairperson, Gunnison County Commissioners

(Affix Seal)

ATTESTATION:

City/County Clerk

Signed this 6th day of December, 19 99

STATE OF COLORADO, }
County of Denver } ss.

The foregoing instrument was acknowledged before me this 19th day of January, 2000 , by Maria S. Zepeda-Sanchez

My commission expires April 14, 2003

Witness my hand and official seal

Notary Public.

No. _____

499861 02/24/2000 10:19A 319
3 of 6 R 0.00 D 0.00 N 0.00 Gunnison County

QUIT CLAIM DEED

TO

STATE OF COLORADO, } ss.
County of

I hereby certify that this instrument was filed for record in my office, at _____ o'clock _M., _____, 19_ and is duly recorded in book _____ page _____.

Film No. _____ Reception No. _____

_____
Recorder.

By _____
Deputy.

Fees, $ _____

ATTACHMENT A

LAND ANNOTATION

GUNNISON, COLORADO PROCESSING SITE

The Uranium Mill Tailings Radiation Control Act (Public Law 95-604), Section 104, requires that the State notify any person who acquires a designated processing site of the nature and extent of residual radioactive materials removed from the site, including notice of the date when such action took place, and the condition of the site after such action. The following information is provided to fulfill this requirement.

The Gunnison, Colorado processing site consists of two separate land parcels. The northern parcel contained the tailings pile, while the southern parcel contained the mill building and associated structures. However, since the two sites are contiguous and physically similar, the remainder of this annotation will address the mill site as a whole.

Approximately 734,000 cubic yards of contaminated materials which included 1) tailings; 2) subpile soils; 3) surficial materials in the mill yard; 4) windblown materials; and 5) mill demolition debris were removed from the mill site from 1993 to 1995. The remediation was conducted in accordance with regulations promulgated by the U.S. Environmental Protection Agency, in 40 CFR 192. These regulations require that the concentration of radium-226 in land averaged over any area of 100 square meters shall not exceed the background level by more than: 5 pCi/g (picocuries per gram), averaged over the first 15 cm (centimeters) of soil below the surface, and 15 pCi/g averaged over 15 cm thick layers of soil more than 15 cm below the surface. Verification measurements were conducted at the site by dividing the site into approximately 2,900 30-foot by 30-foot grids. A soil sample was collected and analyzed for contaminants from each grid to verify that the standards had been met.

After remediation was complete the site was backfilled with approximately 450,000 cubic yards of clean fill material, graded for drainage and revegetated. Backfill materials were routinely analyzed for radium-226 and were determined to have concentrations near background. Material with radium-226 concentrations less than 5 pCi/g were used for surface backfill.

Excavation of residual radioactive material was also conducted for thorium-230 beneath the tailings pile in the subpile soils which consisted mainly of large cobbles, sands and gravels. For thorium-230, the cleanup standard was determined as a projected 1,000 year radium-226 concentration based on the eventual decay of the thorium to radium. Because the material contained large cobbles, a mass correction factor was applied which allowed for the averaging of the thorium concentration throughout the soil mass. This resulted in a bulk thorium-230 concentration of approximately 35 pCi/g as the clean-up standard.

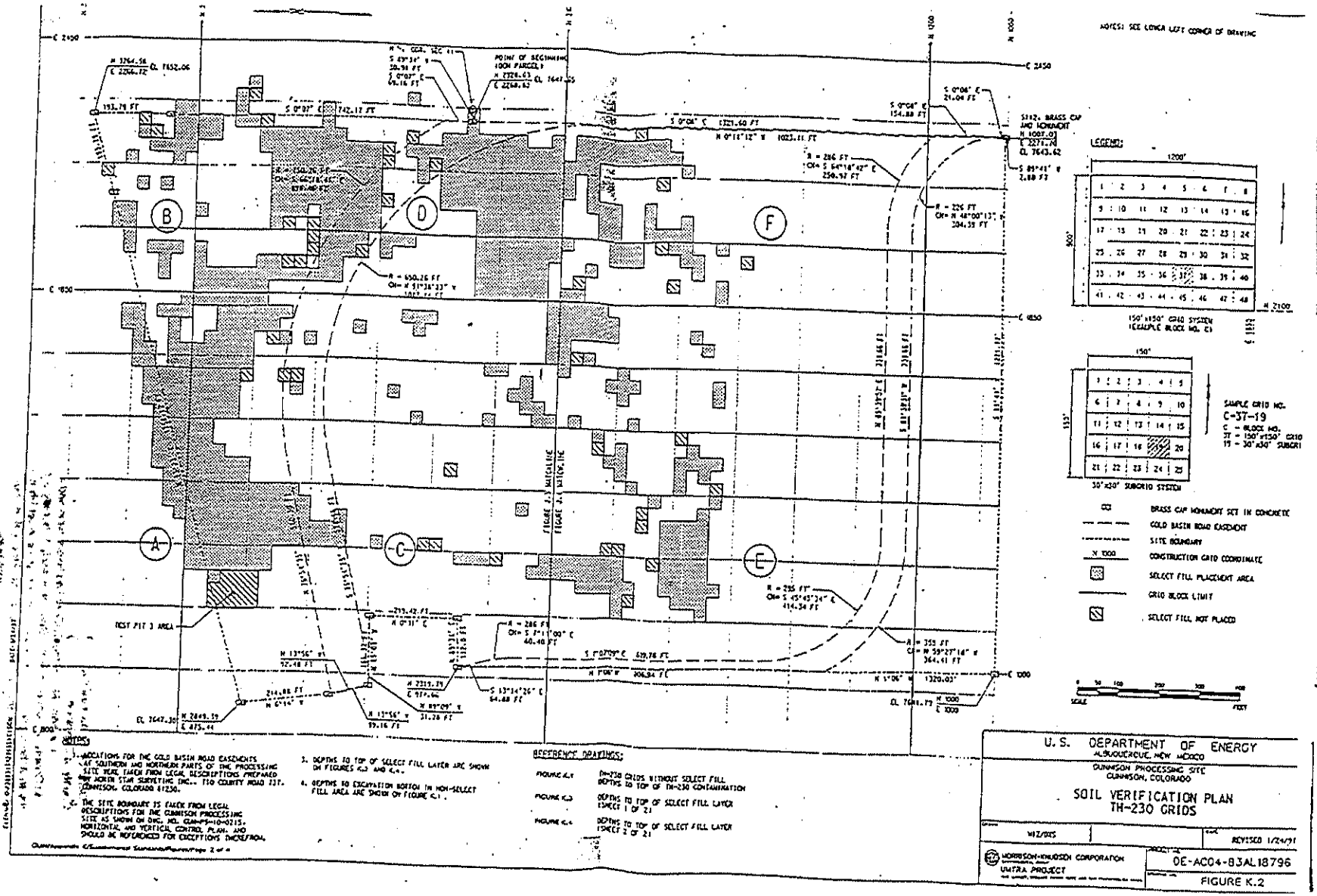
Due to the shallow depth of the water table beneath the tailings pile, complete excavation of all thorium-contaminated material was not feasible without extensive dewatering. Thus, in accordance with the EPA regulations a procedure was developed whereby thorium contamination

was left in place at depth, once the water table was reached in the excavation. Any concentration of thorium above 175 pCi/g that was to remain in place was to receive a cap layer of one foot of fine-grained backfill, called "select fill" as low in the excavation as possible, to reduce the eventual emissions of radon gas from the thorium deposits. (The value of 175 pCi/g was based on a radon emanation model that determined that after backfill, the radon escaping from a deposit of less than 175 pCi/g would be below the EPA standard for radon emanation. Any concentration greater than 175 pCi/g would need to have a cap layer that would minimize the radon emissions.) At the Gunnison site, 596 grids received the select backfill material (approximately 22,000 cubic yards of select fill were used at the site). An additional 41 grids contain thorium deposits in concentrations greater than 175 pCi/g, but are not covered by the select fill material. The locations of the thorium-containing grids are shown on the attached map. Additional information regarding the depth to the thorium deposits and the depth to the select fill is available upon request from Colorado Department of Public Health and Environment and has been provided to Gunnison County. The select fill can be visually distinguished from the general fill by its darker color and fine-grained texture (the general fill was a coarse-grained sand/gravel material).

The groundwater beneath the Gunnison Mill site remains contaminated and will be addressed during Phase II of the uranium mill tailings remedial action project. Several groundwater monitor wells are present on and downgradient of the site and will remain in place until the U.S. Department of Energy determines that they can be removed.

Any person who acquires a designated processing site shall apply for any permits, including U.S. Army Corps of Engineers Section 404 permits regarding construction in or near wetlands, as required by law.

Additional information concerning the remedial action, groundwater conditions, and thorium deposits is available from the Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division.



Appendix B

New Domestic Well Constraint Special Area—Gunnison County

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Gunnison County
COLORADO

John DeVore CHIEF EXECUTIVE OFFICER
PHONE 970.641.0248 FAX 970.641.3061
CELL 970.209.5353

November 17, 2004

Tracy Plessinger
Department of Energy
2597 B ¾ Road
Grand Junction, Colorado 81503

Dear Tracy:

Enclosed is the Resolution establishing the New Domestic Well Constraint Area for the Dos Rios area of the County. Let me know if you need anything else. Thanks for all your assistance with this project.

Sincerely,

John DeVore,
Chief Executive Officer

200 East Virginia Avenue • Gunnison, CO 81230

BOARD OF COUNTY COMMISSIONERS OF GUNNISON COUNTY
RESOLUTION NO. 59, SERIES 2004

A RESOLUTION APPROVING A SPECIAL GEOGRAPHIC AREA, THE NEW DOMESTIC WELL CONSTRAINT AREA

WHEREAS, the Gunnison County Board of Commissioners on May 25, 2004 directed its staff to initiate proceedings for the creation of a Special Geographic Area, the "New Domestic Well Constraint Special Area" in an area south of the City of Gunnison, generally known as the Dos Rios area.

WHEREAS, on June 7, 2004, the request to initiate, and proposed regulations, a report evaluating the need for the proposed designation, and a map of the boundaries of the area, titled "New Domestic Well Constraint Area" were submitted to the Planning Department, pursuant to the requirements of Section 1-110, *Process for Designation Special Areas*, of the *Gunnison County Land Use Resolution*; and,

WHEREAS, after a review of the application and all information, documentation and testimony related to it, the Gunnison County Planning Commission did, on September 3, 2004 forward a Recommendation of approval of that application with certain Findings and conditions; and

WHEREAS, having reviewed and considered the Planning Commission's recommendation, the Board makes the following Findings:

This is an established and developed residential area in which the uses require a potable water supply. That need will continue to exist for any foreseeable development in this area.

The past uranium milling activities in the area resulted in a plume of contaminated groundwater under the area.

1. This is an established and developed residential area in which the uses require a potable water supply. That need will continue to exist for any foreseeable development in this area.

2. The past uranium milling activities in the area resulted in a plume of contaminated groundwater under the area.

3. To ensure that contaminated ground water is not made available for domestic purposes, it is necessary for the public health to prohibit new domestic wells, to ensure that development can safely occur within the boundaries of the New Domestic Well Constraint Special Area, and to ensure that each property owner has access to a domestic water supply provided by the Dos Rios Water Treatment System.

4. The boundaries of the proposed area, are reasonably based upon scientific evidence that they encompass the plume of contamination and ensure protection for the source of potable water to the residents within it.

5. This review and decision incorporates, but is not limited to, all the documentation submitted to the County and included within the Planning Office file relative to this application; including the map, report, the proposed regulations, and all other exhibits, references and documents as included therein.

6. Formation of this special geographic area does not conflict with the City of Gunnison's Three Mile Plan.

7. The U.S. Department of Energy and Colorado Department of Health have contemplated alternative treatment systems, and found that the method of prohibition of new domestic wells as proposed within this special geographic area designation is the preferred alternative. Based upon the best available scientific evidence provided by, and recommendations of, both these agencies, that this alternative ensures the greatest public protection and benefit to the residents within this Special Geographic Area, the Board finds this to be in the best interest of public health, safety and welfare.

8. There are no adverse impacts contemplated to result from the formation, operation and maintenance of this special geographic area.

9. This permit is limited to the activities described within the "Project Description" of this application, and as depicted on the plans submitted as part of this application. Any uses other than those will require either an application for amendment of this permit, or submittal of an application for a new permit, in compliance with applicable requirements of the *Gunnison County Land Use Resolution.*

10. This permit may be revoked or suspended if Gunnison County determines that any material fact set forth herein or represented by the applicant was false or misleading, or that the applicant failed to disclose facts necessary to make any such fact not misleading.

11. The removal or material alteration of any physical feature of the property (geological, topographical or vegetative) relied on herein to mitigate a possible conflict shall require a new or amended land use change permit.

NOW, THEREFORE, BE IT RESOLVED by the Board of County Commissioners of Gunnison County, Colorado, that the New Domestic Well Constraint Area is hereby approved.

THIS APPROVAL is effected noting that decision documentation includes, but is not limited to the application and the entire Planning Department application file relative to this application

This approval is founded on each individual finding and requirement. Should the applicant successfully challenge any such finding or requirement, this approval if null and void.

THIS RESOLUTION AND THE APPROVAL GRANTED HEREBY shall not be effective unless and until a copy is recorded in the Office of the Clerk and Recorder of Gunnison County.

INTRODUCED by Commissioner Jim Starr, seconded by Commissioner Perry Anderson, and passed on this 8th day of November, 2004.

BOARD OF COUNTY COMMISSIONERS

Fred Field,
Chairperson

Jim Starr,
Commissioner

Perry Anderson,
Commissioner

GUNNISON COUNTY SEAL COLORADO

ATTEST:

Kelly Balch
Deputy Clerk

Gunnison County Clerk and Recorder

Dos Rios Water Constraint Area Special Geographic Area Res.wpd