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United States Department of Energy

LONG-TERM SURVEILLANCE PLAN FOR THE MAYBELL, COLORADO DISPOSAL SITE

December 1997

Uranium Mill Tailings Remedial Action Project

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Prepared for
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Environmental Restoration Division
UMTRA Project Team
Albuquerque, New Mexico

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF PLATES

LIST OF TABLES

LIST OF ACRONYMS

Acronym	Definition
BMP	best management practice
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
LTSP	long-term surveillance plan
MCL	maximum concentration limit
NRC	U.S. Nuclear Regulatory Commission
POC	point of compliance
QA	quality assurance
RAP	remedial action plan
TAC	Technical Assistance Contractor
UMTRA	Uranium Mill Tailings Remedial Action

CHANGE HISTORY

Document version	Date	Pages/comments
Rev. 0	September 1997	Initial version prepared for DOE and NRC review.
Rev. 0, Ver. 2	December 1997	Response to DOE review comments.

1.0 PURPOSE AND SCOPE

This long-term surveillance plan (LTSP) describes the U.S. Department of Energy's (DOE) long-term care program for the Uranium Mill Tailings Remedial Action (UMTRA) Project Maybell disposal site in Moffat County, Colorado.

The U.S. Nuclear Regulatory Commission (NRC) has developed regulations for the issuance of a general license for the custody and long-term care of UMTRA Project disposal sites in 10 CFR Part 40. The purpose of this general license is to ensure that the UMTRA Project disposal sites are cared for in a manner that protects the public health and safety and the environment. Before each disposal site is licensed, the NRC requires the DOE to submit a site-specific LTSP. The DOE prepared this LTSP to meet this requirement for the Maybell disposal site. The general license becomes effective when the NRC concurs with the DOE's determination that remedial action is complete for the Maybell site and the NRC formally accepts this LTSP.

This document describes the long-term surveillance program the DOE will implement to ensure the Maybell disposal site performs as designed. The program is based on site inspections to identify threats to disposal cell integrity. The LTSP is based on the UMTRA Project long-term surveillance program guidance document (DOE, 1996a) and meets the requirements of 10 CFR §40.27(b) and 40 CFR §192.03.

2.0 FINAL SITE CONDITIONS

2.1 SITE HISTORY

The Maybell site was established by the Trace Element Corporation in 1955. After Umetco assumed control of the site, milling operations began in 1957 using uranium ore from nearby open pit mines. During the 7 years of operation by Umetco, the mill processed approximately 2.6 million tons of ore. After the mill shut down in November 1964, Umetco dismantled it and began stabilizing the tailings in 1971 in accordance with Colorado regulations.

The DOE began constructing the disposal cell in 1995. The existing tailings were left in place, but reshaped. Windblown contaminated material and other residual radioactive materials (such as contaminated demolition debris, soil, and vicinity property materials) were placed on top of the existing tailings. Cell construction was completed in 1998 with the placement of a radon/infiltration barrier and frost and erosion protection layers.

2.2 GENERAL DESCRIPTION OF THE SITE VICINITY

The Maybell site is approximately 25 miles (mi) (40 kilometers [km]) west of Craig, Colorado, in Moffat County (Figure 2.1). The site is 5 mi (8 km) north of the Yampa River. Running east-west, U.S. Highway 40 is approximately 2 mi (3 km) south of the site (Figure 2.2). The small town of Maybell is about 5 road mi (8 km) southwest of the site. The nearest residence is 2.9 mi (4.7 km) southwest of the site. The area is relatively flat with some low, flat-topped mesas.

The UMTRA Maybell disposal cell is located in a mining district, which contains numerous abandoned uranium mines. Rob Pit is approximately 2000 feet (ft) (610 meters [m]) west of the Maybell disposal cell. Rob Pit is currently a large open hole with standing water at the bottom. Johnson Pit is approximately 1000 ft (305 m) south of the Maybell cell. Johnson Pit has been partially backfilled with mine overburden soil and rock. Several reclaimed and unreclaimed overburden piles are located in the area of the Maybell site. A heap leach pile is located approximately 0.75 mi (1.2 km) to the west.

The climate in the vicinity of the Maybell disposal cell is semiarid. The average annual precipitation in the town of Maybell is 11.7 inches (29.7 centimeters [cm]) and is distributed relatively uniformly throughout the year. The snowfall accumulation is approximately 65 inches (170 cm) per year and generally does not result in rapid runoff. Data from the airport in Craig, Colorado, show the prevailing winds are from the west-southwest, and to a lesser degree from the east-northeast. The prevailing wind at the tailings pile is easterly (URS Company, 1976).

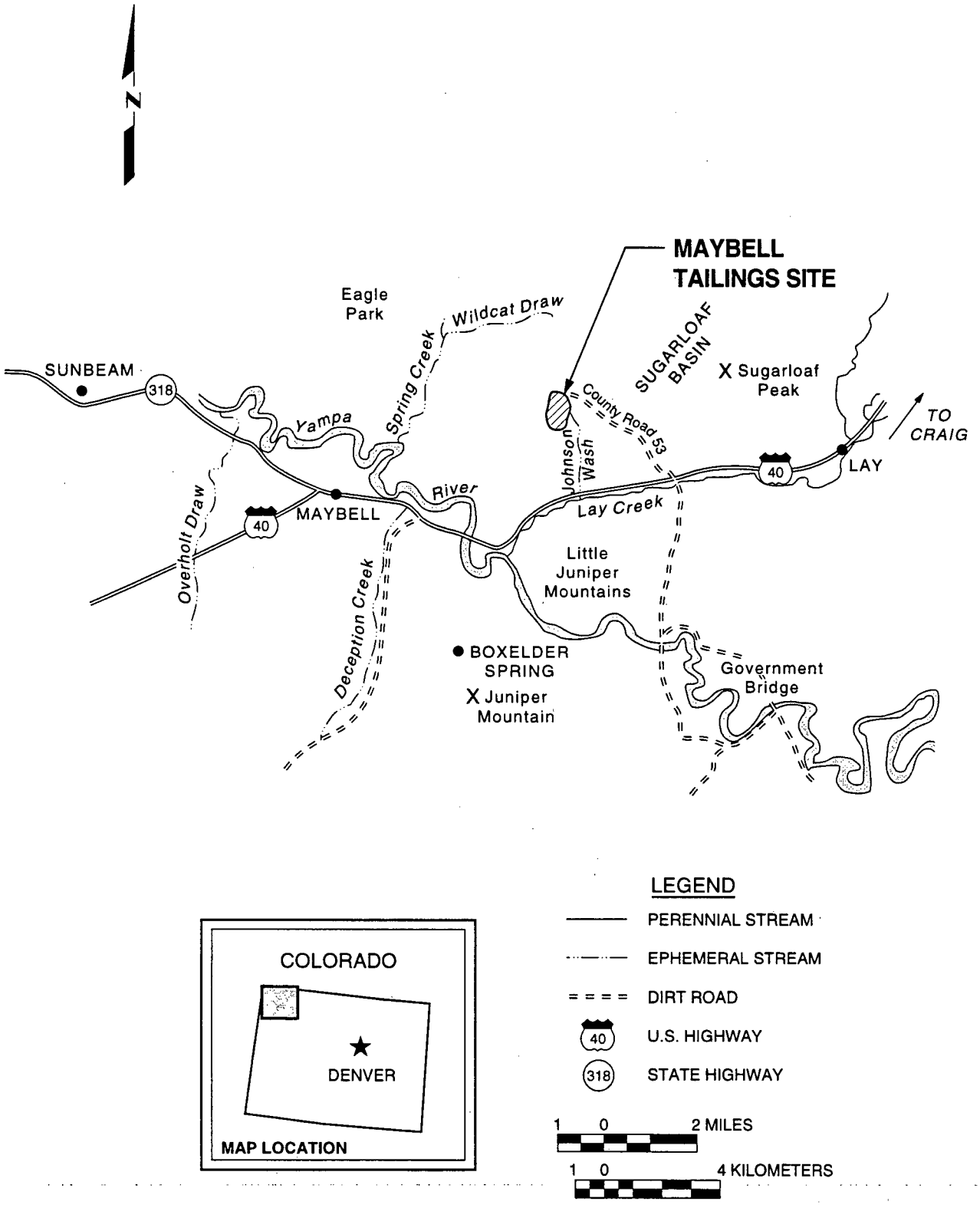


FIGURE 2.1
DISPOSAL SITE LOCATION
MAYBELL, COLORADO, SITE

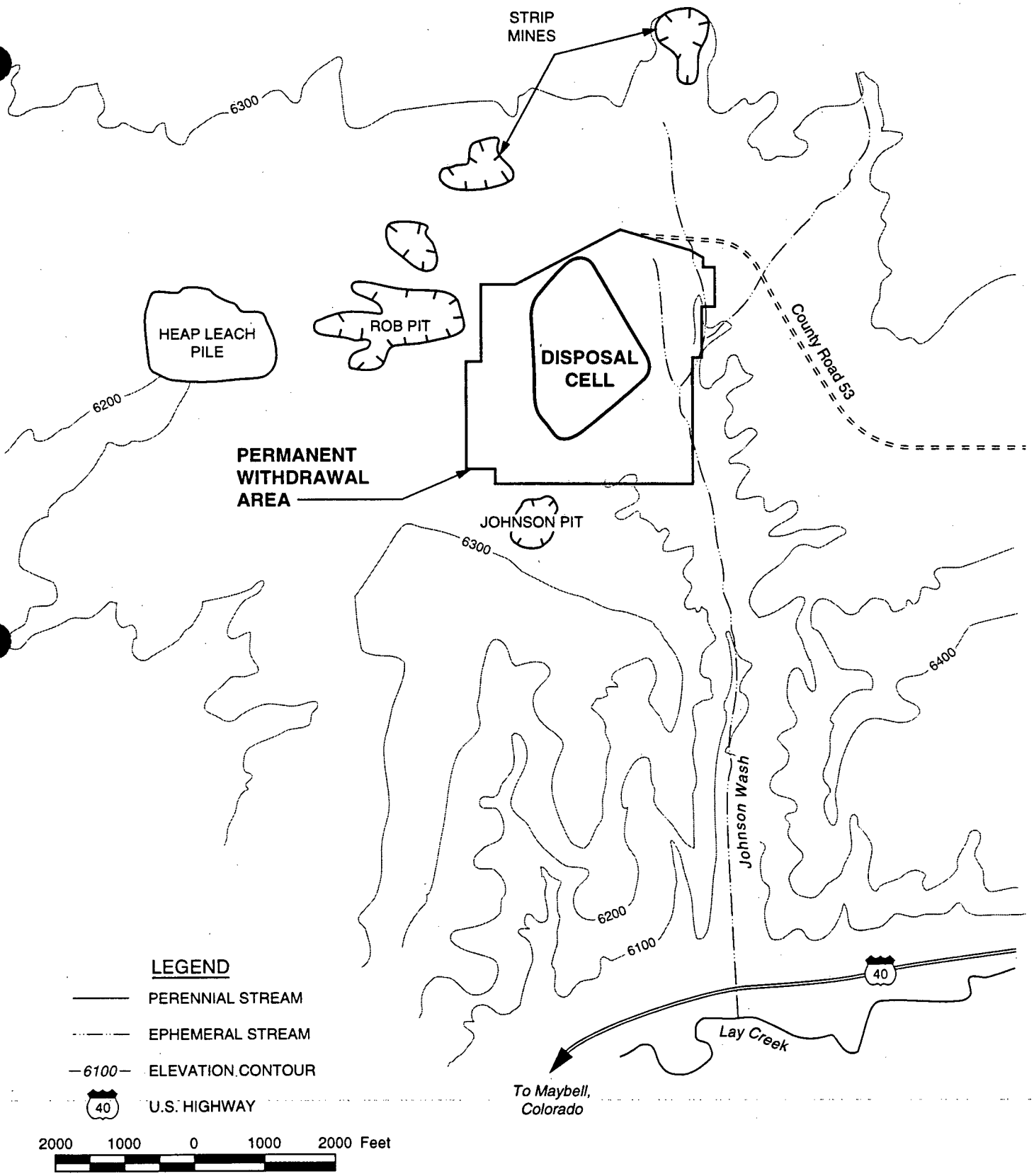


FIGURE 2.2
DISPOSAL CELL LOCATION
MAYBELL, COLORADO, SITE

2.3 DISPOSAL SITE DESCRIPTION

2.3.1 Site ownership and legal description

Remedial action at the Maybell, Colorado, UMTRA site consisted of onsite consolidation and stabilization of the contaminated materials. Under the requirements of the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978 (42 USC §7901 *et seq.*), as amended, the state of Colorado acquired a portion (two properties) of the designated site property.

These properties comprise the southwest portion of the designated site. They are referred to as the Howsam and Gordon properties. The state acquired them in fee simple from the private owners. The two properties comprise approximately 110 acres (ac) (45 hectares [ha]). Attachment 1 provides the legal description for these two properties.

2.3.2 Directions to the disposal site

Follow these directions to the disposal site:

- Begin at the intersection of State Highway 13 and U.S. Highway 40 (on the west side of Craig, Colorado).
- Drive west on Highway 40 20 mi (32 km) to a gravel road on the left (south) with a sign to Juniper Springs.
- Go 0.2 mi (0.3 km) further to an unmarked (from the highway) gravel road on the right (north).
- Turn right onto the gravel road and go over the cattle guard.
- Follow the road sign (County Road 53) 3 mi (5 km) to the site.

2.3.3 Description of surface conditions

The Maybell disposal site is located on approximately 265 ac (107 ha) of land (Plate 1). The disposal cell itself covers approximately 66 ac (27 ha). The completion report contains a detailed description of the final site conditions including the results of the final site topographic survey (MK-F, 19xx). The site is enclosed with a 5-strand wire fence (except on the east side), and the perimeter is marked with warning signs, boundary markers, and survey monuments. The tailings and other contaminated materials are contained in a rock-covered disposal cell in the center of the site.

The disposal cell is in a small valley approximately 2.4 mi (3.8 km) long (east to west) and 2 mi (3.2 km) wide (north to south). The center of the valley where the disposal site is located is at an elevation of about 6200 ft (1900 m) mean sea level. The dominant surface feature on the Maybell site is Johnson Wash, which drains to the south into Lay Creek at a point just south of US 40. The main channel of

Johnson Wash is just east of the disposal cell. Original surface topography on the site reflects drainage to the south and east into Johnson Wash. Several small tributary branches of Johnson Wash begin south of the disposal cell and drain toward the east-southeast. Erosion protection rock has been installed in four of these drainages, designated as gullies 1 through 4 on the design drawings (see drawing MAY-PS-10-0211). Extrapolation of the alignment of gully 2 indicates it likely extends beneath the existing tailings pile.

During final site grading, all areas were contoured to promote drainage away from the disposal cell. The DOE used a mix of grasses indigenous to the area to revegetate all disturbed areas of the disposal site not covered by riprap.

At the completion of remedial action, the DOE documented final disposal site conditions with site maps, as-built drawings, and ground and aerial photographs (MK-F, 19xx). These documents illustrate baseline conditions for comparison to future disposal site conditions. Lithologic logs and construction data for monitor wells drilled on and around the disposal site provide detailed information on site hydrogeology. All original drawings, site maps, well logs, and photographs are part of the Maybell permanent site file.

2.3.4 Permanent site-surveillance features

THIS SECTION TO BE COMPLETED AFTER CELL IS COMPLETE.

2.4 DISPOSAL CELL DESIGN

The disposal cell area is not subject to any significant hazard from slope failure processes such as landslides, debris flows, mud flows, and rock falls. The geomorphic processes posing a potential hazard to the stabilized disposal cell are ephemeral drainage channel changes, low-gradient slope erosion, and wind erosion. However, these processes are not reasonably expected to affect the cell within the next 1000 years, or in any case for at least 200 years.

The disposal cell is above grade and is approximately 30 ft (9 m) above the surrounding terrain. The disposal cell contains approximately 3,500,000 cubic yards (y^3) (2,676,000 cubic m [m^3]) of stabilized-in-place and relocated tailings and other residual radioactive materials, primarily contaminated soil and demolition debris. The disposal cell is capped with a 7-ft (2.13-m)-thick multiple-component cover.

Figure 2.3 shows a typical cross section of the disposal cell and cover. The cover consists of the following layers, starting at the bottom of the cover:

- A 1.5-ft (0.45-m)-thick radon/infiltration barrier, comprised of bentonite-amended clayey soil placed on top of the contaminated materials.
- A 4-ft (1.2-m)-thick layer of compacted soil to prevent the radon/infiltration barrier from the adverse effects of freeze-thaw cycles.

- A 0.5-ft (0.15-m)-thick layer of coarse-grained bedding material to act as a capillary break and filter, and to promote drainage of infiltrating water away from the radon/infiltration barrier.

- An 8- to 12- inch (20- to 30-cm)-thick layer of riprap (rock) to prevent wind and water erosion of the underlying materials.

The topslope of the cell slopes to the west at a grade of 3 percent. Runoff from the topslope enters a rock-lined ditch adjacent to the cell. The sideslopes of the disposal cell are at a 20 percent grade and are protected by riprap aprons on the south and east sides. On the north and west sides of the cell, the sideslopes are part of the main ditch that will carry surface runoff from the cell and adjacent off-cell areas. All upland flow will be intercepted and routed around the disposal cell by these ditches. Detailed engineering drawings of the disposal cell are in the site completion report (MK-F, 19xx).

2.5 GROUND WATER CHARACTERIZATION

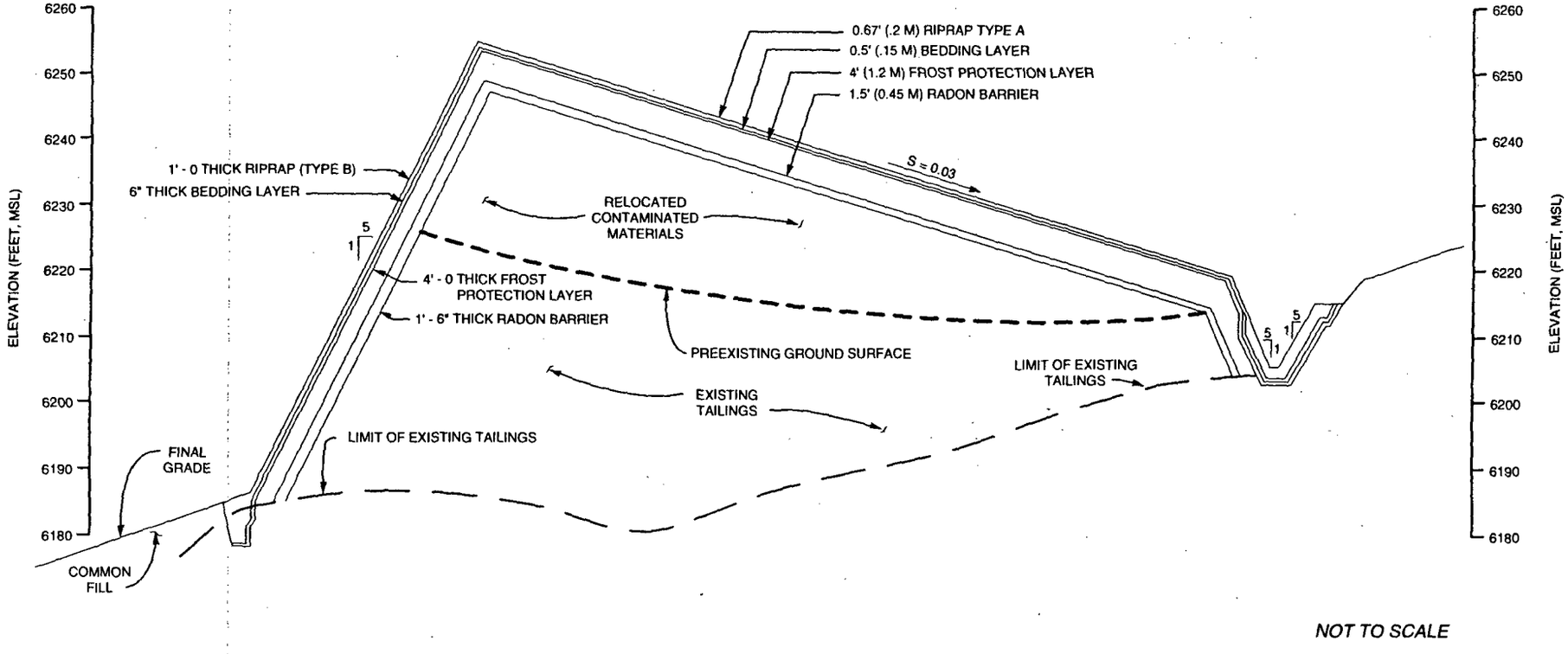
The DOE has characterized the hydrogeology, aquifer properties, geochemical conditions, water quality, and water resources at the Maybell disposal site. This information is summarized below, with details provided in Attachments 3 and 4 of the RAP (DOE, 1994b).

2.5.1 Hydrogeologic setting

The disposal site is underlain by the Tertiary Browns Park Formation of Miocene age, which unconformably overlies truncated rocks of the Cretaceous Mancos Shale. The Browns Park Formation consists of poorly cemented fluviolacustrine and eolian sandstones. These sandstones contain small lenses of siltstone, claystone, and some well-cemented intervals of calcite. The underlying Mancos Shale consists of relatively impermeable dark gray marine shale, with lenticular sandstone beds near the top and base.

The uppermost aquifer is the upper sandstone unit of the Browns Park Formation. The top of the unconfined ground water table occurs at depths ranging from 35 ft (11 m) to greater than 300 ft (91 m) beneath the ground surface. The average hydraulic conductivity is 1.7 ft/day ($6x10^{-4}$ centimeters per second [cm/s]) and the average linear ground water velocity is 0.17 ft per day (ft/day) ($6x10^{-5}$ cm/s).

The Maybell site is in a recharge area with a limited upslope catchment basin. Recharge to the Browns Park Formation aquifer principally is from rain or snow infiltration. Ground water from the Browns Park Formation discharges to the Yampa River alluvial aquifer system. The potentiometric surface indicates ground water is flowing southwest away from the disposal site.



NOTE: ELEVATIONS ARE GIVEN IN FEET.
TO CONVERT FROM FEET TO METERS,
MULTIPLY FEET BY 0.3048.

FIGURE 2.3
TYPICAL CROSS SECTION
MAYBELL, COLORADO, DISPOSAL CELL

2.5.2 Background ground water quality

Background ground water quality upgradient and downgradient from the Maybell tailings area is variable because it has been naturally affected by extensive low-grade uranium mineralization in the Browns Park Formation. Ground water quality also has been affected by uranium exploration and open pit mining operations. Upgradient background ground water in the Browns Park Formation has maximum observed concentrations of arsenic, cadmium, lead, molybdenum, selenium, and uranium, and activities of radium-226 and -228 that exceed the U.S. Environmental Protection Agency (EPA) maximum concentration limit (MCL) (40 CFR Part 192). Downgradient background ground water in the Browns Park Formation has maximum observed concentrations of arsenic, cadmium, lead, molybdenum, nitrate, selenium, and uranium that exceed the EPA MCLs. The integration of data from both upgradient and uncontaminated downgradient monitor wells yields a more complete picture of the variable (and often poor) quality of the ground water present in the Browns Park Formation.

2.6 GROUND WATER PROTECTION

2.6.1 Surface remediation (Subpart A)

Evaluating site characterization data shows that a program to monitor ground water for demonstration of disposal cell performance based on a set of concentration limits and a point of compliance (POC) is not appropriate because ground water in the uppermost aquifer is of limited use, and a narrative supplemental standard has been applied to the site (40 CFR §192.21(g)). The limited use designation is based on the fact that ground water in the uppermost aquifer is not a current or potential source of drinking water in the area because it contains widespread ambient contamination (related to mineralization in the area and associated exploration and mining activities) that cannot be cleaned up using methods reasonably employed by public water supply systems (40 CFR §192.11(e)). Defining concentration limits and a POC would not provide further protection to human health and the environment. Therefore, ground water monitoring will not be required to demonstrate compliance with the ground water protection standards.

The DOE plans to perform postclosure ground water level monitoring downgradient from the disposal cell as a "best management practice" (BMP). The purpose of this BMP monitoring is to measure changes in ground water levels in monitor wells 695 and 696 that may be related to transient drainage caused by disposal cell construction (Plate 1). Computer modeling to simulate existing ground water conditions at the Maybell site and predict the effects of transient drainage resulting from remedial action construction has been performed (Calculation No. MAY-03-96-12-05-00) (DOE, 1996b). The modeling has provided a better understanding of site ground water conditions, the rate of dissipation of the ground water mound beneath the site, and the potential water level impacts of transient drainage. Based on this understanding, evaluation of transient drainage by monitoring ground water levels downgradient from the site may not be fully definitive because the potential water level increase resulting from transient drainage would be masked by the predicted water level decrease due to dissipation of the ground water mound. That in turn

would be affected by the natural fluctuation of ground water levels in the area. To verify the modeling predictions, periodic measurements of ground water levels in monitor wells 695 and 696 will continue.

BMP monitoring is not required under the regulations for the purpose of demonstrating compliance with the final EPA ground water protection standards (40 CFR §192.02) and will not trigger corrective action (40 CFR §192.04).

2.6.2 Ground water cleanup (Subpart B)

The ground water compliance strategy for Subpart B is no remediation. This strategy is based on ground water in the uppermost aquifer being classified as limited use, thus providing the basis for the application of supplemental standards (40 CFR §192.21(g) and §192.11(e)). Ground water in the uppermost aquifer is not a current or potential source of drinking water in the area because it contains widespread ambient contamination caused by naturally occurring uranium mineralization and from the effects of broad-scale human activity unrelated to uranium-milling operations at the site (uranium exploration and mining activities). This ground water cannot be cleaned up using treatment methods reasonably employed in public water supply systems.

Since ground water remediation is not planned for the Maybell processing site, ground water monitoring will not be required for demonstration of compliance with the ground water protection standards. Also, there is no risk to human health and the environment because there are no known exposure pathways for ground water from the uppermost aquifer to a receptor.

3.0 SITE INSPECTIONS

The DOE will inspect the Maybell disposal site to detect progressive change caused by slow-acting natural processes and to identify potential problems before the need for extensive maintenance, repairs, or corrective action. Inspections also may be conducted to follow up on events or conditions that have affected the disposal site (Attachment 2). The DOE will compare the findings from these inspections to initial baseline conditions to identify changes over time and to provide a basis for future inspections, repairs, and corrective actions. This process is shown in Figure 3.1. Custodial maintenance and repair are described in Section 4.0. Corrective action is detailed in Section 5.0.

3.1 INSPECTION FREQUENCY

The DOE will inspect the Maybell disposal site annually. The DOE may schedule more frequent inspections, if necessary. The DOE will notify the NRC and state of the inspection schedule.

3.2 INSPECTION TEAM

The inspection team will consist of a minimum of two inspectors qualified to inspect disposal cell integrity and make preliminary assessments of modifying processes that could adversely affect the disposal cell.

If problems are observed that require more investigation, follow-up inspections will be performed and teams will include one or more technical specialists in appropriate disciplines to assess the problems under investigation. For example, a follow-up inspection by a plant specialist may be required to evaluate reports of significant plant growth on the rock cover or a soils scientist or geomorphologist may be needed to evaluate erosion processes.

3.3 SITE INSPECTION PROCEDURES

Before inspections, inspectors will conduct a preinspection briefing. The long-term surveillance program guidance document contains information useful in preparing for inspections (DOE, 1996a).

Site inspections will cover the disposal cell, the area immediately surrounding the disposal site, and the immediate offsite areas. Site inspections will be thorough enough to identify significant changes or active modifying processes that potentially could adversely impact the disposal cell. Surveillance should be performed to identify unanticipated effects of modifying processes such as gully formation, slope erosion, changes to the rock cover, ephemeral drainage channel changes, and significant modifications by humans, animals, or plants.

Inspectors will evaluate the integrity of the disposal cell by walking a series of transects around the perimeter and over the rock cover. Sufficient transects, at

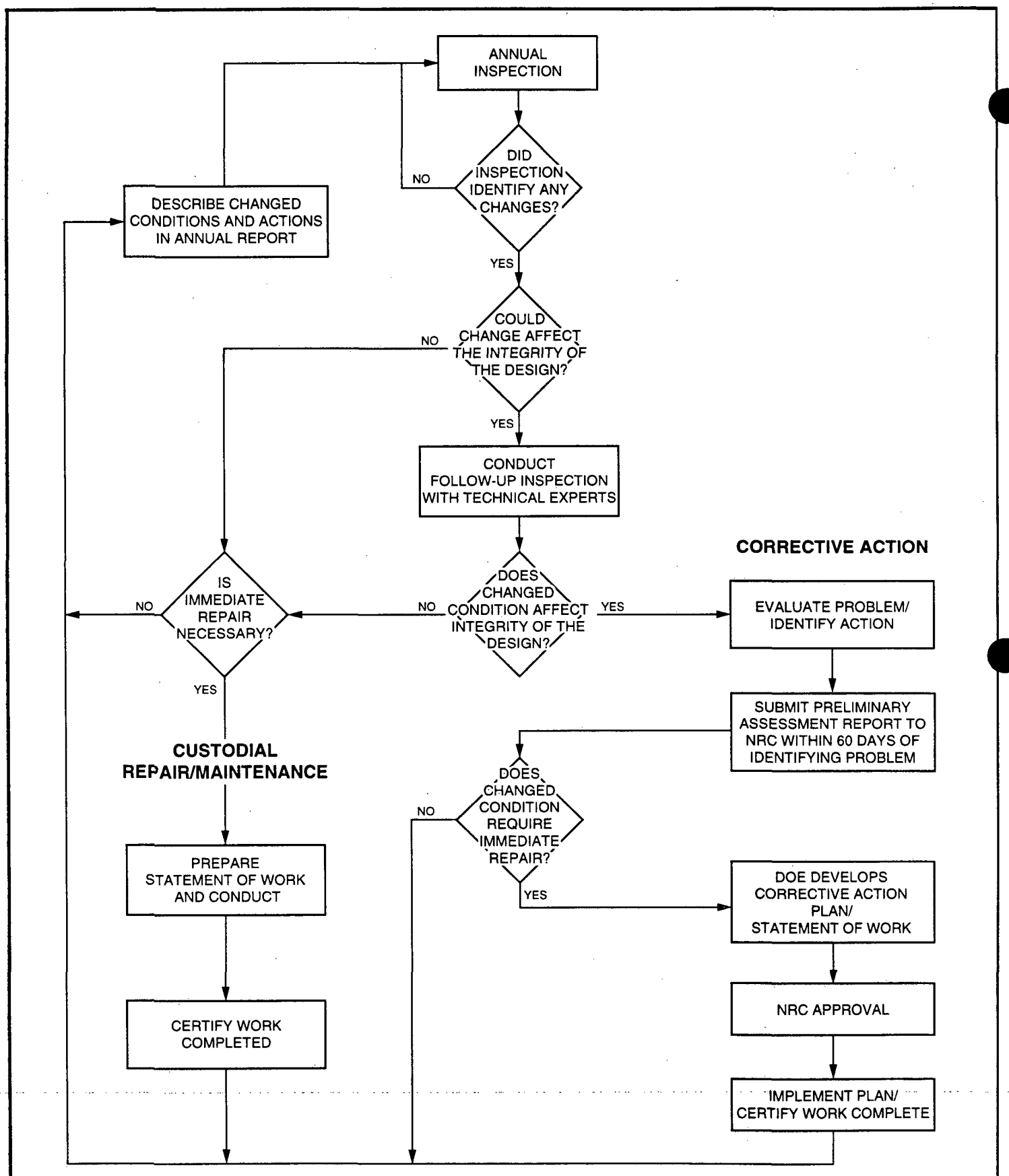


FIGURE 3.1
STEPS FOR FOLLOW-UP INSPECTIONS, CUSTODIAL MAINTENANCE, AND CORRECTIVE ACTION MAYBELL, COLORADO, DISPOSAL SITE

approximately 150-ft (46-m) intervals, will be walked to ensure the disposal cell is thoroughly covered and inspected. Diagonal transects of the topslopes will be made and the crest line will be walked. Additional transects will be walked along the sideslopes and rock apron. Transects along the entire length of the drainage ditch will be made to determine whether it is functioning as designed and can be expected to continue to function properly. Inspectors will vary the path of transects from one inspection to the next to ensure small anomalies are not overlooked. The sample inspection checklist lists items that should be examined during inspections (DOE, 1996a).

Vegetation is not planned for the disposal cell cover. However, remedial action of the areas surrounding the disposal cell included revegetation with grasses indigenous to the area. The area surrounding the disposal cell will be monitored to determine the success of the revegetation efforts. Inspectors also will inspect this area for evidence of erosion caused by wind, sheet wash, or changes in drainage patterns.

Site inspectors also will monitor damage to or disturbance of permanent site-surveillance features, fencing, gates, and locks.

From inside the disposal site, inspectors will visually survey the area approximately 0.25 mi (0.40 km) outside the disposal site boundary for evidence of land-use changes that indicate increased human activity such as land development, new roads, and paths. Inspectors will note the condition of and changes to site access roads, surrounding vegetation, and relevant geomorphic features like gullies or ephemeral drainage channels; potential impacts to the site will be noted.

3.4 QUALITY ASSURANCE

The DOE has developed and implemented a quality assurance (QA) plan (DOE, 1996c) for the site inspection program that meets the requirements of DOE Order 5700.6C. Site inspections will be conducted in accordance with this plan.

3.5 SITE-SPECIFIC CONCERNS

Four site-specific concerns require special attention during annual inspections: erosion by gullies 1 through 4, postconstruction settlement, the potential for seeps during transient drainage, and monitoring of transient drainage at monitor wells 695 and 696. These four concerns are discussed in detail below.

3.5.1 Erosion near gullies 1 through 4

Available information indicates surface runoff erosion occurred on the property prior to milling operations on the site. Several erosion gullies formed, which drain toward Johnson's Wash to the east-southeast. Erosion protection measures were installed at the outlets of these gullies during construction. Above the erosion protection rock, all four gullies were filled with compacted common fill to the toe of the disposal cell (see sections B and J on construction drawings MAY-PS-10-0214 and MAY-PS-10-0223). The upper end of gully 2 extended beneath the tailings pile.

To monitor potential erosion damage, the inspectors will check for erosion and any changes in headcutting or sedimentation in and around gullies 1 through 4, between these gullies, and the toe of the disposal cell (Plate 1).

3.5.2 Postconstruction settlement

Characterization of the Maybell tailings pile indicated a rather thick deposit of slimes exists beneath the south central portion of the pile. To promote settlement of these slimes before construction of the radon barrier, a preload fill was constructed (see drawing MAY-PS-10-0209 and Note 8).

During construction, nine settlement plates, numbers 1 through 9, were installed for long-term monitoring (see drawing MAY-PS-10-0211). Calculations indicate that significant settlements of the Maybell pile should occur during the first 5 years after placement of the frost protection layer. Inspectors will annually monitor the settlements of plates 1 through 9 (Plate 1) to confirm the predicted settlement profiles are not exceeded for a period of 5 years or less, if trending indicates all significant settlement has occurred.

3.5.3 Potential for transient drainage seeps

During disposal cell construction, the slopes on the east side of the pile were cut back to form the final slope configuration. Although not confirmed directly by characterization data, extrapolation of those data indicates the cut slope near the east corner of the cell may be near buried slime layers. If transient drainage from the slimes formed a surface expression on the Maybell cell, it would be located on the east or southeast slopes toward the east corner of the cell.

While walking routine transects over the east and southeast slopes of the cell, inspectors will check for evidence of potential seeps. Potential seeps will not form after transient drainage is complete.

3.5.4 Monitoring transient drainage

During design and planning, NRC representatives expressed concern that transient drainage from the cell could be observed in nearby monitor wells as a temporary rise in the ground water level, and might mistakenly be interpreted as a cell performance problem or even cell failure. Misidentification of the cause of a water level rise could falsely trigger an investigation of cell cover integrity, needlessly consuming resources and funds.

Computer modeling was performed to predict an "upper bound" curve of water level versus time for monitor well 695. Complete documentation of this modeling is included in the Technical Assistance Contractor Calculation MAY-03-96-12-05-00, dated 8 April 1996, which is on file in the UMTRA Project Document Control Center, File Location No. 14.19.2.7. The monitoring and closure plan for monitor well 695 is included in the appendix to this LTSP.

Well 695 is monitored to compare the measured water level with the predicted water level shown in Appendix A, Figure 1. If the measured water levels are below the predicted water levels, and the trend line of measured water levels is not expected to cross the predicted line shown in Appendix A, Figure 1, the cell's cover performance should be satisfactory.

4.0 CUSTODIAL MAINTENANCE OR REPAIR

The DOE does not plan to conduct routine maintenance at the Maybell disposal site. However, the DOE will perform needed custodial maintenance or repair as determined by site inspections.

Unscheduled custodial maintenance or repair at the Maybell disposal site may be identified during an annual inspection. These activities may include the following:

- Repairing or replacing deteriorated or vandalized warning signs, fencing, gates, locks, and monitor well caps.

- Removing deep-rooted plants determined to be a threat to the integrity of the cover.

For a period up to five (5) years after completion of the disposal cell, a plant specialist or other qualified person will periodically participate in site inspections. If the inspection does not coincide with the general growing season, the individual may conduct a separate inspection at a more favorable time. Conditions such as drought during the five year period immediately following cell completion may cause the revegetation to die.

The Department of Energy is required to reseed those portions of the temporary withdrawal area that have not sustained a satisfactory growth of vegetation after the second and fourth growing season (2000 and 2002). In either eventuality, seeding must be completed after 1 September and prior to the onset of prolonged ground frost.

Reseeding will be performed per subcontract document specifications Section 02935, Part 2 (DOE, 1994).

After the work is completed and before contractors are released, the DOE will verify that work was performed according to specifications.

The annual report to the NRC will document any repair that is performed. Copies of records, reports, and certifications will be included in the permanent site file.

5.0 CORRECTIVE ACTION

Corrective actions are repairs needed to address problems that affect the integrity of the disposal cell or compliance with 40 CFR Part 192. The NRC must approve the recommended action in advance. Site inspections are designed to identify problems at the developmental stage. Conditions that might trigger corrective action are:

- Surface rupture or subsidence of the disposal cell.
- Development of rills, gullies, or slope instability on the disposal cell.
- Deterioration of the erosion protection rock on the disposal cell.
- Tailings fluid originating from the disposal cell.
- Gully development on or immediately adjacent to disposal site property that could affect the integrity of the disposal cell.
- Damage to the cell cover or disposal site property from natural catastrophic events or vandalism.
- Damage to the disposal cell cover from deep-rooted plant growth.

The DOE will evaluate the factors that caused the problem and identify actions to mitigate the impact and prevent recurrence. An onsite inspection or preliminary assessment will include but is not limited to:

- Identifying the nature and extent of the problem.
- Reevaluating germane engineering design parameters.

For conditions that warrant follow-up inspections, the DOE will submit a preliminary assessment or status report to the NRC within 60 days of the inspection. The preliminary assessment report will evaluate the problem and recommend the next step (e.g., immediate action or continued evaluation). If the problem requires immediate repair, the DOE will develop a corrective action plan for NRC approval. Once the NRC approves the corrective action, the DOE will implement the plan. In some cases, corrective action could include temporary emergency measures taken prior to the completion of the normal approval process. If a problem does not require immediate repair, the problem will be documented in the annual report and assessed at the next annual inspection.

NRC regulations do not stipulate a time frame for implementing corrective action except the finding of an exceedance in established ground water concentration limits, which does not apply at this site. The DOE does not consider assessing the extent of a problem and developing a corrective action plan to be initiation of the corrective action program.

In addition to the preliminary assessment report, the DOE may, as appropriate, prepare progress reports on each corrective action while it is under way or under evaluation.

After corrective action is complete, the DOE will certify the work and submit a certification statement with supporting documentation to the NRC for review and concurrence. A copy of the certification statement will become part of the permanent site file, as will reports, data, and documentation generated during the corrective action.

6.0 RECORD KEEPING AND REPORTING

6.1 PERMANENT SITE FILE

The DOE will maintain a permanent site file containing site inspection reports and other supporting documentation of long-term surveillance program activities. The information placed in the site file will include:

- Documentation of disposal site performance.
- Demonstration that licensing provisions were met.
- Information needed to forecast future site surveillance and monitoring needs.
- Reports to stakeholders regarding disposal cell integrity.

After the site is brought under the general license, the DOE will compile copies of site documentation required by the long-term surveillance program guidance document (DOE, 1996a). These copies will be come part of the Maybell disposal site permanent site file. Copies of deeds, custody agreements, and other property documents also will be kept in the site file.

The DOE will maintain the surveillance and maintenance documentation identified in other sections of this LTSP and it will become part of the permanent site file. The DOE will update the site file as necessary after disposal site inspections, maintenance activities, or corrective actions are complete. These records will be handled in accordance with DOE directives to ensure their proper handling, maintenance, and disposition. The archival procedures set forth in 41 CFR Part 101 and 36 CFR Parts 1220-1238, Subchapter B, will be followed. The permanent site file will be available for NRC and public review.

6.2 INSPECTION REPORTS/ANNUAL REPORTS

During site inspections, activities and observations will be recorded and described using site inspection checklists, maps, photographs and photo logs, and field notes. Documentary evidence of anomalous, new, or unexpected conditions or situations will describe developing trends and enable the DOE to make decisions concerning follow-up inspections, custodial maintenance, and corrective action. This information will be contained in the permanent site file at the DOE Grand Junction Office. The DOE will prepare a site inspection report documenting the findings and recommendations from field inspections.

Site inspection reports will be submitted to the NRC within 90 days of the annual site inspection. Inspection reports will summarize the results of follow-up inspections and maintenance completed since the previous annual inspection.

If unusual damage or disruption is discovered at the Maybell disposal site during an inspection, a preliminary report assessing the impact will be submitted to the NRC within 60 days. If maintenance, repair, or corrective action is warranted, the DOE will notify the NRC. The NRC will receive a copy of corrective action plans and each corrective action progress report, or the reports will be attached to the annual report.

The DOE will provide copies of inspection reports and other reports generated under the long-term surveillance program to the state of Colorado as required in its cooperative agreement.

7.0 REFERENCES

DOE (U.S. Department of Energy), 1996a. *Guidance for Implementing the Long-Term Surveillance Program for UMTRA Project Title I Disposal Sites*, DOE/AL-62350-189, Rev. 0, prepared for the U.S. Department of Energy, Environmental Restoration Division, UMTRA Project Team, Albuquerque, New Mexico.

DOE (U.S. Department of Energy), 1996b. Calculation Set, Evaluation of Transient Drainage, Maybell, Colorado. Prepared for the U.S. Department of Energy, Environmental Restoration Division, UMTRA Project Team, Albuquerque, New Mexico

DOE (U.S. Department of Energy), 1996c. *Long-Term Surveillance and Maintenance Program, Quality Assurance Program Plan*, MAC-2152, Rev. 0, prepared by MACTEC Environmental Restoration Services for the U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado.

DOE (U.S. Department of Energy), 1994. *Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site, Maybell, Colorado*, December, DOE/AL/62350-24F, Rev. 1, prepared for the U.S. Department of Energy, Environmental Restoration Division, UMTRA Project Team, Albuquerque, New Mexico.

MK-F (Morrison Knudsen-Ferguson), 19**xx**. *Maybell, Colorado, Completion Report,* prepared by MK-F for the U.S. Department of Energy, Environmental Restoration Division, UMTRA Project Team, Albuquerque, New Mexico.

URS Company, 1976. "Meteorology Affecting Uranium Tailings Near Maybell, Colorado," unpublished report prepared for Ford, Bacon & Davis Utah, Inc., Salt Lake City, Utah.

CODE OF FEDERAL REGULATIONS

10 CFR Part 40, *Domestic Licensing of Source Material*, U.S. Nuclear Regulatory Commission.

36 CFR Parts 1220-1238, *National Archives and Records, Subchapter B- Records Management*, National Archives and Records Administration.

40 CFR Part 192, *Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings*, U.S. Environmental Protection Agency.

41 CFR Part 101, *Federal Property Management Regulations*, General Services Administration.

DOE ORDERS

Order 5700.6C, *Quality Assurance*, 21 August 1991, U.S. Department of Energy, Washington, D.C.

UNITED STATES CODE

42 USC §7901 *et seq.*, *Uranium Mill Tailings Radiation Control Act,* 8 November 1978.

ATTACHMENT 1

SITE REAL ESTATE INFORMATION

REAL ESTATE DOCUMENTATION

GENERAL

Remedial action at the Maybell, Colorado, Uranium Mill Tailings Remedial Action (UMTRA) Project site consisted of onsite consolidation and stabilization of the contaminated materials. The site comprises approximately 251 acres of land. The site was acquired in two portions.

The larger portion of the disposal site is on land formerly administered by the U.S. Department of the Interior's (DOI) Bureau of Land Management (BLM). Under the requirements of the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978, as amended, the DOE acquired this portion of the disposal site land via Public Land Order (PLO).

The second portion, acquired by the state of Colorado, comprises two properties referred to as the Howsam and Gordon properties. The state acquired the properties in fee simple from the private owners. The 2 properties comprise approximately 110 acres.

TRANSFER OF BLM LANDS

The PLO permanently transferred 141 acres from the public domain to the DOE. As a result of the transfer, the land is no longer subject to the operation of the general land laws, including the mining and mineral leasing laws. The transfer of the land to the DOE vested in the DOE the full management, jurisdiction, responsibility, and liability for the land. However, the BLM retained the authority to administer any claims, rights, and interests in the land established before the effective date of the transfer.

Legal Description

A tract of land located in Township 7 North, Range 43 East, Sixth Principal Meridian, described by the following government land survey. Section 19, lots, 10. 12, 14, and 16. W1/2 E1/2 SW1/4 NE1/4, W1/2 E1/2 NE1/4 SW1/4 NE1/4, W1/2 SW1/4 NE1/4, SE1/4 NW1/4, W1/2 W1/2 NE1/4 NW1/4 SE1/4, and W1/2 NW1/4 SE1/4. The area described contains 140.49 acres of public land in Moffat County, Colorado.

Recorded

The PLO was published in the *Federal Register,* Volume 60, No. 71, page 18778, dated 13 April 1995. The *Federal Register* document is listed as 95-9048 filed 12 April 1995 as 43 CFR Public Land Order 7137. The effective date of the transfer is 13 April 1995.

TRANSFER OF PRIVATE LANDS

Legal Descriptions

Howsam tract

A parcel of land situated in the SW1/4 of Section 19, T.7 N., R. 94 W., 6th Principal Meridian, being more particularly described as follows:

Considering the East line of the Northeast of said Section 19 to bear S00°00'00"E and all bearings contained herein to be relative thereto; Beginning at the Center 1/4 corner of said Section 19; thence S. 00°00'11"E 1,813.80 ft the Southwest corner of the N3/4 NW1/4 SW1/4 SE1/4 of Section 19; thence N89°58'15 "W 2103.37 ft to the Southwest corner of the N1/2 S1/2 NE1/4 of Government Lot 8 of said Section 19, thence N00°01'20"E 164.88 ft to the Southeast corner of the NE1/4 NW1/4 of Government Lot 8 of said Section 19; thence N89°58'16"W 391.26 ft to the Southwest corner of the NE1/4 NW1/4 of Government Lot 8 of said Section 19; thence N00°02'01"E 1648.81 ft to the Northwest corner of the E1/2 W1/2 of Government Lot 7 of said Section 19; thence S89°58'24"E 2493.50 ft to the Point of Beginning, containing 102.37 acres, as described,

with all its appurtenances subject to existing easements for public roads and highways, public utilities, railroads, pipelines and reservations or exceptions of record. The land herein conveyed to the United States of America by and through the Department of Energy.

Filed: _____at Book _____, on Page ____, Moffat County, Colorado.
(To be completed when filed.)

Gordon tract

A parcel of land situated in the SE1/4 of Section 19, T.7 N., R. 94 W., 6th Principal Meridian, being more particularly described as follows:

Considering the East line of the Northeast of said Section 19 to bear S00°00'00"E and all bearings contained herein to be relative thereto; Beginning at the Northwest corner of N3/4 NW1/4 SW1/4 SE1/4 (the South 1/16 Corner of Section 19); thence S89°58'17"E 660.48 ft to the Northeast corner of the N3/4 NW1/4 SW1/4 SE1/4 of said Section 19, thence S00°00'00"E 494.68 ft to the Southeast corner of the N3/4 NW1/4 SW1/4 SE1/4 of said Section 19; thence N89°58'15"W 660.46 ft to the Southwest corner of the N3/4 NW1/4 SW1/4 SE1/4 of said Section 19; thence N 00°00'11"W 494.67 ft to the Point of Beginning, containing 7.50 acres, as described,

with all its appurtenances subject to existing easements for public roads and highways, public utilities, railroads, pipelines and reservations or exceptions of record. The land herein conveyed to the United States of America by and through the Department of Energy.

Filed: _____at Book _____, on Page ____, Moffat County, Colorado.
(To be completed when filed.)

REPOSITORY

Real estate correspondence and related documents are filed and maintained by the Department of Energy's Property and Administrative Services Division, C/O Chief, Property Management Branch, Albuquerque Operations Office, P. O. Box 5400, Albuquerque, NM 87115, (505) 845-6450.

ATTACHMENT 2

NRC CONCURRENCE AND LICENSING DOCUMENTATION

(To be provided when the site is licensed)

APPENDIX A

MONITORING AND CLOSURE PLAN FOR WELLS 695 AND 696

1.0 INTRODUCTION

1.1 Purpose

The purposes of this appendix are to explain the ground water conditions as they relate to impacts from milling operations and construction-related drainage at the Maybell disposal cell, document water level monitoring downgradient from the cell, assess results of the monitoring, and formulate a plan for closure of the two monitor wells used for measuring water levels.

1.2 Background

Analysis of the ground water conditions at the site showed that the uranium milling/processing operations impacted ground water levels in the vicinity of the disposal cell and that construction-related drainage from the cell also would impact the water levels. Residual radioactive materials at the Maybell processing site were stabilized in place. There appears to be a residual ground water mound as a result of the 7 years of leakage from the tailings pond to the ground water during the milling operations. The mound is still dissipating 30 years after the mill closed. Current groundwater levels beneath the tailings pile are estimated to be 80 to 90 feet (ft) (24 to 27 meters [m]) above levels that existed prior to mill operation. Mounding of the ground water table presently appears to extend several thousand feet in all directions from the existing tailings pile. It is anticipated that this mound will take several hundred years to completely dissipate. During and after remedial action construction, as the tailings consolidate under the load from the relocated tailings and the cover, water will be released that will impact water levels below the disposal cell. This transient drainage from construction of the disposal cell will be superimposed on the milling-related ground water mound.

During remedial action design and planning, the NRC expressed concern that transient drainage from the disposal cell could be observed in nearby monitor wells as a temporary rise in the ground water level, and might mistakenly be interpreted as a cell performance problem or even cell failure. Misidentification of the cause of a water level rise could falsely trigger an investigation of cell cover integrity, needlessly consuming resources and funds.

2.0 WATER LEVEL MONITORING

2.1 Monitoring plan

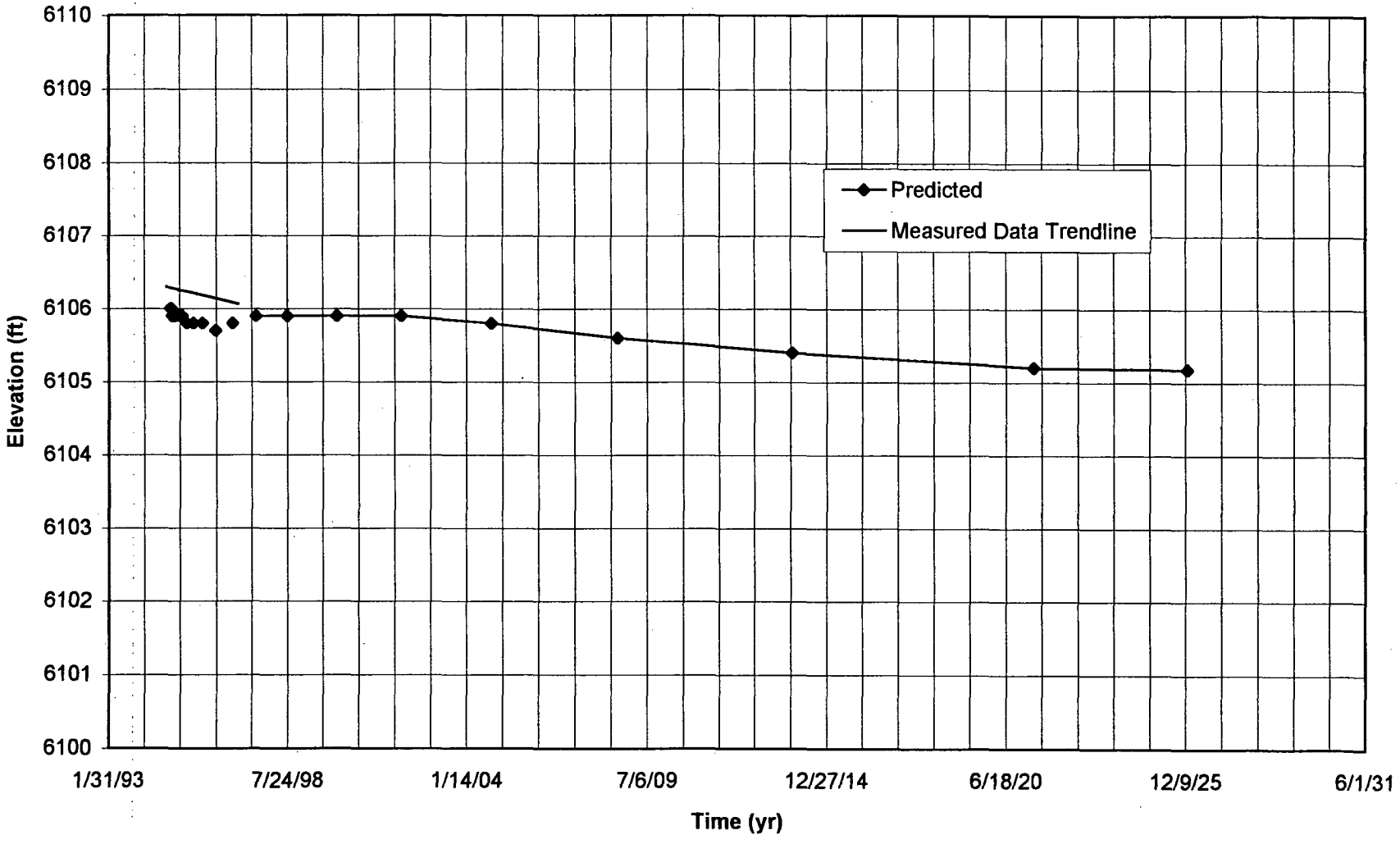
The DOE plans to perform postclosure ground water level monitoring downgradient from the disposal cell as a "best management practice" (BMP). The purpose of this BMP monitoring is to measure changes in ground water levels in monitor wells 695 and 696 that may be related to transient drainage caused by disposal cell construction. Computer modeling to simulate existing ground water conditions at the Maybell site and predict the effects of transient drainage resulting from remedial action construction has been performed (Calculation No. MAY-03-96-12-05-00). The modeling has provided a better understanding of site ground water conditions, the dissipation rate of the ground water mound beneath the site, and the potential water-level impacts of transient drainage. Based on this understanding, evaluation of transient drainage by monitoring ground water levels downgradient from the site may not be fully definitive because the potential increase in water level resulting from transient drainage would be masked by the predicted water-level decrease due to dissipation of the ground water mound. That in turn would be affected by the natural fluctuation of ground water levels in the area. To verify the modeling predictions, periodic measurements of ground water levels in monitor wells 695 and 696 will continue. BMP monitoring is not required under the regulations for the purpose of demonstrating compliance with the final U.S. Environmental Protection Agency ground water protection standards (40 CFR §192.02) and will not trigger corrective action (40 CFR §192.04).

2.2 Monitoring results

Monitor wells 695 and 696 were installed downgradient from the Maybell disposal cell in October 1994. A data logger has recorded water levels continuously in monitor well 695 since November 1995, while the data logger assigned to well 696 is temporarily on loan to another Uranium Mills Tailing Remedial Action (UMTRA) Project site. Data are available in the SEEUMTRA data base (available at the Grand Junction Office).

Monitor wells 695 and 696 are on the southwest side of the cell, which is downgradient of the tailings pile. The change in water level at monitor well 695 estimated to be approximately 2 ft (61 centimeters [cm]) due to transient drainage from the disposal cell. Since the general water level around wells 695 and 696 is falling due to the decreasing ground water mound caused by milling operations, the net change in water level in well 695 (due to the UMTRA Project-caused transient drainage), should be on the order of 0.2 ft (6 cm) (Figure 1). This very small net rise is the reason that a data logger is being used for monitoring at the site.

FIGURE 1
Future Groundwater Levels at Well 695 - Maybell



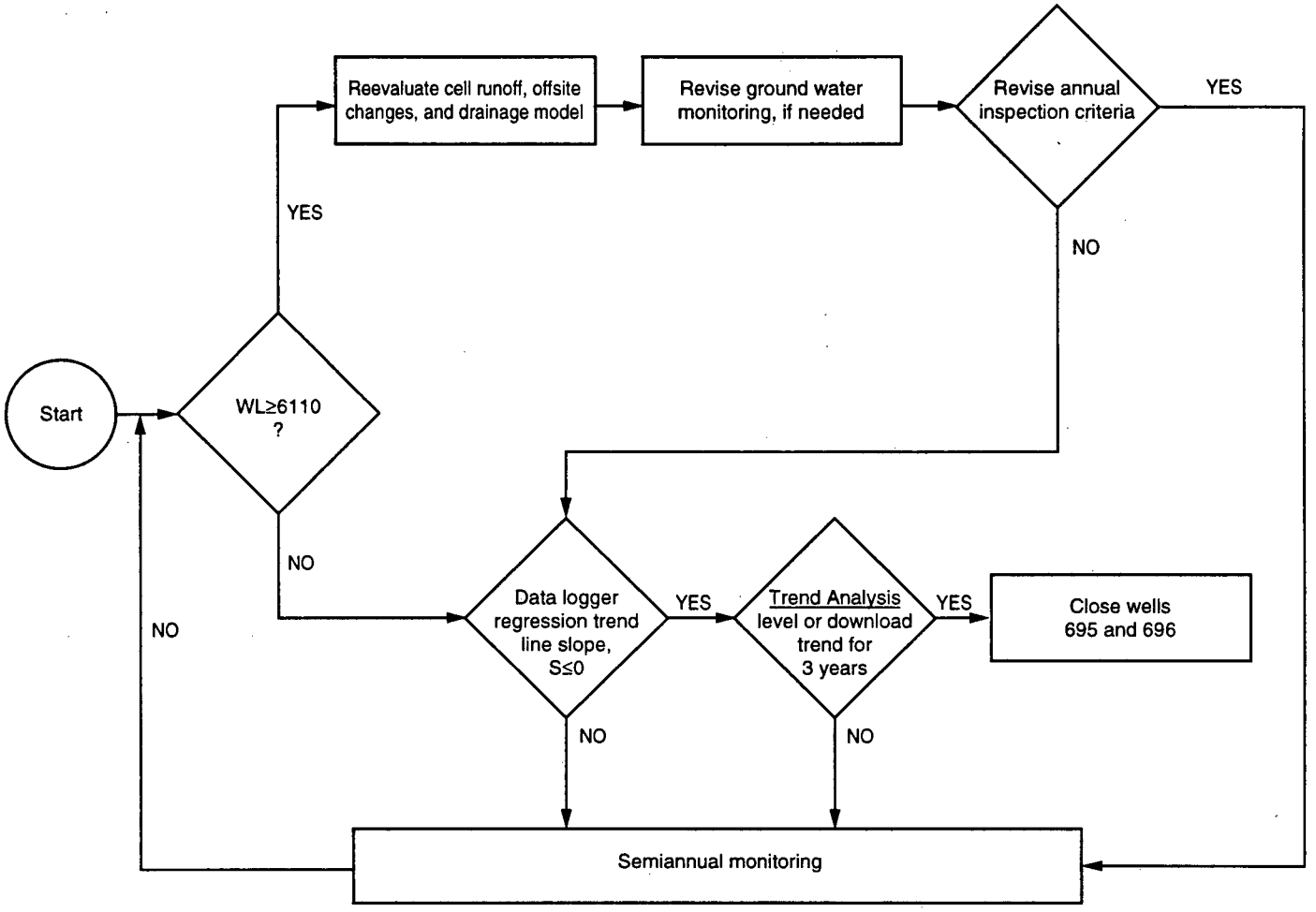
3.0 MONITOR WELL CLOSURE PLAN

3.1 Decision criteria

The decision to discontinue water level monitoring and close the monitor wells downgradient from the disposal cell at the Maybell site will be based on the flow chart of monitoring activities (Figure 2). The data loggers at the Maybell site should be downloaded twice each year. The data from monitor well 695 should then be compared with the predicted levels. As long as the 6-month water level trend is approximately parallel to the predicted trend, no action is necessary.

3.2 Well closure

When the water levels downgradient from the disposal cell show a consistent trend, as determined by the flow chart in Figure 2, water level monitoring will be discontinued and the monitor wells will be abandoned. When the flow chart in Figure 2 indicates well closure, monitor wells 695 and 696 may be abandoned in accordance with UMTRA Project and state of Colorado procedures. The state of Colorado will be notified prior to closure of the wells.



WL = WATER LEVEL ELEVATION (FT)
S = SLOPE

FIGURE 2
FLOWCHART FOR CLOSURE OF MONITORING WELLS 695 AND 696
MAYBELL, COLORADO, SITE

THIS PAGE IS AN OVERSIZED DRAWING OR FIGURE,

THAT CAN BE VIEWED AT THE RECORD TITLED:

DRAWING NO. PLATE 1, "DISPOSAL SITE MAP"

WITHIN THIS PACKAGE... OR BY SEARCHING USING THE DOCUMENT/REPORT NO.

PLATE 1

D-01

T. Johnson

Department of Energy
Albuquerque Operations Office
P. O. Box 5400
Albuquerque, New Mexico 87185-5400

March 30, 1999

Mr. N. King Stablein, Acting Chief
Uranium Recovery Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards
Mail Stop T7J9
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Mr. Stablein:

Enclosed for your review and concurrence are three (3) copies each of the "FINAL" Completion Report (Part I and Part II) (fCR) the Long-Term Surveillance Plan (LTSP) and the Final Audit Report (FAR) for the Maybell, Colorado, Uranium Mill Tailings Remedial Action Project Site.

The "FINAL" Completion Report (Part I and Part II) consists of the following documents:

Volume 1

Volume 2 (Appendices A, C, D and E)

Volume 3 (Appendices F, G, H, I, J, K and L)

Volume 4 (Appendix B)

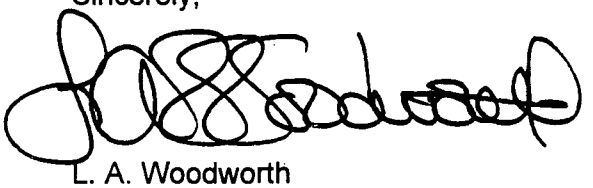
Volume 4A (Appendix B)

Also included in this transmittal, to aid in your review, are three (3) copies each of the Department of Energy's responses to Nuclear Regulatory Commission (NRC) comments on the Maybell, Colorado "DRAFT" CR (Part I), and a Maybell, Colorado, CR review cross-walk. The documents are being shipped in six (6) boxes via regular mail.

The documents and/or information transmitted herein have been determined, by the Department of Energy, to be exempt from disclosure under Exemption 5 of the Freedom of Information Act (5 U. S. C. 552(b)(5) as Amended). Therefore, we request these documents not be released to the general public until they have been approved by the NRC.

Please feel free to contact me at (505) 845-5637 if you have any questions regarding this transmittal.

Sincerely,



L. A. Woodworth
Maybell Site Manager
Uranium mill Tailings Remedial
Action Team
Environmental Restoration Division

5 Enclosures:
1. "FINAL" Completion Report [Part I and Part II], Maybell, Colorado
2. Long Term Surveillance Plan, Maybell, Colorado
3. Final Audit Report, Maybell, Colorado
4. Exhibit 2 Response to NRC Comments
5. Exhibit 3 Completion Report Review Cross-Walk

cc w/o attachments
C. Abrams, NRC
R. Carlson, NRC
W. Naugle, CDPHE/D
F. Bosiljevac, ERD, AL
E. Artiglia, TAC
S. Cox, TAC
R. Waddington, MK-F
Document Control. TAC

EXHIBIT 2

EXHIBIT NO. 2

Response to Nuclear Regulatory Commission (NRC) Comments

Maybell, Colorado Completion Report (Part 1)

Radiation Protection and Soil Cleanup

1. The Remedial Action Plan (RAP) indicated that areas known or suspected of containing elevated levels of Th-230 below the depth of Ra-226 remediation will have 100% of the grids analyzed. Windblown areas will not be analyzed for Th-230, and other areas will have 10% of the grids verified for Th-230. Appendix J of the Completion Report (CR) states that Th-230 sampling was performed on nearly 100% of the sub-pile grids, and approximately 4% of the off-pile grids. The DOE should clarify if there is a discrepancy between the RAP commitment and the Th-230 verification performed.

   DOE Response:

   The Remedial Action Plan (RAP) indicates that Th-230 will be remediated and sampled in accordance with the Generic Protocol for Th-230 Cleanup/Verification at UMTRA Project Sites. The Generic Th-230 Protocol requires 100% sampling in areas suspected of preferentially mobilizing thorium contamination over radium contamination based on process knowledge or other sources such as sampling data. It requires 10% sampling in subpile areas, and no sampling is required in areas where process knowledge and characterization data indicate no potential for preferential mobilization.

   All subpile areas were sampled at 100% frequency. Areas directly adjacent to the subpile were sampled at 100% frequency. The area to the south of the tailings pile was sampled at 100% frequency based on process knowledge and characterization data. All other areas were conservatively sampled at 4% frequency even though process knowledge and characterization data did not indicate the potential for Th-230 mobilization.

   There is no discrepancy between the RAP commitment and the Th-230 sampling performed at the Maybell site. However, the DOE has modified the text in Appendix J so that it is clear that the RAP requirements have been met.

   Implementation:

   The text on page 3 of Appendix J has been modified so that it is clear that the sampling requirements contained in the generic Th-230 protocol (which was referenced in the RAP) have been met.

   Reference Attachment 1 for Appendix J text revisions to be included in the Part II completion report.

Radiation Protection and Soil Cleanup

2. As mentioned to DOE concerning other documents, 40 Code of Federal Regulations (CFR) Part 192.21 was revised as of January 1995 (60 FR 2854). Therefore, the supplemental standard criteria designation mentioned on pages 6, 32, and 43 of the CR should be revised (c = cost, h = other radionuclides).

DOE Response:

The DOE agrees with this comment and has changed the appropriate sections of Appendix K to reflect the proper citations of the supplemental standards criteria identified in the January 1995 Federal Register.

Implementation:

The text on pages 6, 32 and 43 of Appendix K of the Maybell Completion Report has been changed to reflect the proper citations of the supplemental standards criteria contained in the January 1995 Federal Register (60 FR 2854).

Reference Attachment 2 for Appendix K text revisions to be included in the Part II completion report.

Radiation Protection and Soil Cleanup

3. On page 33 of the CR, concerning the supplemental standard for a section of Johnson Wash and three of its gullies, DOE states that some of the ore materials have been influenced by mill processes. However, the soil data provided indicates all ore (Highest Ra-226/U-238 ratio is 11.3 and apparently 6-12 feet deep, page 49). DOE should indicate what data demonstrate that there are tailings in the area or if supplemental standards are just needed for the elevated Th-230 that could be natural.

DOE Response:

The samples collected in Johnson Wash in areas within the influence of the site indicate elevated Th-230 levels which may have been caused by release of Th-230 contaminated materials into Johnson Wash. Sampling does not indicate elevated Th-230 levels upstream from the area of influence of the site. Therefore, the sampling data provides some indication that contamination in Johnson Wash in the area of influence of the site was produced by site processes as explained on page 33 of Appendix K.

Implementation:

None.

Radiation Protection and Soil Cleanup

4. The final radon flux calculations should be provided in the final CR.

DOE Response:

When the final radon flux measurements are completed, the results will be provided in Appendix J of the Part II completion report.

Implementation:

As stated above in the DOE response.

Geotechnical

During an investigation to determine the extent of frost damage to exposed or partially covered radon barrier material, it was determined that the radon barrier thickness was 13 inches, 13 inches, 14 inches, and 18 inches in the four test pits dug in the northeast corner of the disposal cell. This data needs to be evaluated to determine if further tests are required to establish that design specifications were met during construction of the radon barrier.

DOE should submit calculations to support its position that only 13 inches of competent radon barrier is adequate, and also establish that the radon barrier thickness over a major portion of the disposal cell is as-designed (18 inches). If the as-built thickness of the radon barrier is less than 18 inches over a major portion of the disposal cell, then the thickness of the competent radon barrier must be correspondingly reduced in radon flux calculations to account for a frost depth of 66.8 inches.

DOE Response:

A Nonconformance Report (NCR), NCR-MAY-97-01, was issued by the MK-F Albuquerque Project Office QA Department on May 7, 1997, due to the radon barrier thickness measuring of 13 to 14 inches at one location on the north sideslope of the disposal embankment. Upon receipt of the NCR, MKES examined all existing information related to radon barrier thickness, including the survey data on the 100 ft. grids and the daily quality control check sheets prepared during placement of the radon barrier. As noted in the MKES recommendation regarding resolution of the NCR (included as Exhibit B of Appendix E, Radon Barrier Material section) the information indicated that, in general, the thickness of the placed radon barrier was within the specified tolerance of 18 inches $\pm$ 1.2 inches. MKES also noted the fact that a radon barrier thickness of 18 inches was measured approximately 35 feet from the area identified in the NCR, indicating that the reported nonconformity was limited to a small area.

Subsequently, a radon barrier calculation was prepared to evaluate the effects of a 13 inch thickness, as noted in the nonconforming area. Evaluated was the average radon flux over the entire cell (MKES calculation No. 375-01-00 included as Exhibit B of Appendix E, Radon Barrier Material section). Using all the existing data, and conservative assumptions regarding the area in question, MKES calculations showed that the average radon flux for the entire cell is well below the EPA standard.

Based on the overall radon barrier thickness being within the specified limits, this small isolated area noted in the above referenced NCR, was determined to perform adequately as is, and poses no risk of exceeding emanation requirements. Therefore, no further testing, measurements or calculations with regard to the nonconforming area are required.

Implementation:

None, NCR-MAY-97-01, MKES recommendations, and Calculation No. 375-01-00 were included as Exhibit B of Appendix E, Radon Barrier Material section of the Part I completion report.

Groundwater Hydrology

No information was provided in the CR on well abandonment. DOE should provide documentation detailing which monitor wells have been abandoned at the site. Additionally, locations of wells not abandoned, including any piezometers, should be included on the as-built drawings included in the final CR.

DOE Response:

The list of abandoned wells, including individual well abandonment records, will be submitted in the Part II completion report. In addition, the locations of both abandoned and existing wells will be shown on the as-built drawings presented in the Part II completion report.

Implementation:

As stated above in the DOE response.

Surface Water Hydrology and Erosion Protection

No riprap material data or final surface contour data was provided in the CR, so no evaluation could be performed. The data should be provided in the final CR.

DOE Response:

The erosion protection material data and the as-built surface contours will be provided in the Part II completion report.

Implementation:

As stated above in the DOE response.

EXHIBIT 3

EXHIBIT NO. 3

MAYBELL, COLORADO
COMPLETION REPORT REVIEW CROSS-WALK
PART 1 AND PARTS 1 & 2

Completion Report Section or Appendix	Part 1	Parts 1 & 2	Review Recommendation
Section I - Executive Summary	Section provided as Rev. F	Section revised to Rev. F1	**Review is recommended**
Section II - Critical Review Summary	Entire section not provided. **NRC comment on providing documentation of monitor well abandonment, and location for abandoned wells and those that remain. (See Exhibit No. 2)**	Section provided. **Documentation of monitor well abandonment addressed in Section II, with all abandonment reports provided. Abandoned and remaining monitor well locations provided on As-Built Drawing No. MAY-PS-10-0230 at the end of Section II, Monitor Well Abandonment Reports tab.**	**Review is recommended**
Section III - Design Assessment	Section provided as Rev. F1	Section revised, but is still Rev. F1	**Review is recommended**
Section IV - Remedial Action Assessment	Section provided as Rev. F1	Section revised, but is still Rev. F1	**Review is recommended**
Appendix A - Design Criteria	Not provided in NRC version of a completion report	Not provided in NRC version of a completion report	None required
Appendix B - Design Calculations **(See end of this table)**	**(See end of this table)**	**(See end of this table)**	**(See end of this table)**

Completion Report Section or Appendix	Part 1	Parts 1 & 2	Review Recommendation
Appendix C - Technical Specifications	Appendix C provided	Specification Nos. 02278 and 02935 were revised	**Review is recommended of Specification Nos. 02278 and 02935**
Appendix D - As-Built Drawings	Entire appendix not provided. **NRC comment on providing drawing with location of abandoned monitor wells and those that remain. NRC comment on providing final surface contour data. (See Exhibit No. 2)**	Appendix provided. **Abandoned and remaining monitor well locations provided on As-Built Drawing No. MAY-PS-10-0230. Final surface contour data provided on As-Built Drawing No. MAY-PS-10-0232.**	**Review is recommended**
Appendix E - Materials Testing Summary, Contaminated Material	Text, comparison chart, frequency chart and plots provided	Revisions made to text, comparison chart, frequency chart and plots	**Review is recommended**
Appendix E - Radon Barrier Material	Text, Exhibits A, B and C, comparison chart, frequency chart and plots provided. **NRC comment on radon barrier thickness, resulting flux and frost penetration depth. (See Exhibit No. 2)**	Revisions made to text, comparison chart, frequency chart and plots. **NRC comment addressed in Appendix E - Radon Barrier Material text revisions, and Calculation No. 14-326-07-00.**	**Review is recommended**
Appendix E - Frost Protection Material	Text, comparison chart, frequency chart and plots provided	Revisions made to text, comparison chart, frequency chart and plots	**Review is recommended**

Completion Report Section or Appendix	Part 1	Parts 1 & 2	Review Recommendation
Appendix E - Bedding Material	Not provided. **NRC comment on absence of erosion protection material data. (See Exhibit No. 2)**	Text, comparison chart, frequency chart and plots provided. **Bedding material text and data provided in Appendix E.**	**Review is recommended**
Appendix E - Type "A" Riprap	Not provided. **NRC comment on absence of riprap material data. (See Exhibit No. 2)**	Text, comparison chart, frequency chart and plots provided. **Riprap "A" material text and data provided in Appendix E.**	**Review is recommended**
Appendix E - Type "B" Riprap	Not provided. **NRC comment on absence of riprap material data. (See Exhibit No. 2)**	Text, comparison chart, frequency chart and plots provided. **Riprap "B" material text and data provided in Appendix E.**	**Review is recommended**
Appendix E - Type "C" Riprap	Not provided. **NRC comment on absence of riprap material data. (See Exhibit No. 2)**	Text, Exhibit A, comparison chart, frequency chart and plots provided. **Riprap "C" material text and data provided in Appendix E.**	**Review is recommended**
Appendix E - Type "D" Riprap	Not provided. **NRC comment on absence of riprap material data. (See Exhibit No. 2)**	Text, non-conformance disposition, comparison chart, and frequency chart provided. **Riprap "D" material text and data provided in Appendix E.**	**Review is recommended**

Completion Report Section or Appendix	Part 1	Parts 1 & 2	Review Recommendation
Appendix E - Type "E" Riprap	Not provided. **NRC comment on absence of riprap material data. (See Exhibit No. 2)**	Text, non-conformance disposition, comparison chart, and frequency chart provided. **Riprap "E" material text and data provided in Appendix E.**	**Review is recommended**
Appendix E - Photographs	Photographs provided	Additional photographs provided	**Review is recommended**
Appendix F - Permits, Titles and Statement of Compliance	Not provided in NRC version of a completion report	Not provided in NRC version of a completion report	None required
Appendix G - Pre-Remedial Action Site Conditions	Not provided in NRC version of a completion report	Not provided in NRC version of a completion report	None required
Appendix H - Post-Remedial Action Site Conditions	Entire appendix not provided	Appendix provided	**Review is recommended**
Appendix I - Audit, Inspection & Surveillance Summary	Appendix I provided	Appendix I provided, no revisions	Reviewed previously
Appendix J - Verification Measurements	Text, Figure J.1, Tables J.1, J.2, J.3, J.4, J.5 and J.6, Exhibit J.1 and Exhibit J.2 were provided. **NRC comment on Th-230 sampling frequency. NRC comment on final radon flux measurements. (See Exhibit No. 2)**	Revisions made to text, Figure J.1, Tables J.2, J.3 and J.4. **NRC comment on Th-230 sampling addressed. Final radon flux measurements provided.**	**Review is recommended**

Completion Report Section or Appendix	Part 1	Parts 1 & 2	Review Recommendation
Appendix K - Supplemental Standards	Introductory text, Section A and Section B provided. **NRC comment on FR citation. (See Exhibit No. 2)**	Introductory text, Section A and Section B provided and revised. **NRC comment on FR citation addressed.**	**Review is recommended**
Appendix L - Technical Reports and Reference Information	Appendix L provided	Appendix L provided and revised	**Review is recommended**
Appendix B - Design Calculations			
14-323-11-01	Calc. provided	Calc. provided, no revisions	Reviewed previously
14-323-02-01	Calc. provided	Calc. provided, no revisions,	Reviewed previously
14-336-15-00	Calc. provided	Calc. provided, no revisions	Reviewed previously
14-354-01-00	Calc. provided	Calc. provided, no revisions	Reviewed previously
14-354-02-01	Calc. 14-354-02-00 provided	Calc. revised to 14-354-02-01	**Review is recommended**
14-354-03-01	Calc. 14-354-03-00 provided	Calc. revised to 14-354-03-01	**Review is recommended**
14-336-17-00	Calc. not provided	Calc. provided	**Review is recommended**
14-330-01-01	Calc. provided	Calc. provided, no revisions	Reviewed previously
14-337-01-01	Calc. provided	Calc. provided, no revisions	Reviewed previously
14-392-01-01	Calc. not provided	Calc. provided	**Review is recommended**
14-394-01-02	Calc. not provided	Calc. provided	**Review is recommended**

Completion Report Section or Appendix	Part 1	Parts 1 & 2	Review Recommendation
Appendix B - Design Calculations (Continued)			
14-338-01-01	Calc. provided	Calc. provided, no revisions	Reviewed previously
14-338-02-00	Calc. provided	Calc. provided, no revisions	Reviewed previously
14-396-01-01	Calc. not provided	Calc. provided	**Review is recommended**
14-335-02-02	Calc. not provided	Calc. provided	**Review is recommended**
14-348-01-00	Calc. provided	Calc. provided, no revisions	Reviewed previously
14-327-02-01	Calc. provided	Calc. provided, no revisions	Reviewed previously
14-398-03-01	Calc. provided	Calc. provided, no revisions	Reviewed previously
14-326-01-02	Calc. not provided	Calc. provided	**Review is recommended**
14-326-04-00	Calc. not provided	Calc. provided	**Review is recommended**
14-326-07-00	Calc. not provided	Calc. provided	**Review is recommended**
14-336-06-00	Calc. provided	Calc. provided, no revisions	Reviewed previously
14-350-01-00	Calc. provided	Calc. provided, no revisions	Reviewed previously
14-336-05-01	Calc. provided	Calc. provided, no revisions	Reviewed previously
14-336-11-02	Calc. 14-336-11-01 provided	Calc. revised to 14-336-11-02	**Review is recommended**
14-336-12-01	Calc. provided	Calc. provided, no revisions	Reviewed previously

Completion Report Section or Appendix	Part 1	Parts 1 & 2	Review Recommendation
Appendix B - Design Calculations (Continued)			
14-336-13-04	Calc. 14-336-13-03 provided	Calc. revised to 14-336-13-04	**Review is recommended**
14-336-07-03	Calc. not provided	Calc. provided	**Review is recommended**
14-326-03-01	Calc. not provided	Calc. provided	**Review is recommended**

Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

23 January, 1998

Mr. Joseph J. Holonich, Chief
Uranium Recovery Branch
Office of Nuclear Materials
Safety and Safeguards
Mail Stop T7J9
U. S. Nuclear Regulatory Commission
11545 Rockville Pike
Rockville, Maryland
20852-2747

Dear Mr. Holonich:

Enclosed for your review and comment are four (4) copies of the Long-Term Surveillance Plan (LTSP) for the Maybell, Colorado, Uranium Mill Tailings Remedial Action (UMTRA) site. Upon resolution of any comments you may have, the document will be modified, as appropriate, through a page change process. Under this scenario, this document will ultimately become the FINAL LTSP for the Maybell UMTRA Disposal Site, per agreement between the Department of Energy and the Nuclear Regulatory Commission. Please note the LTSP is not complete at this time. All missing material will be provided by this office upon completion of remedial action.

The documents and/or information transmitted herein have been determined, by the Department of Energy, to be exempt from disclosure under Exemption 5 of the Freedom of Information Act (5 U. S. C. 552(b)(5) as amended. Therefore, we request that these documents not be released to the general public at this time.

Please feel free to contact me at (505) 845-5637 if you have any questions concerning this transmittal.

Sincerely,

L. A. Woodworth
Maybell Site Manager
Uranium Mill Tailings Remedial
Action Team
Environmental Restoration Division