U.S. Department of Energy
Grand Junction Office
2597 B¾ Road
Grand Junction, CO 81503

JUL 12 2001

Mr. Melvyn Leach, Chief
U.S. Nuclear Regulatory Commission
Fuel Cycle Licensing Branch
Division of Fuel Cycle Safety & Safeguards
Mail Stop T8A33
Washington, D.C. 20555-0001

Subject: Transmittal of the Revised *Ground Water Compliance Action Plan for the Gunnison, Colorado, UMTRA Project Site*

Dear Mr. Leach:

Enclosed are two copies of the *Ground Water Compliance Action Plan for the Gunnison, Colorado, UMTRA Project Site* for your review and approval. The document was updated and revised based on comments received from the Colorado Department of Public Health and Environment in December 2000.

If you have any questions, please contact me at 970/248-7612.

Sincerely,

Donald R. Metzler
Technical/Project Manager

Enclosures

cc w/o enclosure:
K. Hooks, NRC
W. Naugle, CDPHE
R. Heydenburg, MACTEC-ERS
S. Marutzky, MACTEC-ERS
Project File GWGUN 1.9 (P. Taylor)

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NMSS08
WM-61

U.S. Department of Energy
Grand Junction Office
2597 B¾ Road
Grand Junction, CO 81503

JUL 12 2001

Ms. Wendy Naugle
Colorado Department of Public Health and Environment
Remedial Programs Section
Hazardous Materials & Waste Management Division
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

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GJO-2001-233-TAR
MAC–GWGUN 1.9

UMTRA
Ground Water Project

Ground Water Compliance Action Plan for the Gunnison, Colorado, UMTRA Project Site

July 2001

Prepared by the
U.S. Department of Energy
Grand Junction Office

GJO-2001-233-TAR
MAC–GWGUN 1.9

Ground Water Compliance Action Plan for the Gunnison, Colorado, UMTRA Project Site

July 2001

Prepared by
U.S. Department of Energy
Grand Junction Office
Grand Junction, Colorado

Project Number UGW-511-0010-10-000
Document Number U0111300

Work Performed Under DOE Contract Number DE–AC13–96GJ87335

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Appendix A—Quit Claim Deed

1.0 Introduction

This *Ground Water Compliance Action Plan* (GCAP) presents the proposed compliance strategy for ground water cleanup at the Gunnison, Colorado uranium processing site (Figure 1). It is based on U.S. Department of Energy (DOE) evaluation of information included in the Site Observational Work Plan (SOWP) (DOE 2001a). The GCAP will serve as a stand-alone modification to the *Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site at Gunnison, Colorado* (RAP) (DOE 1992) to address ground water restoration and compliance with the U.S. Environmental Protection Agency (EPA) ground water protection standards for the Uranium Mill Tailings Remedial Action (UMTRA) Project Title I sites. The GCAP will be the U.S. Nuclear Regulatory Commission (NRC) concurrence document for compliance with Subpart B of 40 CFR 192 for the Gunnison processing site.

The proposed compliance strategy for the Gunnison site is based on the compliance strategy selection framework following the steps presented in the *Final Programmatic Environmental Impact Statement for the Uranium Mill Tailings Remedial Action Ground Water Project* (PEIS) (DOE 1996) (Figure 2). National Environmental Policy Act issues and environmental concerns are addressed in the Environmental Assessment (DOE 2001b), and this information will be made available to public officials and citizens in the area for their review and comment.

2.0 Ground Water Compliance

To achieve compliance with Subpart B of 40 CFR 192, the DOE proposed action is natural flushing in conjunction with institutional controls (ICs) and continued monitoring. Ground water flow and transport modeling has predicted that site-related concentrations of uranium in ground water in the uppermost aquifer beneath and downgradient from the site will decrease to below the maximum concentration limit (MCL) for uranium within 100 years (Section 5.4 and Appendix H, DOE 2001a). ICs will be maintained and verified during the flushing period. This compliance strategy will be protective of human health and the environment. This proposed action has been determined by applying the compliance strategy selection framework from the PEIS, consisting of several evaluative steps that are discussed below.

2.1 Assessment of Environmental Data

The first step in the decision process was an assessment of both historical and new environmental data collected to characterize hydrogeological conditions and the extent of ground water contamination related to uranium processing activities at the site. Ground water occurs under unconfined conditions in the alluvial aquifer (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 through gravel, with cobbles and occasional boulders. The thickness of the alluvium ranges from 70 to 130 ft. Ground water 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. The average linear ground water velocity ranges from 1.9 to 3.2 ft/day. Ground water in the alluvial aquifer system is recharged by ground water 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. Ground water is discharged naturally to adjacent streams and by the gravel pit dewatering operations south of the site.

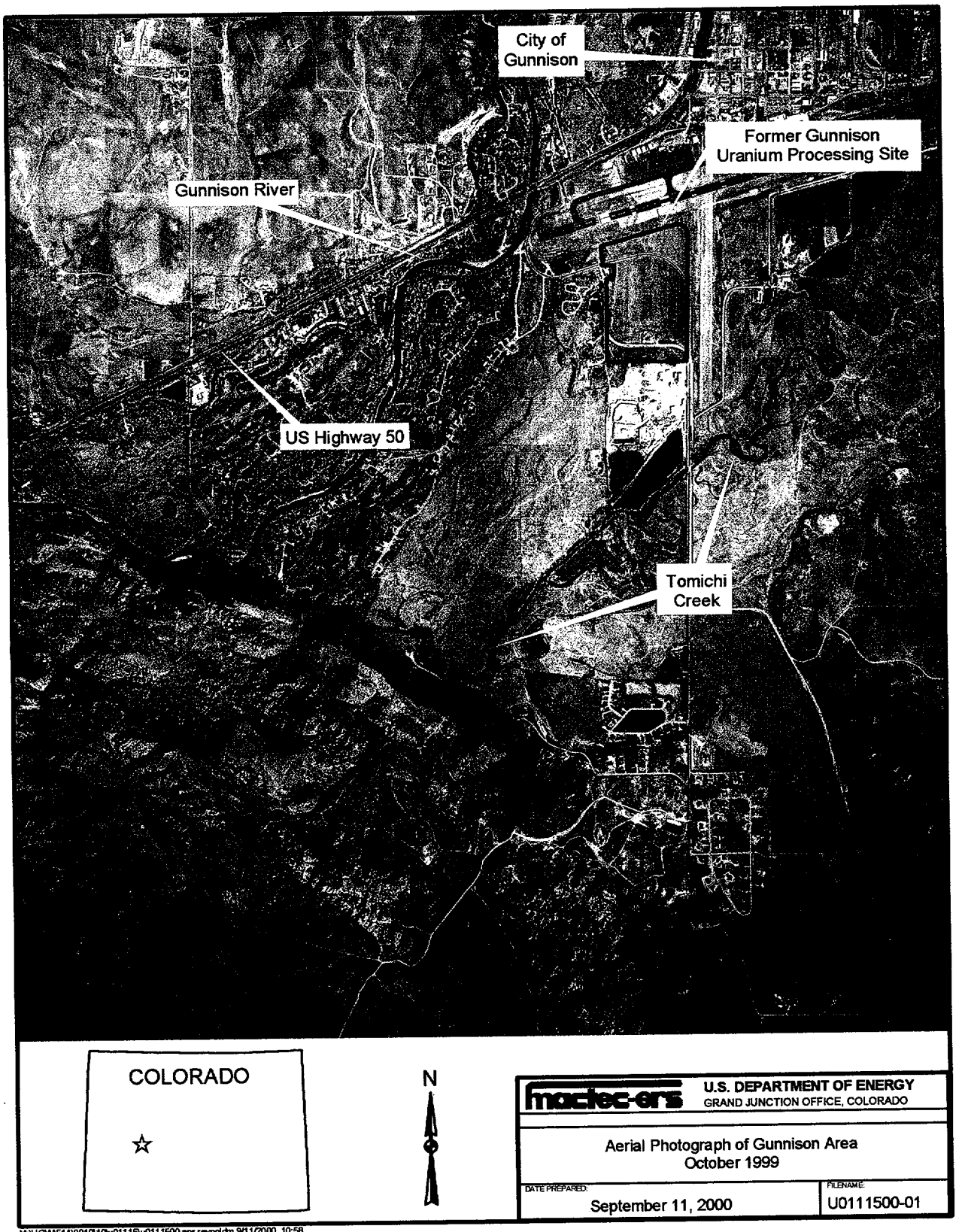

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Figure 1. Aerial Photograph of the Gunnison Area, October 1999

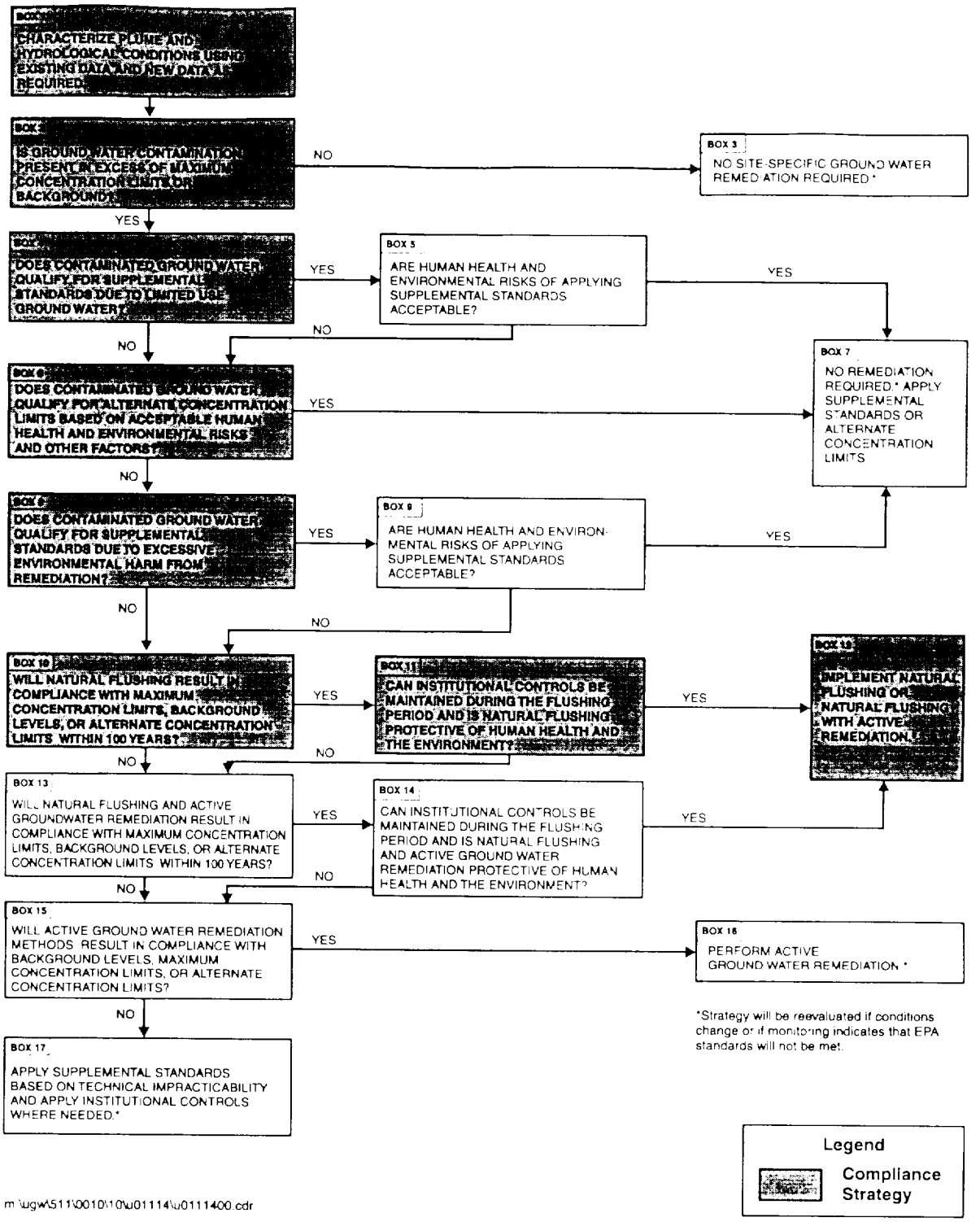


Figure 2. Compliance Strategy

2.2 Ground Water Contaminants

Ground water in the alluvial aquifer beneath and downgradient from the Gunnison site was contaminated by uranium processing activities. Residual radioactive material beneath the site was cleaned up to just below the water table with some contaminated material left in place. Clean fill was placed above these areas to prevent radiation from emanating to the surface. Uranium is the primary constituent of potential concern (COPC) in ground water with concentrations up to 1.0 milligram per liter (mg/L) beneath the site and exceeding the uranium MCL of 0.044 mg/L several thousand feet downgradient from the site boundary (Figure 3). Concentrations of uranium in ground water 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 becomes more dilute and migrates deeper into the aquifer as it progresses in a southwesterly direction, therefore there are no affects on shallow wells or surface water. Manganese is also a COPC in ground water with concentrations up to 19 mg/L beneath the site (Figure 4). There is no MCL for manganese, but an acceptable human health risk-based level is 1.7 mg/L (Section 6.1 of the SOWP, DOE 2001). Manganese does not appear to be widespread in the aquifer and concentrations beneath the site are decreasing.

2.3 Applicability of Natural Flushing

A ground water flow and transport model was developed to evaluate if natural processes will reduce site-related uranium concentrations to regulatory levels in the alluvial aquifer within 100 years. Only uranium was modeled as it appears to be the most representative and wide-spread of site-related contamination in ground water. Results of the modeling are summarized below and details are presented in Section 5.4 and Appendix H of the SOWP (DOE 2001a).

Two different versions of the model were developed to address conditions in the vicinity of 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 cleanup 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 modeling effort, with maximum average concentrations 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%) that the maximum concentration will be greater than the standard over an insignificant area of the alluvial aquifer (Figure 5).

Based on modeling results, natural flushing appears to be an acceptable compliance strategy that allows natural processes to reduce the ground water contaminants to 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 ground water may be above the standard over an insignificant 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 institutional controls, and the existence of the water supply system installed in 1994 that eliminated the only potential pathway (which was ingestion of contaminated ground water 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 ground water at the site for a period of time (10 to 20 years) will provide data to verify the modeling predictions, ascertain that natural

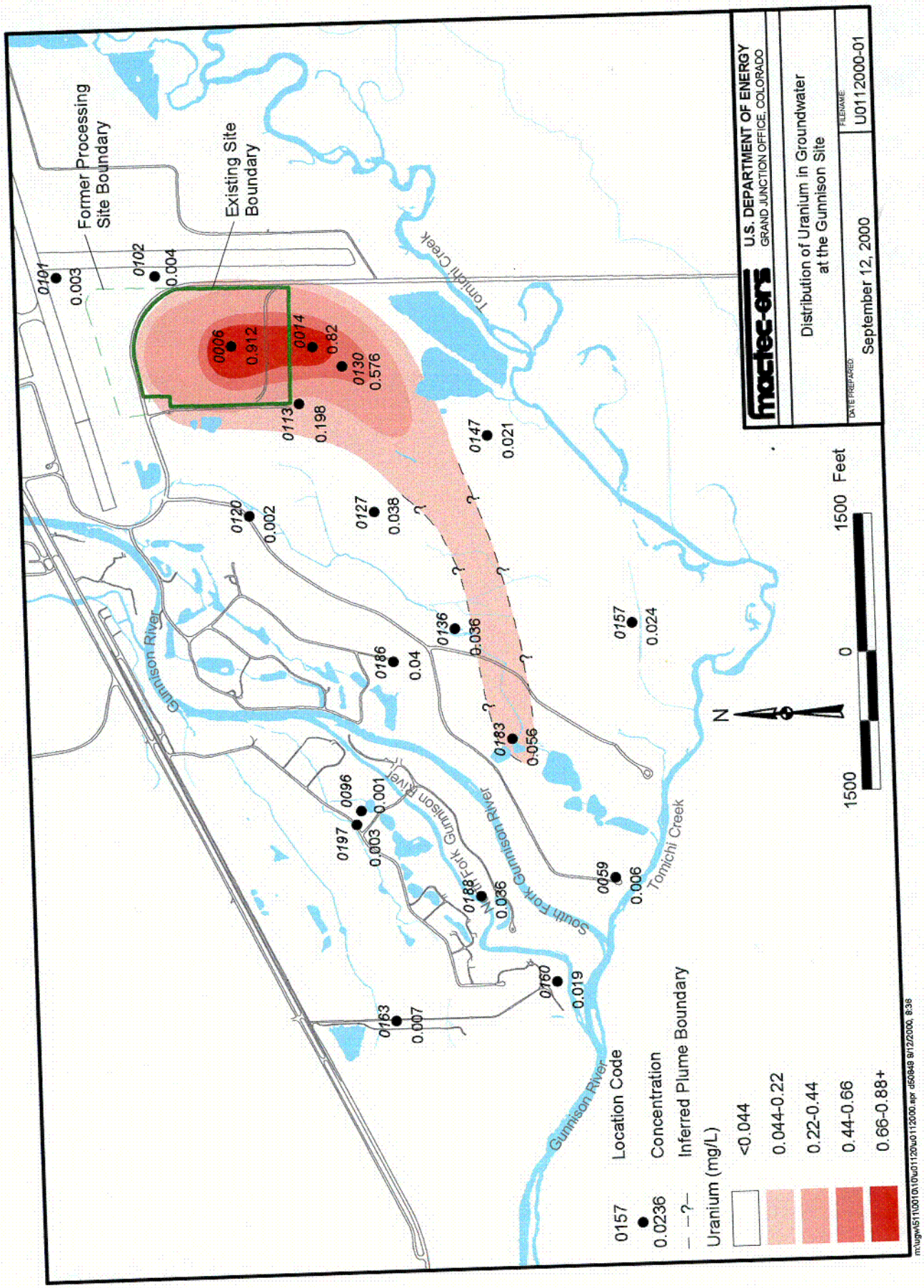


Figure 3. Distribution of Uranium in Ground Water at the Gunnison Site (1999)

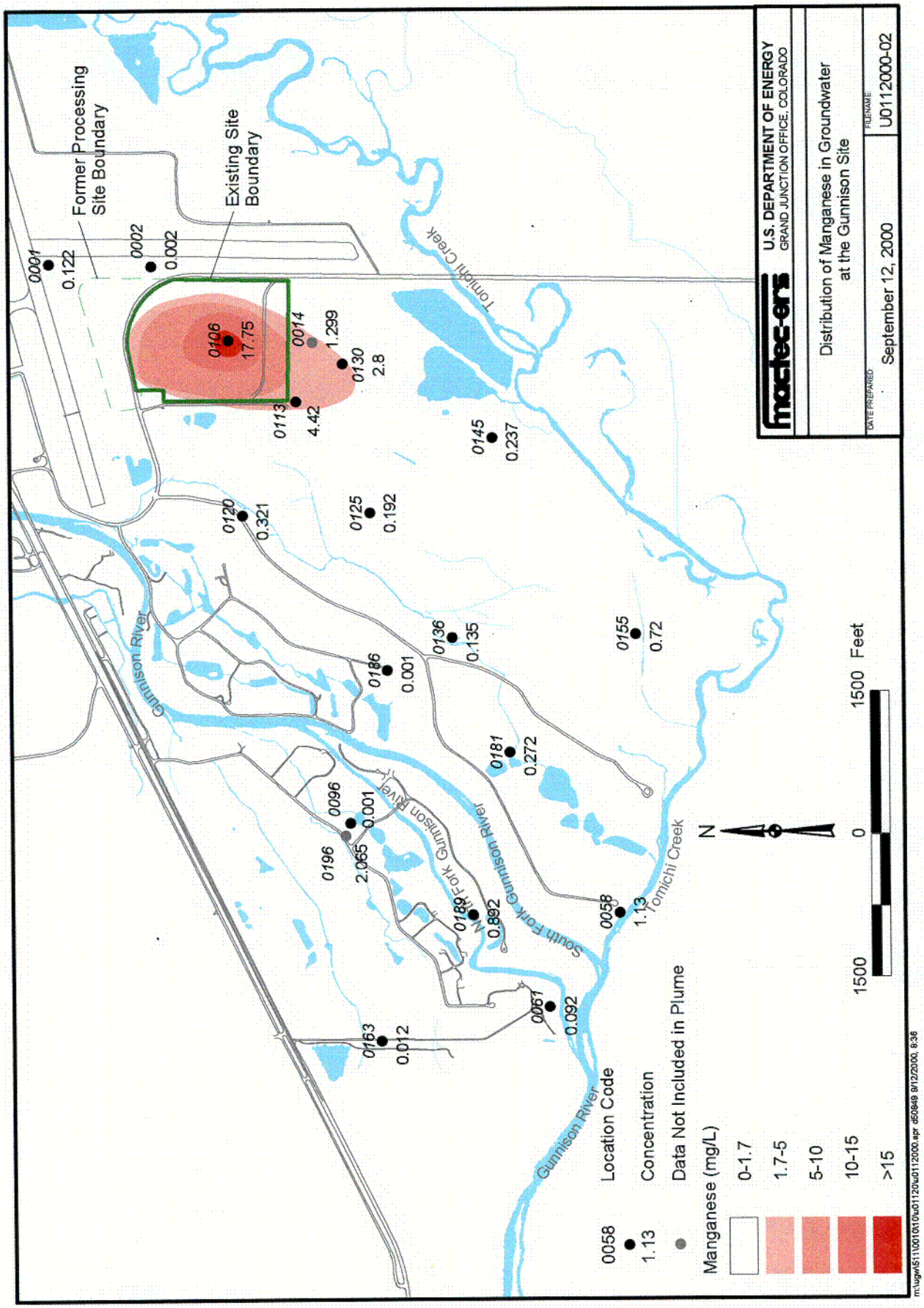


Figure 4. Distribution of Manganese in Ground Water at the Gunnison Site (1999)

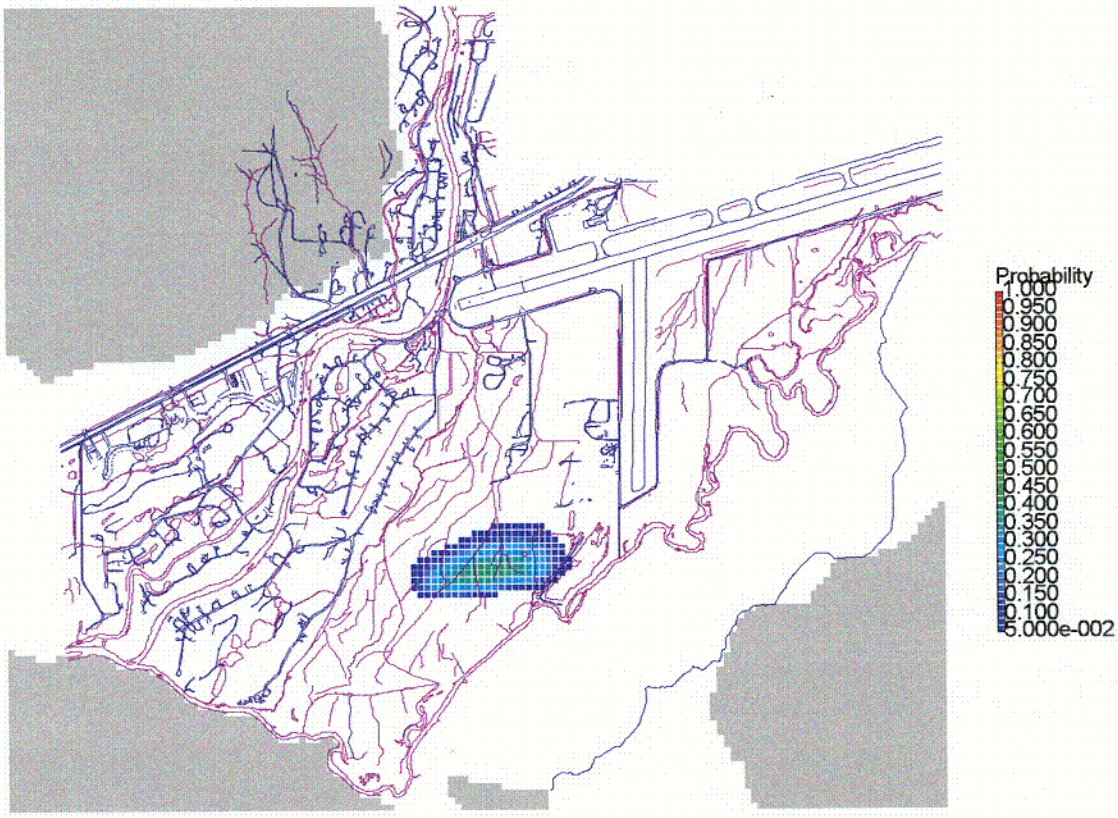


Figure 5. Probability of Uranium Concentration Exceeding the UMTRA Project Standard at 100 Years (200 simulations)

flushing is meeting compliance expectations, and ensure protection of human health and the environment, and (4) contingency remedies will be considered and implemented in the event that the selected compliance strategy is not effective in meeting cleanup objectives within a timely manner.

2.4 Institutional Controls

ICs are restrictions that effectively protect public health and the environment by limiting access to a contaminated medium—alluvial ground water at the Gunnison site. ICs typically depend on an administrative legal action, such as zoning, ordinances, and laws to ensure that protection is effective and enforceable. For the UMTRA Ground Water Project, ICs reduce exposure to contaminated ground water or reduce health risks by (1) preventing intrusion into contaminated ground water or (2) restricting access to or use of contaminated ground water for unacceptable purposes. The EPA standards require that ICs (1) have a high degree of permanence, (2) protect human health and the environment, (3) satisfy beneficial uses of ground water, (4) are enforceable by administrative or judicial branches of government entities, and (5) can be effectively maintained and verified. The EPA standards permit the use of ICs at sites where natural flushing will return the ground water to regulatory levels within 100 years.

To "provide an effective and enforceable means of ensuring the conduct of any required maintenance, monitoring, or operation, and of restricting future uses of the land, including placing restrictions on drilling for or pumping ground water for as long as any residual contamination remains hazardous," the State of Colorado passed into law Senate Bill 01-145. This law compels the Colorado Department of Public Health and Environment (CDPHE) to enter into an intergovernmental agreement with local municipalities to oversee and monitor any instrument that restricts the use of land or ground water because of contamination left in place or other environmental concerns. The instruments, such as ordinances, deed restrictions and restrictive easements, will be recorded with the appropriate municipality as environmental covenants, will follow the property deed, and are binding on future owners of the property. The law requires that all plans for construction or drilling on property with an environmental covenant must receive concurrence from CDPHE to ensure that the proposed actions do not violate the restrictions in the covenant. Should any violation of the environmental covenant occur, the State may bring suit against the owner or violator of the covenant. This law provides assurance that the ICs established for the Gunnison site are in effect and will be enforced for the entire period of natural flushing.

2.4.1 On-site ICs

ICs are in place at the former millsite through deed restrictions that became effective when the State of Colorado transferred ownership to Gunnison County in December 1999 (Appendix A). The restrictions prohibit use of contaminated ground water and control excavation of contaminated soil. The deed contains the following language:

"Grantee (Gunnison county) covenants ... (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 (Colorado Department of Public Health and Environment) and the U.S. Department of Energy."

This language establishes an environmental covenant and ensures that any future landowner is subject to the same restrictions. The site is within the service area of the Dos Rios water system, so future users have a source of domestic water available.

2.4.2 Off-site ICs

Results of ground water sampling downgradient from the former processing site from July through October 1990 indicated that 22 domestic wells contained concentrations of uranium in excess of background levels. Most of these wells were located in the Dos Rios subdivision and are screened in the shallow alluvial aquifer. Since the elevated levels were related to uranium processing activities at the site, DOE began supplying bottled water to those residences in August 1990. DOE also investigated funding a permanent water supply system for this area. Construction of the water supply system occurred from 1992 to 1994. By July 1994, most residents had hooked up to the alternate water supply system, and the facility was turned over to the Gunnison County Public Works Department. Water is taken from the west side of the Gunnison River just south of U.S. Highway 50 into the 350 gallons per minute water treatment plant, and then stored in a 250,000 gallon water storage tank located just north of U.S. Highway 50. The water distribution system extends from U.S. Highway 50 on the north, toward Tomichi Creek on the south, from Gold Basin Road on the east, to Que Quay Lane on the west. According to the Director of the Gunnison County Public Works Department, the water

system has the capacity for expansion to cover any anticipated growth in demand in the vicinity (DOE 2001a).

DOE is working with Gunnison County to develop an ICs program to ensure implementation of an administrative mechanism that can be enforced, verified, and maintained. The mechanism under consideration is a Gunnison County ordinance within an ICs boundary that will prohibit using untreated ground water for drinking water purposes. Figure 6 reflects a proposed ICs boundary based on conservative estimates of plume movement and definable geographic boundaries. The final ICs boundary will be negotiated with Gunnison County to provide a functional configuration. The ICs boundary will be reduced over time as the plume decreases in size. Enforcement of the ICs program will be provided by Colorado law.

2.5 Human Health and Environmental Risk

There are no unacceptable risks to human health and the environment associated with current and projected conditions in the vicinity of the Gunnison site as long as ICs can be maintained (see Section 6.0 of the SOWP, DOE 2001a). Current use of ground water at the Valco, Inc. operation presents no unacceptable risk. Consequently, the proposed compliance strategy of natural flushing in conjunction with ICs and continued monitoring will be protective of human health and the environment.

3.0 Implementation

Implementation of the proposed compliance strategy includes ICs and continued monitoring of ground water and surface water.

3.1 Institutional Controls

Gunnison County owns the water distribution system that provides drinking water to the area potentially affected by site-related contaminants. DOE is working with Gunnison County to formalize a requirement that all current and future residents in the area connect to the system. This requirement will become an enforceable administrative IC by means of a county ordinance. Any future water resource needs in the area will be regulated by Gunnison County.

The need for and duration of ICs depends on the compliance strategy selected for a site, the level of risk to humans and the environment, and existing site conditions. Movement of contaminated ground water may require restrictions over an extended period of time, not to exceed 100 years. As risks decrease over time, so should the need for ICs. Therefore, to ensure protection of human health and the environment, and to satisfy requirements for beneficial uses of the water, the ICs program will be verified by CDPHE and modified as necessary.

3.2 Monitoring

Monitoring of ground water and surface water will be implemented during the period of natural flushing to verify modeling results, ascertain that concentrations of uranium and manganese in ground water are decreasing, and ensure protection of human health and the environment (Figures 7 and 8 and Table 1). The concentration versus time plots in Figure 8 were made from a

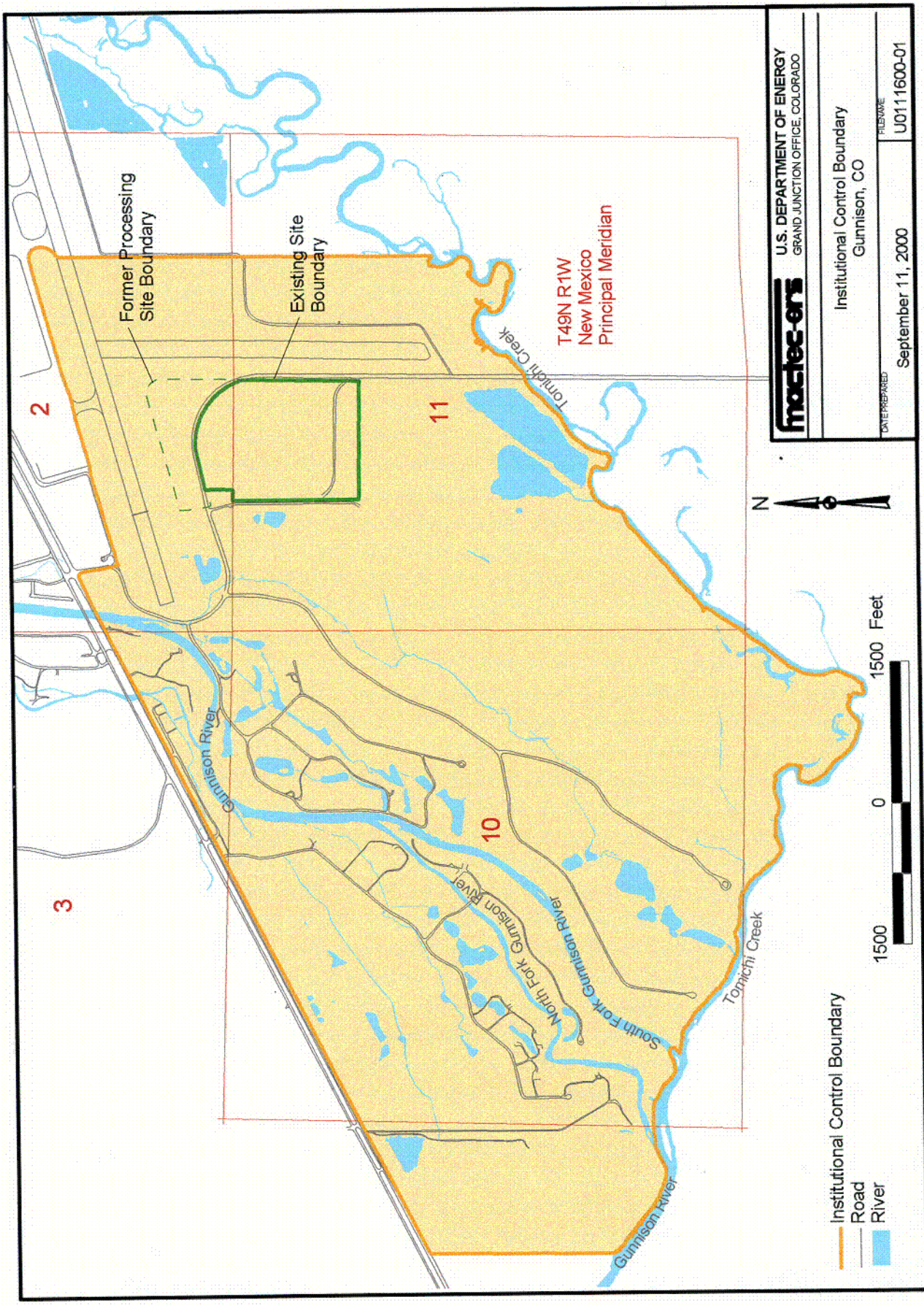


Figure 6. Proposed Institutional Control Boundary, Gunnison, Colorado

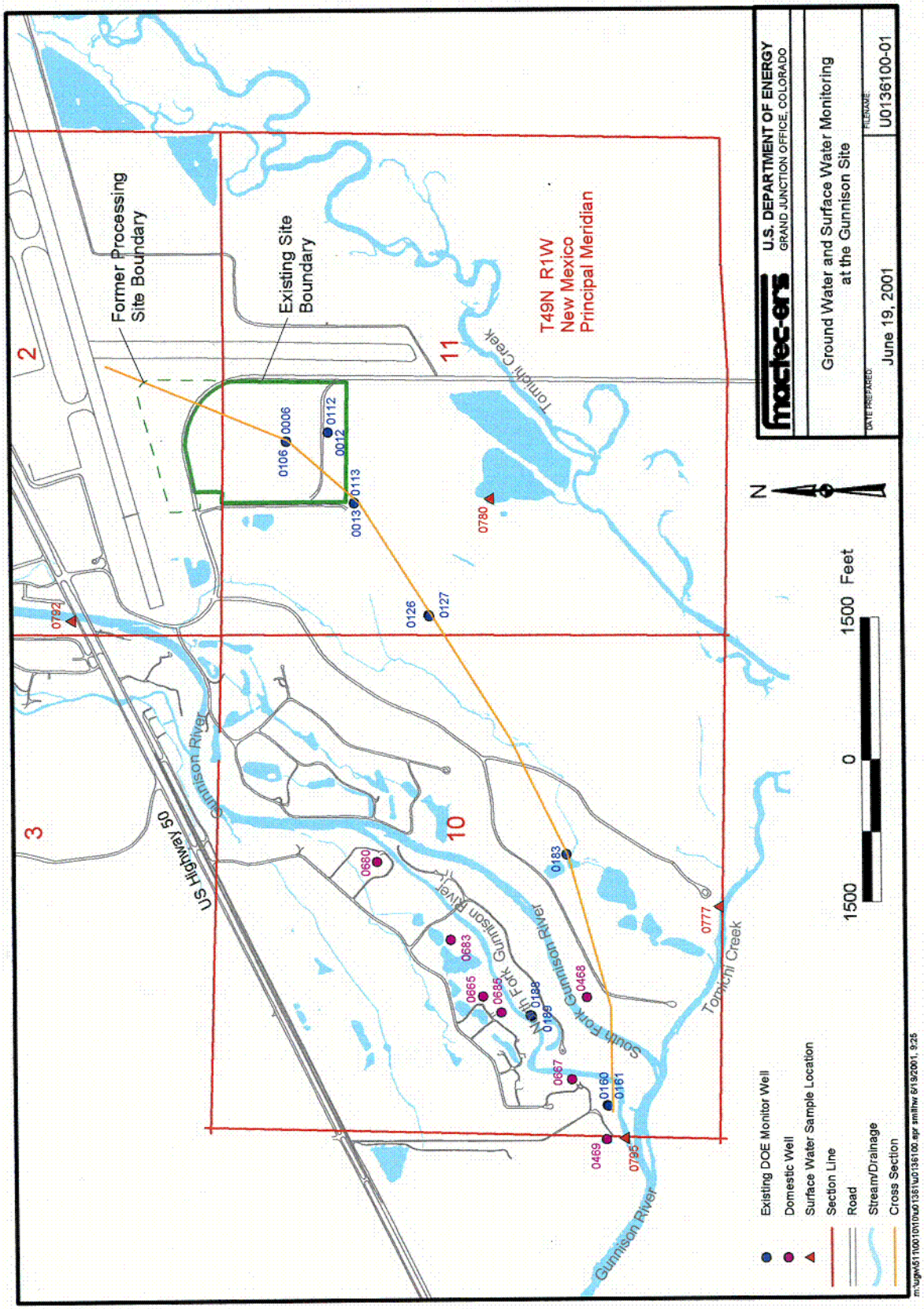
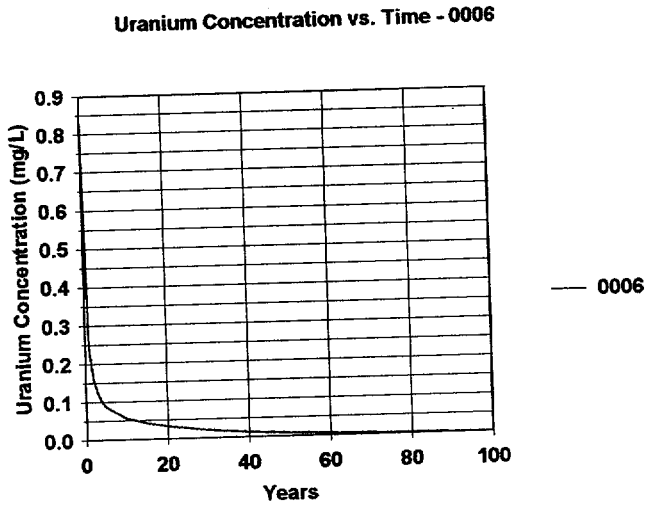
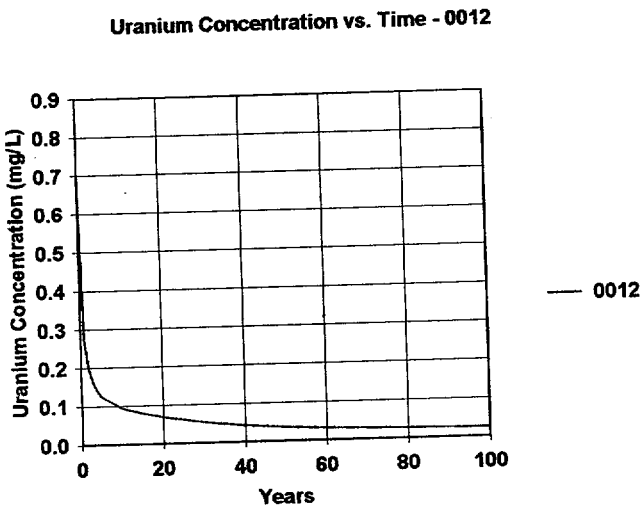


Figure 7. Ground Water and Surface Water Monitoring at the Gunnison Site





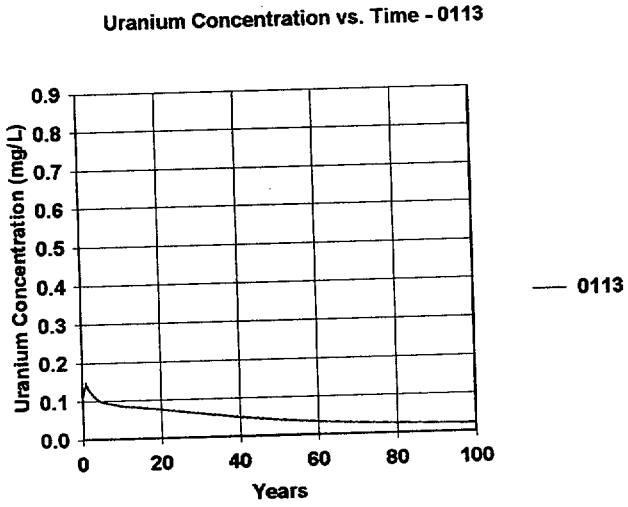


Figure 8. Predicted Uranium Concentration Versus Time

single steady state deterministic simulation. Therefore, it is not possible to calculate confidence limits about the line showing the expected decrease in concentration with time. It would be possible to calculate confidence limits with stochastic simulations, but no observation points were used in the stochastic simulations. However, since the average stochastic simulation results are similar to the deterministic results, concentration versus time plots made from the stochastic simulation would also be similar to the deterministic plots.

Ground water in the shallow zone of the alluvial aquifer will be sampled on-site in monitor wells 006 and 012 which have the highest concentration of uranium. Ground water in the intermediate zone at these two locations will also be monitored in offset monitor wells 106 and 112 to verify that uranium concentration remains below background levels at this depth in the aquifer. Ground water in the shallow and intermediate zones in monitor wells 013 and 113, just off the southwest corner of the site, will be sampled. Concentration of uranium in both wells is decreasing with higher concentration in well 113 indicating that contamination is migrating deeper into the aquifer as it goes downgradient. Monitor wells 126 and 127 are 1,500 ft downgradient from the site and are just beyond the area where uranium concentration is above the MCL. Concentration of uranium is higher in the deeper zone of the aquifer, and is decreasing with time in both intervals. Concentration of uranium is above the MCL in the deep zone in monitor well 183 and is still increasing, indicating migration of the plume through this area. Concentration of uranium in the intermediate and deep zones in monitor wells 160, 161, 188, and 189 is below the MCL, but is still increasing, again indicating migration of the contaminant plume through this area. Monitoring ground water at these locations will provide adequate information to assess the effectiveness of natural flushing, and to ensure that concentrations of uranium do not significantly increase downgradient to the point of potentially impacting human health and the environment. Concentrations of manganese in these areas are generally decreasing with time. Surface water locations have been selected to verify that uranium concentrations remain very low in the Gunnison River and Tomichi Creek and to track concentrations in the gravel pit on the Valco, Inc. property south of the site. Monitoring of ground water from six domestic buffer zone wells will be continued as a best management practice to ensure that any changes in water quality will not impact the few residents northwest of the Gunnison River that still use shallow alluvial ground water as a drinking water source (Figure 7 and Table 1). One domestic irrigation well will also be monitored with the same objective.

COPCs to be analyzed in ground water include uranium and manganese. The MCL for uranium is 0.044 mg/L, and an acceptable human health risk-based level for manganese is 1.7 mg/L. General water quality indicators including alkalinity, conductivity, pH, total dissolved solids, sulfate, and temperature will also be determined during sampling. Statistical methods for evaluation of ground water and surface water monitoring data will be used as appropriate to assess variations in concentrations of COPCs over time. Results of monitoring will be compiled periodically and reports will be available to regulators.

Monitoring will take place on an annual basis for the first 10 years (through 2012). At the end of the initial 10-year monitoring period, an evaluation will be made in consultation with the NRC and State of Colorado to determine the monitoring requirements and frequency until completion of natural flushing. It is likely that monitoring will take place every 5 years after the initial period. The monitoring program will continue until remediation objectives have been achieved. If it is determined that the natural flushing strategy is not progressing as predicted, the compliance strategy will be reevaluated.

Monitor wells not required as part of the monitoring network will be abandoned according to applicable State of Colorado regulations and UMTRA Project procedures. Abandonment will be done by the Long Term Surveillance and Maintenance (LTSM) Program.

Table 1. Ground Water and Surface Water Monitoring, Gunnison, Colorado, Site

Monitor Well	Aquifer Zone	Screened Interval	Location	Rationale (Uranium)
Ground Water				
GUN–006	Shallow	10-15	On-site	"Hot spot"
GUN–106	Intermediate	34-39	On-site	Background
GUN–012	Shallow	10-15	On-site	"Hot spot"
GUN–112	Intermediate	40-45	On-site	Background
GUN–013	Shallow	11-16	Just off-site	Above MCL
GUN–113	Intermediate	41-46	Just off-site	Above MCL
GUN–126	Intermediate	54-59	Downgradient	Below MCL
GUN–127	Deep	94-99	Downgradient	Below MCL
GUN–183	Deep	93-98	Beneath golf course	Above MCL
GUN–188	Intermediate	53-58	West of Gunnison River	Above background
GUN–189	Deep	93-98	West of Gunnison River	Above background
GUN–160	Intermediate	51-56	West of Gunnison River	Above background
GUN–161	Deep	93-98	West of Gunnison River	Above background
Surface Water				
GUN–777			Tomichi Creek	Downstream
GUN–780			Valco, Inc. gravel pit	Above MCL
GUN–792			Gunnison River	Upstream
GUN–795			Gunnison River	Downstream
Domestic Wells				
GUN–468	Shallow	Unknown	East of Gunnison River	Buffer zone
GUN–469	Shallow	Unknown	West of Gunnison River	Buffer zone
GUN–665	Shallow	Unknown	West of Gunnison River	Buffer zone
GUN–667	Shallow	Unknown	West of Gunnison River	Buffer zone
GUN–680	Shallow	Unknown	West of Gunnison River	Buffer zone
GUN–683	Shallow	Unknown	West of Gunnison River	Buffer zone
GUN–685	Shallow	Unknown	West of Gunnison River	Buffer zone

3.3 Confirmation Report

Upon regulatory concurrence with the Gunnison GCAP, the verification monitoring period will commence. This phase should continue through 2007. At that time, actual ground water monitoring results will be compared with modeling predictions and the effectiveness of the natural flushing compliance strategy will be assessed. If actual ground water conditions in the vicinity of the site are reasonably comparable with the modeling predictions, the Confirmation Report will be prepared. At that point (2008), the site will be turned over to the LTSM Group for long-term management activities.

3.4 Certification Report

On completion of natural flushing, a certification report will be prepared for state, NRC, and local government concurrence. This report will be the final close-out document. Monitoring and ICs will be discontinued at this time.

4.0 References

U.S. Department of Energy (DOE), 1992. *Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site at Gunnison, Colorado*, UMTRA-DOE/AL-050508.0000.

_____, 1996. *Final Programmatic Environmental Impact Statement for the Uranium Mill Tailings Remedial Action Ground Water Project*, Vol. I, DOE/EIS-0198.

_____, 2001a. *Final Site Observational Work Plan for the Gunnison, Colorado, UMTRA Project Site*, GWGUN 1.1, Document Number U01024.

_____, 2001b. *Environmental Assessment of Ground Water Compliance at the Gunnison, Colorado UMTRA Project Site*, Draft Document Number U0111900.

Appendix A

Quit Claim Deed

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Reception . 1 of 5 R 0.00 D 0.00 N 0.00 Gunnison County Recorder

RECEIVED
DEC 30 1999
HAZARDOUS MATERIALS
AND WASTE MANAGEMENT

QUIT CLAIM DEED

The Colorado Department of Public Health and the Environment ("Grantor"), whose address is 4300 Cherry Creek Drive South, Deriver, 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, reservatinn 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. } ss.
County of Denver

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. _____

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, $ _____

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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.

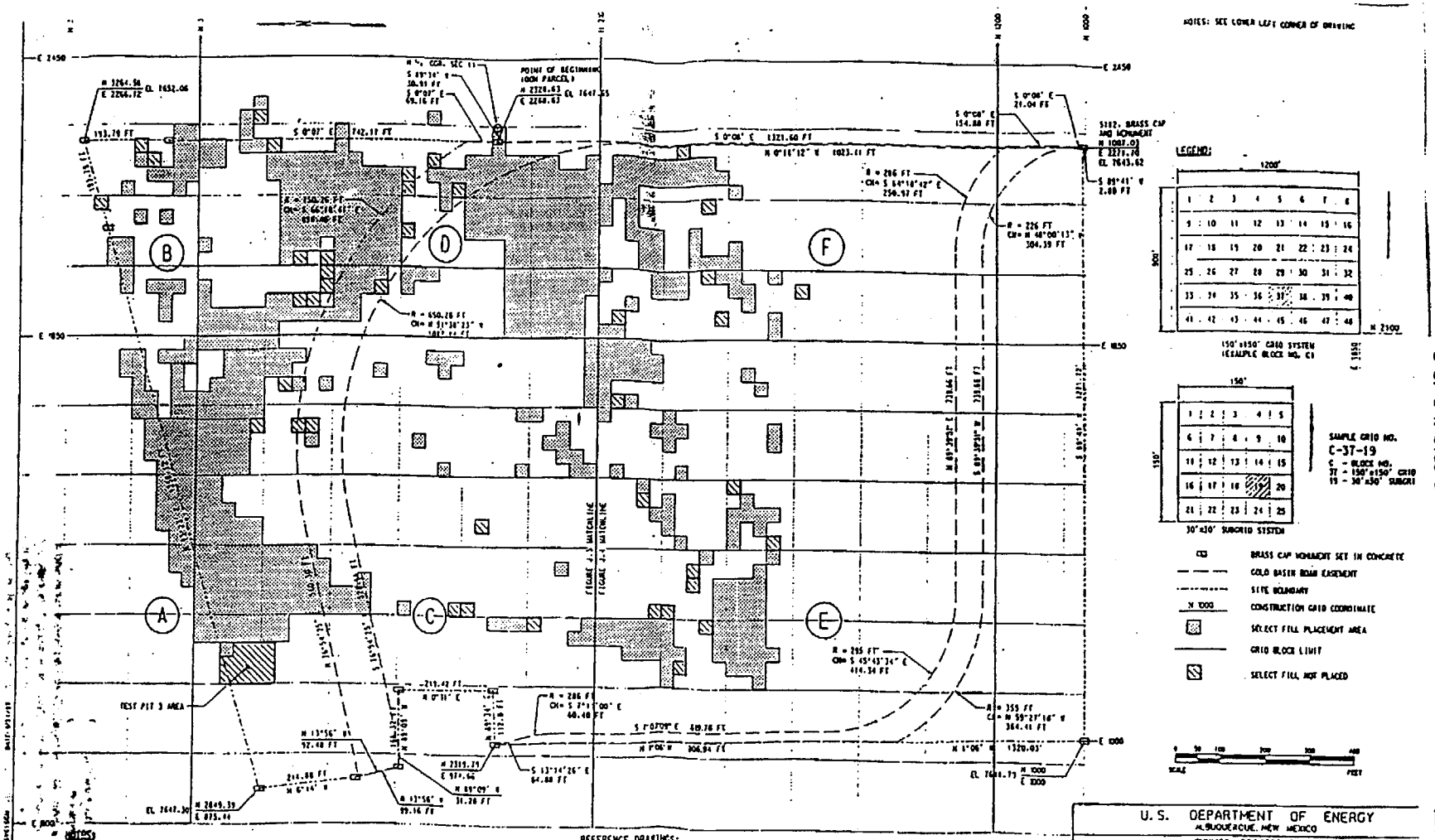
Due to the shallow depth of the water table beneath the tailings pile, complete excavation of all thorium-contaminated material was not feasible without extensive dewatering. Thus, in accordance with the EPA regulations a procedure was developed whereby thorium contamination

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.



NOTES:

1. LOCATIONS FOR THE COLD BASIN ROAD EASEMENTS AT SOUTHERN AND NORTHERN PARTS OF THE PROCESSING SITE WERE TAKEN FROM LEGAL DESCRIPTIONS PREPARED BY NORTH STAR SURVEYING INC., 710 COUNTY ROAD 137, GUNNISON, COLORADO 81230.
2. THE SITE BOUNDARY IS TAKEN FROM LEGAL DESCRIPTIONS FOR THE GUNNISON PROCESSING SITE AS SHOWN ON DWG. NO. GUN-PS-10-0115-HORIZONTAL AND VERTICAL CONTROL PLAN, AND SHOULD BE REFERENCED FOR EXCEPTIONS THEREFROM.
3. DEPTHS TO TOP OF SELECT FILL LAYER ARE SHOWN ON FIGURES K.3 AND K.4.
4. DEPTHS FO EXCAVATION BOTTOM IN NON-SELECT FILL AREA ARE SHOWN ON FIGURE K.1.

REFERENCE DRAWINGS:

FIGURE K.1	TH-230 GRIDS WITHOUT SELECT FILL DEPTHS TO TOP OF TH-230 CONTAMINATION
FIGURE K.3	DEPTHS TO TOP OF SELECT FILL LAYER (SHEET 1 OF 2)
FIGURE K.4	DEPTHS TO TOP OF SELECT FILL LAYER (SHEET 2 OF 2)

U.S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

GUNNISON PROCESSING SITE
GUNNISON, COLORADO

SOIL VERIFICATION PLAN
TH-230 GRIDS

WIZ/DXS | REVISED 1/24/91

MORRISON-KNUDSEN CORPORATION
UMTRA PROJECT

DE-AC04-83AL18796

FIGURE K.2

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