



Department of Energy  
Office of Legacy Management

JUN 27 2007

Keith McConnell, Deputy Director  
Decommissioning and Uranium Recovery Licensing Directorate  
Division of Waste Management and Environmental Protection  
Office of Federal and State Materials and Environmental Management Programs  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Subject: Draft Long-Term Surveillance Plan for the Maybell West, Colorado,  
UMTRCA Title II Site

Dear Mr. McConnell:

Enclosed for the U.S Nuclear Regulatory Commission review is the draft *Long-Term Surveillance Plan for the U. S. Department of Energy Maybell West (UMTRCA Title II) Disposal Site, Moffat County, Colorado*. This Long-Term Surveillance Plan (LTSP) captures information provided in licensee documents and the March 2007 Completion Review Report compiled by the Colorado Department of Public Health and Environment. The LTSP is intended to satisfy the requirements set forth in 10 CFR 40.28 whereby the long-term custodian must provide an LTSP to the NRC as a step in the licensing/license termination process.

Please call me at (202) 586-5881 if you have questions.

Sincerely,

Digitally signed by Jagdish L.  
Malhotra  
Date: 2007.06.26 15:59:43  
-04'00'

Jagdish Malhotra  
Site Manager

Enclosures

c w/enclosures:

P. Michalak, NRC (3 copies)  
Project Record File LMAW 1.1 (D. Roberts)

cc w/o enclosures:

W. Von Till, NRC  
R. Bush, DOE/LM-20  
M. Widdop, Stoller (e)

Malhotra/LTSP Maybell 2007.doc

19901 Germantown Road, Germantown, MD 20874

2597 B 3/4 Road, Grand Junction, CO 81503

3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507

626 Cochrans Mill Road, P.O. Box 10940, Pittsburgh, PA 15236

1000 Independence Ave., S.W., Washington, DC 20585

11025 Dover Street, Suite 1000, Westminster, CO 80021

REPLY TO: Grand Junction Office



**Long-Term Surveillance Plan for  
the Maybell West (UMTRCA Title II)  
Disposal Site  
Moffat County, Colorado**

June 2007

**DRAFT**



U.S. Department  
of Energy

**Office of Legacy Management**

**Office of Legacy Management**  
**Long-Term Surveillance Plan**  
**for the**  
**Maybell West (UMTRCA Title II) Disposal Site**  
**Moffat County, Colorado**

June 2007

Work Performed by S.M. Stoller Corporation under DOE Contract No. DE-AC01-02GJ79491  
for the U.S. Department of Energy Office of Legacy Management, Grand Junction, Colorado

# Contents

1.0	Introduction.....	1-1
1.1	Purpose.....	1-1
1.2	Legal and Regulatory Requirements.....	1-1
1.3	Role of the U.S. Department of Energy.....	1-2
2.0	Final Site Conditions.....	2-1
2.1	Site History.....	2-1
2.2	General Description of the Disposal Site Vicinity.....	2-1
2.3	Disposal Site Description.....	2-3
	2.3.1 Site Ownership.....	2-3
	2.3.2 Directions to the Disposal Site.....	2-3
	2.3.3 Description of Surface Conditions.....	2-3
	2.3.4 Permanent Site Surveillance Features.....	2-4
	2.3.5 Site Geology and Hydrology.....	2-4
2.4	Tailings Impoundment Design.....	2-4
	2.4.1 Encapsulation Design.....	2-10
	2.4.2 Ancillary Cell.....	2-10
	2.4.3 Surface Water Diversion System.....	2-10
2.5	Ground Water Conditions.....	2-12
3.0	Long-Term Surveillance Program.....	3-1
3.1	General License for Long-Term Custody.....	3-1
3.2	Requirements of the General License.....	3-1
3.3	Annual Site Inspections.....	3-2
	3.3.1 Frequency of Inspections.....	3-2
	3.3.2 Inspection Procedure.....	3-2
	3.3.3 Inspection Checklist.....	3-4
	3.3.4 Personnel.....	3-4
3.4	Annual Inspection Reports.....	3-4
3.5	Follow-up Inspections.....	3-4
	3.5.1 Criteria for Follow-up Inspections.....	3-5
	3.5.2 Personnel.....	3-6
	3.5.3 Reports of Follow-up Inspections.....	3-6
3.6	Routine Site Maintenance and Emergency Measures.....	3-6
	3.6.1 Routine Site Maintenance.....	3-6
	3.6.2 Emergency Measures.....	3-6
	3.6.3 Criteria for Routine Site Maintenance and Emergency Measures.....	3-7
	3.6.4 Reporting Maintenance and Emergency Measures.....	3-7
3.7	Environmental Monitoring.....	3-8
	Ground Water Monitoring.....	3-8
3.8	Records.....	3-8
3.9	Quality Assurance.....	3-8
3.10	Health and Safety.....	3-8
4.0	References.....	4-1

## Figures

Figure 2-1. General Location Map of the Maybell West, Colorado, Disposal Site .....	2-2
Figure 2-2. Maybell West, Colorado, Disposal Site Map .....	2-5
Figure 2-3. Message on Site Marker at the Maybell West, Colorado, Disposal Site.....	2-7
Figure 2-4. Message on Warning Sign at Maybell West, Colorado, Disposal Site .....	2-8
Figure 2-5. Simplified Stratigraphic Column.....	2-9
Figure 2-6. Typical Cover Cross-Section.....	2-11
Figure 3-1. Map of Inspection Transects for the Maybell West, Colorado, Disposal Site .....	3-3

## Tables

Table 1-1. Requirements of the LTSP and the Long-Term Custodian of Maybell West Site ...	1-2
Table 3-1. Transects Used During First Inspection of the Maybell West Site.....	3-2
Table 3-2. DOE Criteria for Maintenance and Emergency Measures .....	3-7

## Appendixes

Appendix A	Real Estate Information
Appendix B	Initial Site Inspection Checklist
Appendix C	Custodianship Refusal Letter

# 1.0 Introduction

## 1.1 Purpose

This Long-Term Surveillance Plan (LTSP) explains how the U.S. Department of Energy (DOE) Office of Legacy Management (LM) will fulfill general license requirements of Title 10 *Code of Federal Regulations* Part 40.28 (10 CFR 40.28) as the long-term custodian of the former Umetco Minerals Corporation Maybell uranium mill tailings disposal site near Maybell in Moffat County, Colorado. The LM Program at the DOE-LM office in Grand Junction, Colorado, is responsible for the preparation, revision, and implementation of this LTSP, which specifies procedures for inspecting, monitoring, maintenance, reporting, and maintaining records pertaining to the site.

## 1.2 Legal and Regulatory Requirements

The Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978 (42 USC 7901, as amended) provides for the remediation (or reclamation) and regulation of uranium mill tailings at Title I and Title II sites. Title I addresses former uranium mill sites that were unlicensed as of January 1, 1978, and essentially abandoned. Title II addresses uranium-milling sites under specific license as of January 1, 1978. In both cases, the licensing agency for uranium production is the U.S. Nuclear Regulatory Commission (NRC), or in the case of certain Title II disposal sites, an Agreement State. The former Umetco Maybell site is a Title II site under UMTRCA. The State of Colorado is an Agreement State.

Federal regulations at 10 CFR 40.28 provide for the licensing, custody, and long-term care of uranium and thorium mill tailings sites closed (reclaimed) under Title II of UMTRCA.

A general license is issued by NRC for the custody and long-term care, including monitoring, maintenance, and emergency measures necessary to ensure that uranium and thorium mill tailings disposal sites will be cared for in a manner that protects public health, safety, and the environment after closure (completion of reclamation activities).

The general (long-term custody) license becomes effective when the current specific license is terminated by NRC or an Agreement State, and when a site-specific LTSP, this document, is accepted by NRC.

Requirements of the LTSP and general requirements for the long-term custody of the Maybell West site are addressed in various sections of the LTSP (Table 1-1).

The plans, procedures, and specifications in this LTSP are based on *Guidance for Implementing the Long-Term Surveillance Program for UMTRCA Title I and Title II Disposal Sites* (DOE 2001). Rationale and procedures in the guidance document are considered part of this LTSP.

Table 1-1. Requirements of the LTSP and the Long-Term Custodian of the Maybell West, CO, Disposal Site

LTSP Requirements		
	Requirement	Location
1.	Description of final site conditions	Section 2.0
2.	Legal description of site	Appendix A
3.	Description of the long-term surveillance program	Section 3.0
4.	Criteria for follow-up inspections	Section 3.5.1
5.	Criteria for maintenance and emergency measures	Section 3.6.3
Requirements for the Long-Term Custodian (DOE)		
	Requirement	Location
1.	Notification to NRC of changes to the LTSP	Section 3.1
2.	NRC permanent right-of-entry	Section 3.1
3.	Notification to NRC of significant construction, actions, or repairs at the site.	Sections 3.5 and 3.6

### 1.3 Role of the U.S. Department of Energy

In 1988, DOE designated the Grand Junction facility as the program office for managing DOE disposal sites that contain regulated low-level radioactive materials and portions of sites that do not have a DOE mission after cleanup, as well as other sites (including Title II sites) as assigned, and to establish a common office for the security, surveillance, monitoring, and maintenance of those sites. DOE established the Long-Term Surveillance and Maintenance Program to fulfill these responsibilities.

In December 2003, DOE formally established LM. The LM mission includes "...implementing long-term surveillance and maintenance projects at sites transferred to LM to ensure sustainable protection of human health and the environment." LM is responsible for implementing this LTSP.

## 2.0 Final Site Conditions

Reclamation at the Maybell West mill facility consisted of stabilizing the heap leach cells, salvaging equipment that could be decontaminated, demolishing the balance of site structures and equipment, and disposing of the resulting debris on site in the reclaimed heap leach cells or the reclaimed evaporation pond area. Contaminated mill site soils also were consolidated and disposed of on site into the Heap Leach Repository and Ancillary Cell (CDPHE 2007). All disposed materials are isolated from the environment in engineered disposal structures.

### 2.1 Site History

The Maybell West facility was a heap leaching operation, with heap leach cells constructed and operated from 1975 through 1982 by Umetco Minerals Corporation. The site is located in a historic uranium-mining district characterized by large open pit mines and associated overburden piles (Umetco 2002).

The leach cells were constructed by placing and compacting a 1-foot clay liner, installing a liquor drain collection system, and constructing leach cell embankments from overburden materials. During operations, low-grade uranium ore mined from local pits was placed into 35- to 55-foot-high heap leach cells. Sulfuric acid was used to leach the material to extract uranium minerals. Leachate was then collected by the drain system and piped to an adjacent plant for concentration. The plant consisted of a series of holding ponds where the leachate was either recycled to the heaps for upgrading or processed by ion exchange within the outdoor plant. Additional processing resulted in a uranium oxide precipitate that was sent offsite for final purification (Umetco 2002).

Processing operations ceased in 1981 but liquid waste management operations continued. Liquid waste was managed by evaporation of pond liquids and evaporation from the surface of the heap leach cells. A spray evaporation system to increase liquid waste disposal efficiency was installed in 1988 and operated until 1994. In 1991 the sides and a portion of the top of the pile were regraded and an interim revegetated cover was placed over the heap leach materials (Umetco 1995a).

Formal decommissioning and reclamation of the site under an approved reclamation plan began in 1995 (Umetco 1995a). Final reclamation construction activities were completed in 2005 and approved by the Colorado Department of Public Health and Environment (CDPHE). A final Completion Review Report was submitted by CDPHE to NRC for their review in support of termination of Umetco's license (CDPHE 2007). Outcome of that review is pending. A total of 1,975,000 tons of tailings are stabilized at the Maybell West disposal site. The main disposal structure is referred to as the Heap Leach Repository in site-related documentation. A smaller Ancillary Cell contains evaporation pond materials and residual contaminated debris generated at the close of reclamation activities.

### 2.2 General Description of the Disposal Site Vicinity

The Maybell West disposal site is in northwestern Colorado in Moffat County, approximately 4 miles north-northeast of the town of Maybell and 25 miles west of Craig (Figure 2-1).

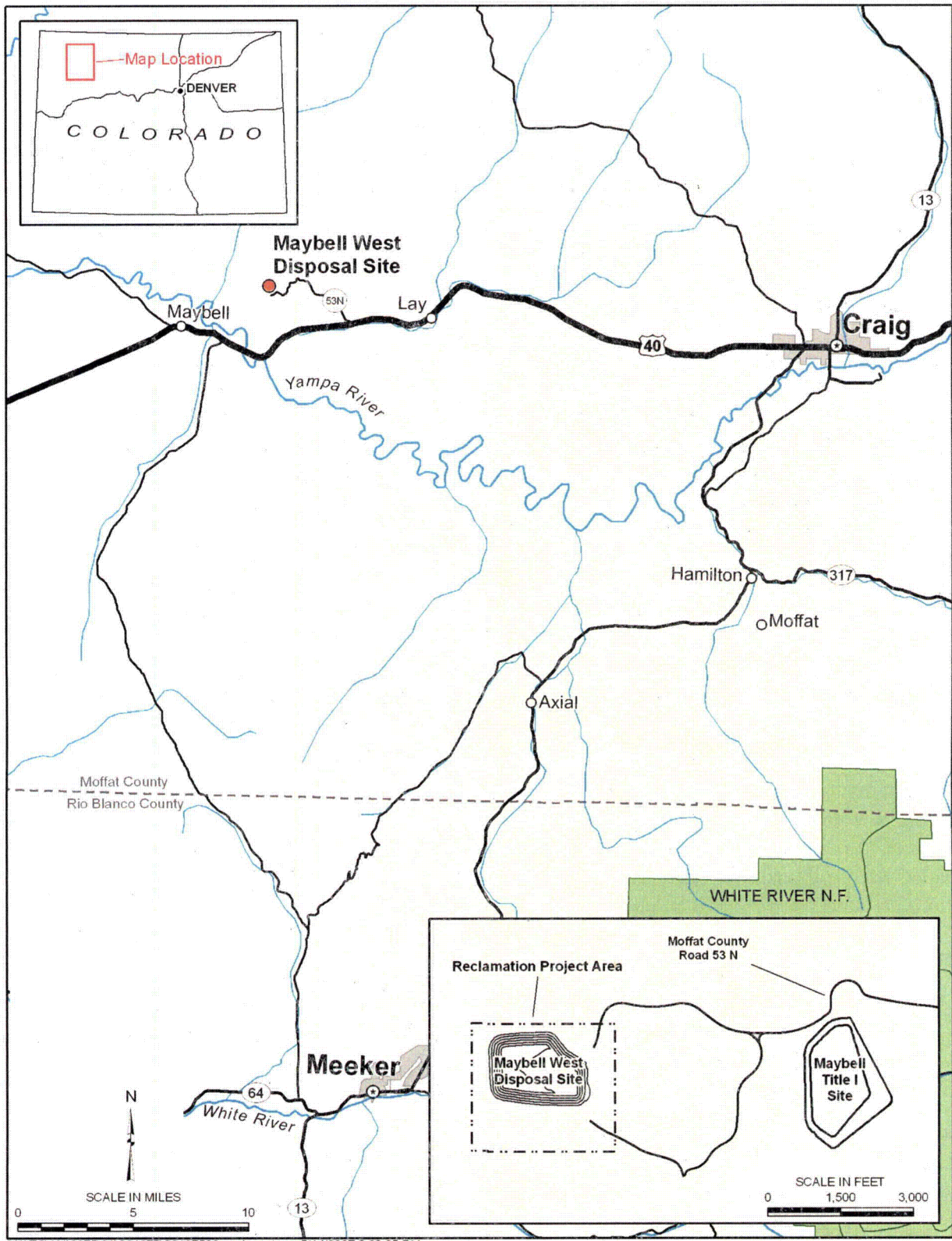


Figure 2-1. General Location Map of the Maybell West, Colorado, Disposal Site

The site is about 2 miles northeast of the Yampa River at an elevation of about 6,200 feet. This location is within the Wyoming Basin physiographic province. Topography of the site is rolling terrain with small dry washes that flow only during intense rainfall events. The washes drain to the Yampa River. Precipitation averages 12 inches per year with a concomitant high evapotranspiration rate. Vegetation is generally sparse and consists primarily of sagebrush, saltbrush, and short grasses (Umetco 1995b). Except for the mineral-related activity that has occurred in the vicinity, virtually all the land near the site is used for grazing (FBD 1977). Much of the surrounding property is administered by the Bureau of Land Management (BLM), and is not available for residential development.

## **2.3 Disposal Site Description**

### **2.3.1 Site Ownership**

Upon completion of reclamation work, the United States Government assumed ownership of the Maybell West disposal site property. Supporting real estate information is presented in Appendix A. The site includes the reclaimed heap leach cells, ancillary cell, and run on and run off diversion channels and drains and associated erosion protection systems. The site layout is illustrated on Figure 2-2.

### **2.3.2 Directions to the Disposal Site**

From Maybell, Colorado, travel east on U.S. Highway 40 approximately 11 miles to the junction with County Road 53 N. Turn left and proceed northwest on County Road 53 N approximately 3 miles, passing through the Maybell, Colorado, Title I site. At the west end of the Title I site, turn left and follow the road that winds around the Rob Pit. Turn right at the intersection with the BLM access road and follow the BLM access road to the site entrance.

### **2.3.3 Description of Surface Conditions**

The final surface conditions at the Maybell West disposal site are a combination of rock armoring and contouring to achieve the necessary surface water run on and run off control and erosion protection to satisfy the longevity design requirements.

The contaminated materials are contained in the reclaimed heap leach cells and the reclaimed evaporation ponds. The entire reclaimed heap leach cell and evaporation pond areas are riprap armored. The heap leach cells are graded to drain to the center of the leach cell cover. A graded and riprap-armored channel conveys water from the center of the leach cell cover to the east and discharges to the former open pit mine known as the Rob Pit.

The heap leach area occupies about 60 acres (Umetco 1995a). The total contiguous riprap covering over the heap leach cells and the reclaimed evaporation ponds is approximately 72.1 acres of the 180-acre disposal site property. There are no monitor wells at the Maybell West site. The engineered features of the site are with barbed wire stock fence. The final site topography is shown on Figure 2-2. The Ancillary Cell occupies 4.5 acres.

### 2.3.4 Permanent Site Surveillance Features

Eight boundary monuments, a site marker, and warning signs are the permanent long-term surveillance features at the Maybell West disposal site. These features will be inspected and maintained as necessary as part of the controls for the site.

The unpolished granite site marker with an incised message identifying the location of the isolated contaminated materials on the Maybell West disposal site property is placed just inside the main entrance gate off of County Road 53N. The message on the granite site marker is shown on Figure 2-3.

The warning sign also is placed near the main entrance to the site property in a position where a random visitor would likely be able to see the sign. The message on the warning sign is shown on Figure 2-4.

Locations of the permanent site surveillance features are shown on Figure 2-2.

### 2.3.5 Site Geology and Hydrology

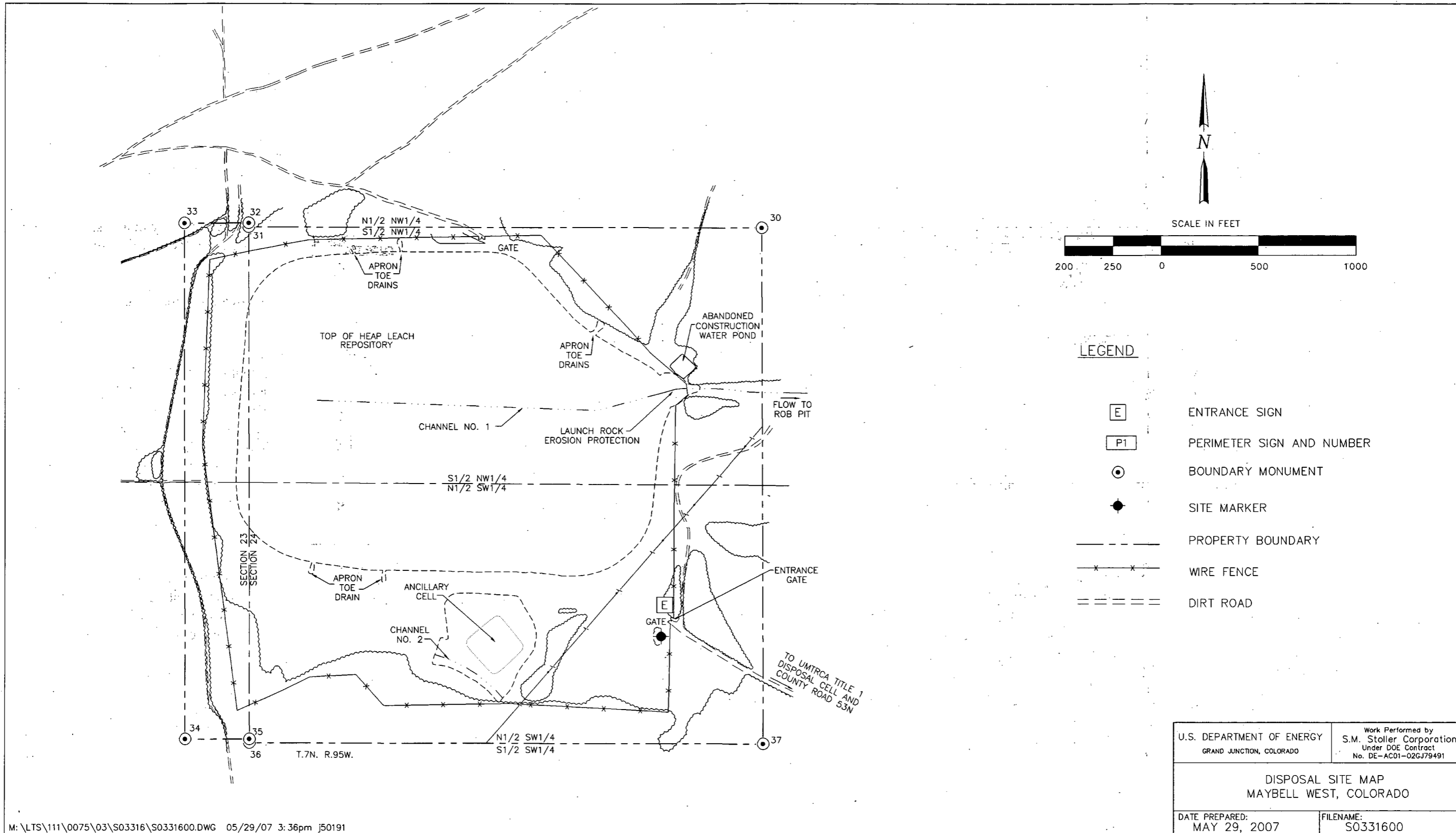
The Maybell West site is situated on gently rolling terrain that ultimately drains toward the Yampa River, to the south. The Browns Park Formation (Miocene) directly underlies the site and is the host rock for the uranium ore in the area (FBD 1977). This formation is composed of white to light gray and tan, partly tuffaceous sandstone with thin layers of conglomerate, siltstone, rhyolitic air-fall tuff, and minor limestone lenses. The thickness of the Browns Park Formation is variable but is believed to be approximately 1,000 feet at the site. Regionally, the Browns Park Formation unconformably overlies older rock units ranging in age from Paleocene to Precambrian. The Mancos Shale underlies the Browns Park Formation at the site and consists of a very thick sequence of dark gray marine shale (Umetco 1995b). A simplified stratigraphic column is shown on Figure 2-5.

The reclaimed heap leach facility is situated south of the axis of the east-west trending geologic feature known as the Browns Park Syncline which is a depositional feature reflecting Miocene paleo-topography. Beneath the unconformity at the base of the Browns Park Formation the structural aspect changes abruptly to beds that are inclined steeply to the north (Umetco 1995b).

Ground water beneath the site occurs within the Browns Park Formation, under unconfined conditions, at a depth of approximately 200 feet. Recharge to the Browns Park Formation in the site vicinity is by infiltration of precipitation but is minimal due to low precipitation and high evaporation. Ground water ultimately discharges to the Yampa River southwest of the site (Umetco 1995b).

## 2.4 Tailings Impoundment Design

The Heap Leach Repository (disposal cell) is in the location of the former heap leach facility. During processing, the uranium ore was placed in the heap leach cells on a compacted clay liner. The uranium was recovered by flooding the cells with a dilute sulfuric acid solution that leached uranium from the ore and discharged the pregnant solution through slotted collection pipes at the



M:\LTS\111\0075\03\S03316\S0331600.DWG 05/29/07 3:36pm j50191

Figure 2-2. Maybell West, Colorado, Disposal Site Map

This page intentionally left blank

# MAYBELL WEST, COLORADO

DATE OF CLOSURE:

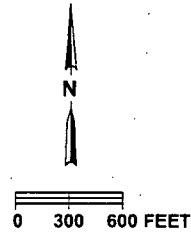
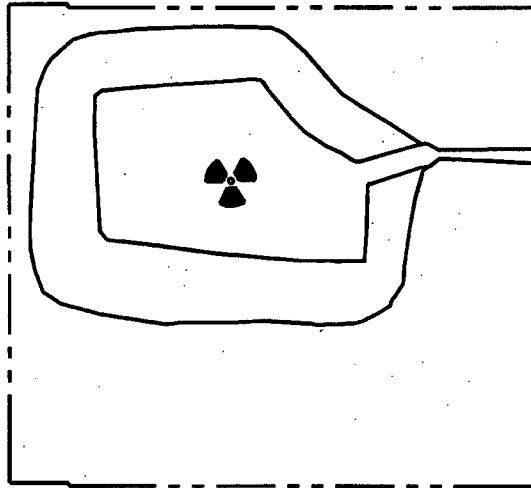
AUGUST 2005

TONS OF TAILINGS:

1,975,000

RADIOACTIVITY:

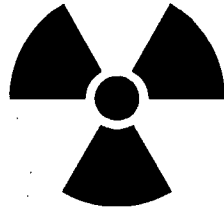
96 Curies, Ra-226



U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AC01-02GJ79491
SITE MARKER AT MAYBELL WEST, COLORADO DISPOSAL SITE	
DATE PREPARED: MARCH 27, 2007	FILENAME: S0187800

M:\LTS\111\0075\01\S01878\S0187800.DWG 03/27/07 3:44pm WhitneyJ

Figure 2-3. Message on Site Marker at the Maybell West, Colorado, Disposal Site



**MAYBELL WEST, COLORADO  
URANIUM MILL TAILINGS REPOSITORY**

**NO TRESPASSING  
THE U.S. DEPARTMENT OF ENERGY  
24-HOUR TELEPHONE NUMBER (970) 248-6070**

SCHMATIC-NOT TO SCALE

U.S. DEPARTMENT OF ENERGY  
GRAND JUNCTION, COLORADO

Work Performed by  
S.M. Stoller Corporation  
Under DOE Contract  
No. DE-AC01-02GJ79491

WARNING SIGN AT  
MAYBELL WEST, COLORADO  
DISPOSAL SITE

DATE PREPARED:  
JUNE 21, 2005

FILENAME:  
S0187700

M:\LTS\111\0075\01\S01877\S0187700.DWG 06/21/05 11:33am J50191

Figure 2-4. Warning Sign at Maybell West, Colorado, Disposal Site

SYSTEM	FORMATION	THICKNESS (FT)	CHARACTER	POSITION OF TAILINGS
TERTIARY (MIOCENE)	BROWNS PARK FORMATION	500-1500	SANDSTONES WITH SOME SILTSTONE AND BASAL CONGLOMERATE; FORMS VALLEYS, AND HILLS; AQUIFER	← MAYBELL TAILINGS
MAJOR UNCONFORMITY				
CRETACEOUS	MANCOS SHALE	2000-5000	GREY SHALE; FORMS VALLEYS AND SLOPES; AQUICLUDE	
	DAKOTA SANDSTONE	0-200	GREY AND BROWN SANDSTONE, SHALE AND CONGLOMERATE; CAPS MESAS AND FORMS CLIFFS; LOW QUALITY, LOW QUANTITY, AQUIFER	
OLDER SEDIMENTARY ROCKS				

M: \LTS\111\0075\01\S01876\S0187600.DWG 07/21/05 08:08am J50191

Figure 2-5. Simplified Stratigraphic Column, Maybell West, CO, Disposal Site

bottom of the cells. In 1991, the sides and a portion of the top of the pile were regraded and an interim (6-inch-thick nominal) cover was placed over the heap leach materials (Umetco 2002). Contaminated materials and equipment from the site were consolidated from 1991 to 1996 into an above-grade, stabilized-in-place embankment extending to a maximum height of 75 feet above the prevailing surface grade (CDPHE 2007).

#### **2.4.1 Encapsulation Design**

A clay liner controls the discharge of contaminants to the subsurface. A clayey soil cover and random fill control precipitation infiltration and radon emissions. Riprap armoring provides erosion protection for the encapsulated materials.

A minimum 12-inch thick clay liner was placed for the bottom of the heap leach cells during the operational period when the leach cells were constructed. During the reclamation phase, the heap materials were reshaped to conform to the reclamation design. A minimum 18-inch-thick clayey soil layer was placed over the reshaped heap materials. On top of the clayey soil layer is a 42- to 48-inch-thick layer of random fill that is covered by a 6-inch-thick layer of riprap/bedding material having a median diameter ( $D_{50}$ ) of 3/8- to 1 1/2-inches. A 12-inch thick layer of 5- to 8-inch  $D_{50}$  riprap covers the 5:1 side slopes of the reclaimed pile. A typical cover cross section is shown on Figure 2-6.

#### **2.4.2 Ancillary Cell**

The Ancillary Cell was an existing heap drainage storage pond that was constructed below grade and adjacent to the Heap Leach Repository. Synthetic pond liner material and contaminated debris remaining on the site was compacted in this cell. The Ancillary Cell was covered with a minimum of 5.5 feet of cover, including radon barrier clay, random fill, and erosion protection material (CDPHE 2007).

#### **2.4.3 Surface Water Diversion System**

The cover of the reclaimed pile is graded to drain to a channel in the center of the cover. This channel then discharges incident precipitation through the channel outlet to the former open pit uranium mine known as the Rob Pit, to the east of the reclaimed heap leach pile. The channel outlet is further protected by a launch rock basin designed to stop headward erosion in the channel by releasing large riprap into the channel as headward erosion moves into the launch rock basin. Three different riprap sizes are used for erosion protection in the channel depending on channel slope and water velocity estimates. The largest channel riprap is an 18- to 24-inch  $D_{50}$ . This large riprap is also used for the launch rock. The reclaimed heap leach pile and diversion channel layout is shown on Figure 2-2.

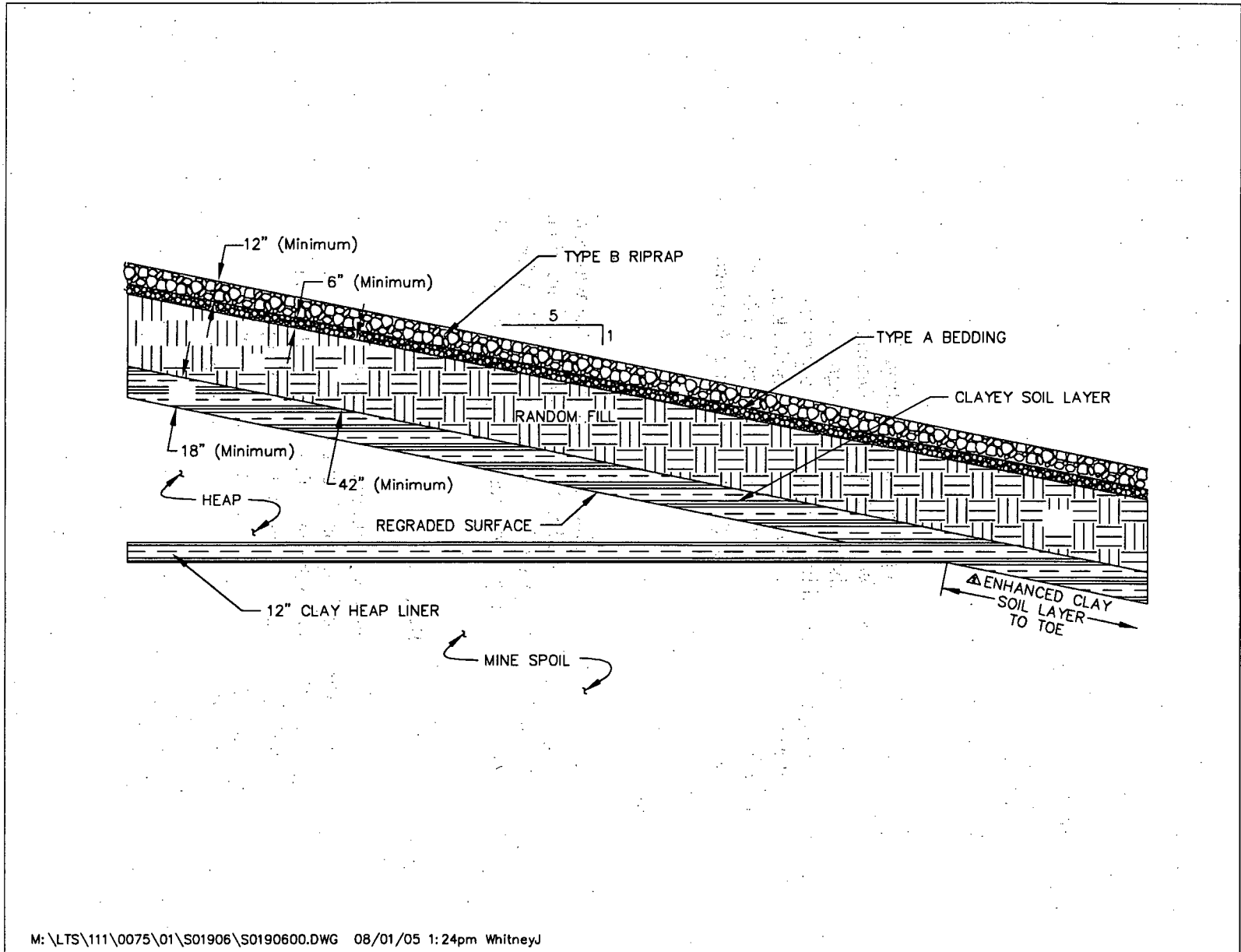


Figure 2-6. Typical Cover Cross-Section, Maybell West, CO, Disposal Cell

## 2.5 Ground Water Conditions

Ground water sampling and analysis has been conducted since 1976. Comparison of the results from the upgradient/background wells, the downgradient/point of compliance wells, and the chemical composition of the heap leachate, suggest that the ground water has not been contaminated by the leachate. This conclusion is supported by several arguments outlined below.

The ground water is a calcium-sulfate type water, which is distinct from the magnesium-sulfate composition of the leachate. Increases in the calcium and sulfate concentrations in the ground water are attributed to the dissolution of calcite and gypsum from the formation as the ground water migrates downgradient to the southwest (Umetco 1995b).

Additionally, the chloride, magnesium, uranium, and radium concentrations in the ground water at the downgradient wells are not significantly higher than the concentrations found in the upgradient wells (Umetco 1995b).

In summary, the heap leach operations at Maybell West have produced a leach liquid with high concentrations of sulfate, magnesium, sodium, chloride, uranium (natural), and radium-226. None of these constituents have impacted the calcium-sulfate type ground water at the site. The detection-monitoring program at Maybell West has shown no significant change in ground water quality in the saturated zone of the Browns Park Formation downgradient of the heap leach pile. Sampling has shown no increase in concentrations in the ground water of any analytes found in elevated concentrations in the heap leachate (Umetco 1995b).

Therefore, based on extensive monitoring results over the last 30 years, ground water quality in the uppermost aquifer has not been measurably affected by site operations and no further ground water monitoring is required for the Maybell West disposal site.

## 3.0 Long-Term Surveillance Program

### 3.1 General License for Long-Term Custody

States have right of first refusal for long-term custody of Title II disposal sites (UMTRCA, Section 202 [a]). On April 2, 1996, the State of Colorado exercised its right of first refusal and declined the long-term custody of the Maybell West site (Appendix C). Because the state declined this right, the site was transferred to DOE for long-term custody.

When NRC accepts this LTSP and concurs with the State of Colorado's termination of Umetco's Colorado Radioactive Materials License Number 660-01, the site will be included under the NRC general license for long-term custody (10 CFR 40.28 [b]). Concurrent with this action, a deed and title for the Umetco-owned portion of the site will be transferred from Umetco to DOE. The balance of the site property is federally owned and subject to segregation and withdrawal by the BLM.

Although sites are designed to last "for up to 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years" (10 CFR 40, Appendix A, Criterion 6), there is no termination of the general license for the DOE's long-term custody of the site (10 CFR 40.28 [b]).

Should changes to this LTSP be necessary, NRC must be notified of the changes, and the changes must not conflict with the requirements of the general license. Additionally, NRC representatives must be guaranteed permanent right-of-entry for the purpose of periodic site inspections. Site access is unimpeded across public right-of-way and federal property.

### 3.2 Requirements of the General License

To meet the requirements of the NRC license at 10 CFR 40, Section 28, and Appendix A Criterion 12, the long-term custodian must, at a minimum, fulfill the following requirements. The section in the LTSP in which each requirement is addressed is given in parentheses.

- Annual site inspection. (Section 3.3)
- Annual inspection report. (Section 3.4)
- Follow-up inspections and inspection reports, as necessary. (Section 3.5)
- Site maintenance, as necessary. (Section 3.6)
- Emergency measures in the event of catastrophe. (Section 3.6)
- Environmental monitoring. (Section 3.7)

### 3.3 Annual Site Inspections

#### 3.3.1 Frequency of Inspections

At a minimum, sites must be inspected annually to confirm the integrity of visible features at the site and to determine the need, if any, for maintenance, additional inspections, or monitoring (10 CFR 40, Appendix A, Criterion 12).

To meet this requirement, DOE will inspect the Maybell West disposal site once each calendar year. The date of the inspection may vary from year to year, but DOE will endeavor to inspect the site approximately once every 12 months unless circumstances warrant a variance. Any variance to this inspection frequency will be explained in the inspection report. DOE will notify NRC and the State of Colorado of the inspection at least 30 days in advance of the scheduled inspection date.

#### 3.3.2 Inspection Procedure

For the purposes of inspection, the Maybell West disposal site will be divided into sections called *transects*. Each transect will be inspected individually. Proposed transects for the first inspection of the Maybell West site are listed in Table 3-1 and shown on Figure 3-1.

Table 3-1. Transects Used During First Inspection of the Maybell West Site

Transect	Description
Top Slope of Disposal Cell	Top Slope of riprap-covered repository.
Side slopes of Disposal Cell	Riprap covered side slopes.
Ancillary Cell	Riprap covered side and top slopes.
Diversion/drainage channels	Discharge channel, riprap in critical areas, and sediment deposition.
Site Perimeter and Balance of Site	Site perimeter including 0.25 mile beyond site boundary, area between closure cell and leach tanks and site boundary, site entrance, boundary monuments, entrance sign, and site marker.

The annual inspection will be a visual walk-through. The primary purpose of the inspection will be to look for evidence of cover cracking, wind or water erosion, structural discontinuity of the containment features, and animal or human intrusions that could result in adverse impacts. Special attention will be given to the launch rock basin area of the outlet channel where headward erosion of the outlet channel is anticipated to be controlled by the launch rock. Any changes in site vegetation will be noted during routine site inspections. If encroachment of deep-rooted vegetation is observed in the vicinity of the disposal cell, an evaluation will be conducted to determine if any action is necessary. Disposal site and disposal cell inspection techniques are described in detail in Attachment 4 of the guidance document (DOE 2001).

In addition to inspection of the site itself, inspectors will note changes and developments in the area surrounding the site, especially changes within the surrounding watershed basin. Significant changes within this area could include development or expansion of human habitation, erosion, road building, or other change in land use.

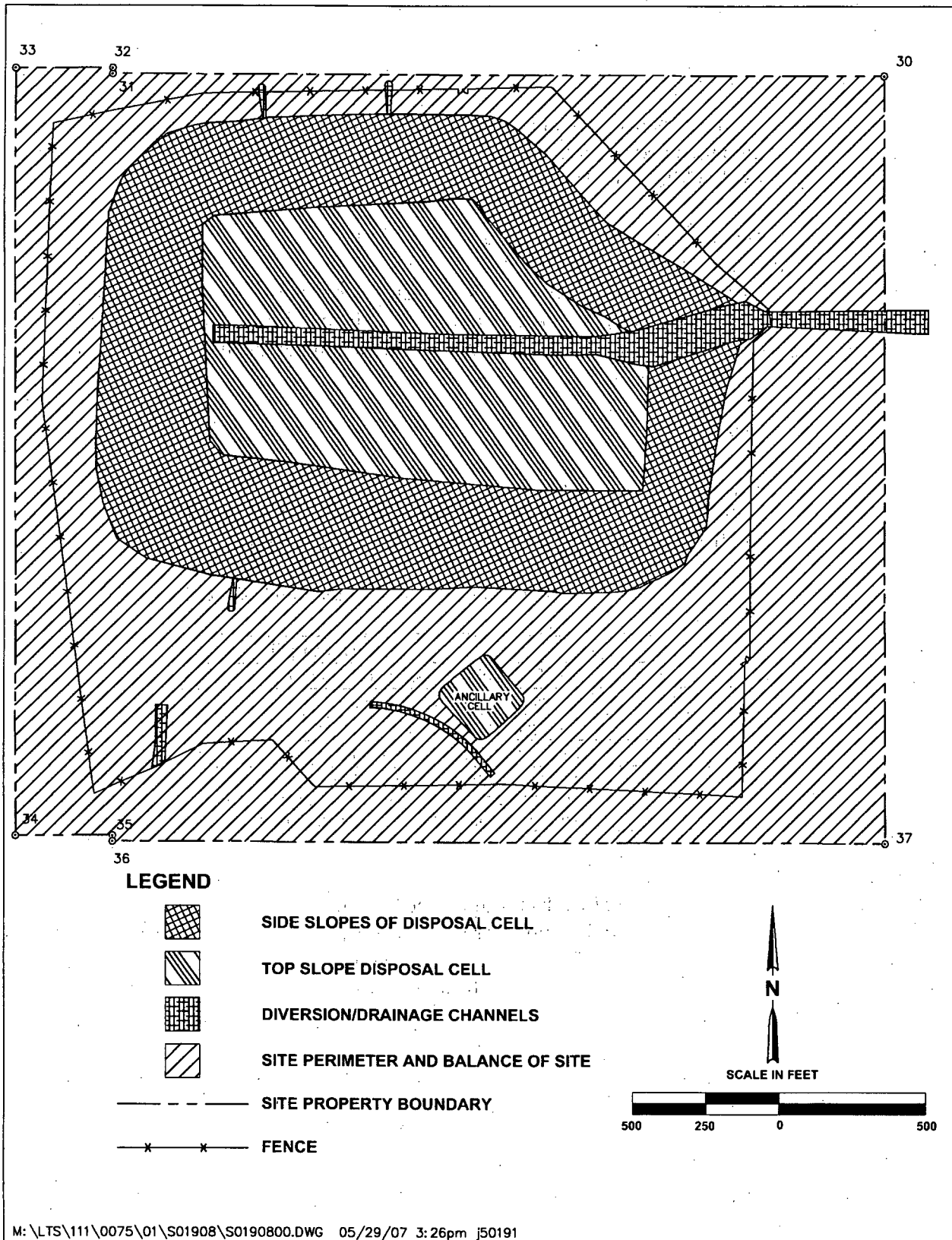


Figure 3-1. Map of Inspection Transects for the Maybell West, Colorado, Disposal Site

It may be necessary to document certain observations with photographs. Such observations may be evidence of vandalism or a slow modifying process, such as rill erosion, that should be monitored more closely during general site inspections. Photographs are documented on the Field Photograph Log.

### **3.3.3 Inspection Checklist**

The inspection checklist guides the inspection. The initial site-specific inspection checklist for the Maybell West disposal site is presented in Appendix B.

The checklist is subject to revision. At the conclusion of an annual site inspection, inspectors will make notes regarding revisions to the checklist, if necessary, to guide the next annual site inspection. Revisions to the checklist will include such items as new discoveries or changes in site conditions that must be inspected and evaluated during the next annual inspection.

### **3.3.4 Personnel**

Annual inspections normally will be performed by a minimum of two inspectors. Inspectors will be experienced engineers and scientists who have been specifically trained for the purpose through participation in previous site inspections.

Engineers typically will be civil, geotechnical, or geological engineers. Scientists will include geologists, hydrologists, biologists, and environmental scientists representing various fields (e.g., ecology, soils, range management). If serious or unique problems develop at the site, more than two inspectors may be assigned to the inspection. Inspectors specialized in specific fields may be assigned to the inspection to evaluate serious or unusual problems and make recommendations.

## **3.4 Annual Inspection Reports**

Results of annual site inspections will be reported to NRC within 90 days of the last site inspection of that calendar year (10 CFR 40, Appendix A, Criterion 12). In the event the annual report cannot be submitted within 90 days, DOE will notify NRC of the circumstances. Annual inspection reports also will be distributed to the state and any other stakeholders who request a copy. The annual inspection report for the Maybell West disposal site is included in a document containing the annual inspection reports for all sites licensed under 10 CFR 40.28.

## **3.5 Follow-up Inspections**

Follow-up inspections are unscheduled inspections that are targeted to evaluate specific findings or concerns.

### 3.5.1 Criteria for Follow-up Inspections

Criteria necessitating follow-up inspections are required by 10 CFR 40.28 (b)(4). DOE will conduct follow-up inspections should the following occur.

- A condition is identified during the annual site inspection or other site visit that requires personnel, perhaps with specific expertise, to return to the site to evaluate the condition.
- DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

With respect to citizens and outside agencies, DOE will establish and maintain lines of communications with nearby landowners and local law enforcement and emergency response agencies to facilitate notification in the event of significant trespass, vandalism, or natural disaster. Due to the remote location of the Maybell West site, DOE recognizes that nearby landowners and local agencies may not necessarily be aware of current conditions at the site. However, these individuals and agencies will be requested to notify DOE or provide information should they become aware of a significant event that might affect the security or integrity of the site.

DOE may request the assistance of local agencies to confirm the seriousness of a condition before conducting a follow-up inspection or emergency response.

The public may use the 24-hour DOE telephone number posted prominently on the entrance sign to request information or to report a problem at the site.

Once a condition or concern is identified at the site, DOE will evaluate the information and determine whether a follow-up inspection is warranted. Conditions that may require a routine follow-up inspection include changes in vegetation, erosion, storm damage, low-impact human intrusion, minor vandalism, or the need to evaluate, define, or perform maintenance tasks.

Conditions that threaten the safety or the integrity of the disposal site may require a more immediate follow-up inspection. Slope failure, disastrous storm, major seismic event, and deliberate human intrusion are among these conditions.

DOE will use a graded approach with respect to follow-up inspections. Urgency of the follow-up inspection will be in proportion to the seriousness of the condition. Timing of the inspection may be governed by seasonal considerations. For example, a follow-up inspection to investigate a vegetation problem may be scheduled for a particular time of year when growing conditions are optimum. A routine follow-up inspection to perform maintenance or to evaluate an erosion problem might be scheduled to avoid snow cover or frozen ground.

In the event of "unusual damage or disruption" (10 CFR 40, Appendix A, Criterion 12) that threatens or compromises site safety, security, or integrity, DOE will

- Notify NRC pursuant to 10 CFR 40, Appendix A, Criterion 12, or 10 CFR 40.60, whichever is determined to apply;
- Begin the DOE Environment, Safety, and Health Reporting process (DOE Order 231.1A, Chg. 1; DOE 2004);

- Respond with an immediate follow-up inspection or emergency response team;
- Implement measures as necessary to contain or prevent dispersion of radioactive materials (Section 3.6).

### **3.5.2 Personnel**

Inspectors assigned to follow-up inspections will be selected on the same basis as for the annual site inspection (see Section 3.3.4).

### **3.5.3 Reports of Follow-up Inspections**

Results of routine follow-up inspections will be included in the next annual inspection report (Section 3.4). Separate reports will not be prepared unless DOE determines that it is advisable to notify NRC or other outside agency of a problem at the site.

If follow-up inspections are required for more serious or emergency reasons, DOE will submit to NRC a preliminary report of the follow-up inspection within 60 days (10 CFR 40, Appendix A, Criterion 12).

## **3.6 Routine Site Maintenance and Emergency Measures**

### **3.6.1 Routine Site Maintenance**

UMTRCA disposal sites are designed and constructed so that “ongoing active maintenance is not necessary to preserve isolation” of radioactive material (10 CFR 40, Appendix A, Criterion 12). The disposal cell and associated systems has been designed and constructed to minimize the need for routine maintenance.

The cover and side slopes of the disposal cell were armored with riprap of sufficient size to prevent erosion that would otherwise be caused by precipitation and associated flood events. The cover of the disposal cell is designed to shed incident precipitation to an armored outlet channel. The outlet channel is further protected against headward erosion by a launch rock basin. Adverse wind or water erosion impacts that would require maintenance are not anticipated. The disposal site area is fenced to prevent damage from livestock grazing in the vicinity and to discourage intentional or unintentional trespassing. Areas where runoff water could achieve erosional velocities have been armored with riprap.

If an inspection of the disposal site reveals failure or degradation of an as-built feature that compromises site protectiveness, repairs will be conducted to re-establish or surpass the durability of the as-built condition. DOE will perform routine site maintenance, where and when needed to maintain protectiveness. Results of routine site maintenance will be summarized in the annual site inspection report.

### **3.6.2 Emergency Measures**

Emergency measures are the actions that DOE will take in response to “unusual damage or disruption” that threaten or compromise site safety, security, or integrity. DOE will contain or prevent dispersal of radioactive materials in the unlikely event of a breach in cover materials.

### 3.6.3 Criteria for Routine Site Maintenance and Emergency Measures

Conceptually, there is a continuum in the progression from minor routine maintenance to large-scale reconstruction of the tailings impoundment following a potential disaster. Criteria, although required by 10 CFR 40.28 (b)(5), for triggering particular DOE responses for each progressively more serious level of intervention, are not easily defined because the nature and scale of all potential problems cannot be foreseen. The information in Table 3-2, however, serves as a guide for appropriate DOE responses. The table shows that the difference between routine maintenance and emergency response is primarily one of urgency and degree of threat or risk. DOE's priority (urgency) in column 1 of Table 3-2 bears an inverse relationship with DOE's estimate of probability. The highest priority response is also believed to be the least likely to occur.

Table 3-2. DOE Criteria for Maintenance and Emergency Measures

Priority	Description <sup>a</sup>	Example	Response
1	Breach of closure cell or leach tank with dispersal of radioactive material.	Seismic event that exceeds design basis and causes massive discontinuity in cover.	Notify NRC. Immediate follow-up inspection by DOE emergency response team. Emergency actions to prevent further dispersal, recover radioactive materials, and repair breach.
2	Breach without dispersal of radioactive material.	Partial or threatened exposure of radioactive materials.	Notify NRC. Immediate follow-up inspection by DOE emergency response team. Emergency actions to repair the breach.
3	Breach of site security.	Human intrusion, vandalism.	Restore security; urgency based on assessment of risk.
4	Maintenance of specific site surveillance features.	Deterioration of signs, markers.	Repair at first opportunity.
5	Minor erosion or undesirable changes in vegetation.	Erosion not immediately affecting disposal cell, invasion of undesirable plant species.	Evaluate, assess impact, respond as appropriate to address problem.

<sup>a</sup>Other changes or conditions will be evaluated and treated similarly on the basis of risk.

### 3.6.4 Reporting Maintenance and Emergency Measures

Routine maintenance completed during the previous 12 months will be summarized in the annual inspection report.

In accordance with 10 CFR 40.60, within 4 hours of discovery of any Priority 1 or 2 events listed in Table 3-2, DOE will notify:

Decommissioning and Uranium Recovery Licensing Directorate  
 Division of Waste Management and Environmental Protection  
 Office of Federal and State Materials and Environmental Management Programs  
 U.S. Nuclear Regulatory Commission

The phone number for the required 4-hour contact to the NRC Operations Center is (301) 816-5100.

## 3.7 Environmental Monitoring

### Ground Water Monitoring

Ground water monitoring is not required for the Maybell West site.

## 3.8 Records

DOE-LM receives and maintains selected records at their office in Grand Junction, Colorado, to support post-closure site maintenance. Inactive records are preserved at a Federal Records Center. Site records contain critical information required to protect human health and the environment, manage land and assets, protect legal interests of DOE and the public, and mitigate community impacts resulting from the cleanup of legacy waste. The records are managed in accordance with the following requirements.

- Title 44, *United States Code* (U.S.C.), Chapter 29, Records Management by the Archivist of the United States and by the Administrator of General Services, Chapter 31, "Records Management by Federal Agencies," and Chapter 33, "Disposal of Records."
- Title 36, *Code of Federal Regulations* Chapter 12, Subchapter B, "Records Management;"
- DOE G 1324.5B, *Implementation Guide*;
- *LM Information and Records Management Transition Guidance*.

## 3.9 Quality Assurance

All activities related to the surveillance and maintenance of the Maybell West site will comply with DOE Order 414.1C, *Quality Assurance*. Quality assurance requirements are routinely fulfilled by use of a work planning process, standard operating procedures, trained personnel, documents and records maintenance, and assessment activities. Requirements will be transmitted through procurement documents to subcontractors if/when appropriate.

## 3.10 Health and Safety

Health and safety requirements and procedures for DOE-LM activities are consistent with DOE Orders, federal regulations, and applicable codes and standards. The DOE Integrated Safety Management process serves as the basis for the Contractor's Health and Safety Program.

Specific guidance is contained in the *Office of Land and Site Management Project Safety Plan* (DOE 2007) or current guidance. This Project Safety Plan identifies specific hazards associated with the anticipated scope of work and provides direction for the control of these hazards. During the pre-inspection briefing, personnel are required to review the plan to ensure that they have an understanding of the potential hazards and the health and safety requirements associated with the work to be performed.

## 4.0 References

ASQC (American Society for Quality Control), 1994. *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs*, ANSI/ASQC E4-1994, Energy and Environmental Quality Division, Environmental Issues Group.

CDPHE (Colorado Department of Public Health and the Environment), 2007. *Completion Review Report for the Maybell Site Located in Moffat County, Colorado*, Colorado RML #660-01, March.

DOE (U.S. Department of Energy), 2001. *Guidance for Implementing the Long-Term Surveillance Program for UMTRCA Title I and Title II Disposal Sites*, GJO-2001-215-TAR, Grand Junction, Colorado, April.

DOE, 2004. *Environment, Safety, and Health Reporting*, DOE Order 231.1A, Chg. 1, June.

DOE, 2005. *Quality Assurance*, DOE Order 4141C, June.

DOE, 2007. *Office of Land and Site Management Project Safety Plan*, DOE-LM/GJ1116-2006, Rev. 0, prepared for the U.S. Department of Energy, Office of Legacy Management, Grand Junction, Colorado, January 29.

FBD (Ford, Bacon & Davis Utah Inc.), 1977. *Phase II-Title I Engineering Assessment of Inactive Uranium Mill Tailings, Maybell Site, Maybell, Colorado*, October.

Umetco (Umetco Minerals Corporation), 1995a. *Soil Cleanup Plan, Maybell Heap Leach Facility*, March.

Umetco, 1995b. *Groundwater Report, Maybell Heap Leach Site, Maybell, Colorado*, July 28.

Umetco, 2002. *Soil Cleanup Verification Report, Maybell Heap Leach Facility, Maybell, Colorado*, Revision 0, January 15.

End of current text

**Appendix A**

**Real Estate Information**

Draft

Draft



## Legal Description

A tract of land being the south  $\frac{1}{2}$  of the northwest  $\frac{1}{4}$  and the north  $\frac{1}{2}$  of the southwest  $\frac{1}{4}$  of Section 24; and the east 330 feet of the southeast  $\frac{1}{4}$  of the northeast  $\frac{1}{4}$  and the east 330 feet of the northeast  $\frac{1}{4}$  of the southeast  $\frac{1}{4}$  of Section 23, all in Township 7 North, Range 95 West, Sixth Principle Meridian, Moffat County, Colorado, containing 180 acres more or less.

The real estate correspondence and instruments are maintained and filed by the U.S. Department of Energy, Grand Junction, Colorado.

A copy of the recorded deed will be included when available.

Draft



**Appendix B**

**Initial Site Inspection Checklist**

Draft

## Inspection Checklist: Maybell West

Date of This Revision: \_\_\_\_\_

Last Annual Inspection: \_\_\_\_\_

Inspectors: \_\_\_\_\_ and \_\_\_\_\_

Next Annual Inspection (Planned): \_\_\_\_\_

No.	Item	Issue	Action
1	Access	Access is from the Maybell Title I site on a gravel road that crosses BLM property.	None.
2	Specific site surveillance features	See attached list.	Inspect. Identify maintenance requirements
3	Monitor wells	There are no monitor wells at this site.	None.
4	Riprap—Heap Leach Repository and Ancillary Cell, diversion channels	Most of the critical disposal site features have been armored with riprap for erosion protection.	Inspect riprap, note evidence of rock displacement or rock degradation, cracking, sloughing, or erosion.

### Checklist of Site Specific Surveillance Features: Maybell West

Feature	Comment
Access Road	Gravel road. Verify road is passable.
Entrance Gate	
Entrance Sign	Near entrance gate
Perimeter Fence	Barbed-wire stock fence
Boundary Monuments	Total: 8
Site Marker	Near entrance gate

End of current text

Draft

**Appendix C**

**Custodianship Refusal Letter**

Draft

UMB Barcode # 3076

RECEIVED STATE OF COLORADO

EXECUTIVE CHAMBERS  
136 State Capitol  
Denver, Colorado 80203-1792  
Phone (303) 866-2471

APR - 5 1996



April 2, 1996

Roy Romer  
Governor

Joseph E. Virgona  
Project Manager  
Grand Junction Projects Office  
U. S. Department of Energy  
P.O. Box 2567  
Grand Junction, CO 81502-2567

Dear Mr. Virgona:

I am writing in response to your letter of October 4, 1995, regarding Colorado's interest in becoming the long-term custodian of the Uranium Mill Tailings Radiation Control Act (UMTRCA) Title II sites within the state.

Four sites within Colorado fall under Title II. These include the Durita Site, the Maybell Title II Site, the Uravan Site and the Canon City Site. It is anticipated that reclamation at two of these sites, Durita and Maybell, will be completed in the period 1996 to 1998. Reclamation at the remaining two sites will be completed some time after 2005. At this time, none of our site operators have requested license termination. The timing of custodianship of any site will of course depend on the license holder's request for license termination.

Colorado declines its option to be custodian of the Durita and Maybell Sites. However, since the Uravan and Canon City sites will not be eligible for closure until after 2000, it is premature to discuss the state's position on these sites.

The Radiation Control Division at the Colorado Department of Public Health and Environment has committed to work with the U.S. Nuclear Regulatory Commission, the U.S. Department of Energy and our licensees to assure a smooth transition of custodianship at the Durita and Maybell Sites. We will keep DOE informed when our licensees establish a firm timetable for termination of their licenses. If you have any questions, please contact Robert Quillin, director of the Radiation Control Division, at (303) 692-3038.

Sincerely,

Roy Romer  
Governor

LCRF 109,113

End of current text