



## Department of Energy

Washington, DC 20585

September 16, 2019

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Deputy Director  
Mail Stop T8-F5  
Washington, DC 20555-0001

Subject: U.S. Department of Energy Response to U.S. Nuclear Regulatory Commission Staff Review of the *Draft Long-Term Surveillance Plan for the Naturita, Colorado, Disposal Site*; and Submission of the Revised Preliminary Final *Long-Term Surveillance Plan for the Naturita, Colorado, Disposal Site* (NRC Docket No. WM-00066)

To Whom it May Concern:

Thank you for your response to the U.S. Department of Energy's (DOE's) report entitled *Draft Long-Term Surveillance Plan for the Naturita, Colorado, Disposal Site*. Below are DOE's responses to the U.S. Nuclear Regulatory Commission's (NRC's) comments. Enclosed is the revised preliminary final *Long-Term Surveillance Plan for the Naturita, Colorado, Disposal Site*, which DOE is submitting for acceptance by NRC.

Please see the comments received from NRC below, along with DOE's responses:

1. **NRC Comment:** In Section 2.1.1, "Site Ownership," the revised Long-Term Surveillance Plan (LTSP) states that Appendix B includes documentation for two agreements that enable access to portions of the site. The first agreement, made with Umetco Minerals Corporation, is for access to the west toe drain outlet, also known as the diversion channel. This agreement was executed on May 15, 2011. The second agreement, made with the U.S. Bureau of Land Management, is for a right-of-way for the east and west toe drains, also known as the storm waste drainage structures. The second agreement listed was executed on March 18, 2003. Both agreements were made after the original LTSP was approved for the Naturita, Colorado, Disposal Site; however, they are not included as listed revisions and the need for them was not discussed in the revised LTSP. Please provide the rationale for including the rights-of-way in the final LTSP.

**DOE Response:** The access agreement and rights-of-way were included in the LTSP to establish that DOE has control of all potentially effected media and access to all portions of the site, including the storm water management structures, for inspection and maintenance. The real property information is included in the LTSP for use by stewards and to inform stakeholders that DOE controls land use where needed to maintain protectiveness. These agreements were established after the general license took effect and the original LTSP was accepted for the Naturita disposal site. Best management practice would have directed they be in place before closure. However, the agreements are in effect now and are included



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in the LTSP to maintain protectiveness. These agreements inform all stewards (not just DOE, but also residents and local and state government entities) of site conditions and controls. Inclusion of real property documentation, including access agreements as appendixes to the LTSP, is a best management practice of DOE.

In Section 1.1 of the new LTSP, DOE has added the following language to indicate the revision:

Appendix B has been revised to include documentation of a 2003 agreement in which the Bureau of Land Management provides a right-of-way to DOE for the east and west toe drains (identified in the agreement as two storm water drainage structures) and a 2011 agreement in which Umetco Minerals Corporation (Umetco) allows DOE access to the west toe drain outlet (identified in the agreement as a diversion channel). These agreements were put in place after acceptance of the original LTSP, and they are included in this revised LTSP as a best management practice to maintain protectiveness and to inform all stewards of site conditions and controls.

Information was also added to Section 2.1.1, "Site Ownership," which now includes the following language:

These agreements were put in place after acceptance of the original LTSP, and they are included in this revised LTSP as a best management practice to maintain protectiveness and to inform all stewards of site conditions and controls.

2. **NRC Comment:** Section 3.5.5 contains several bullets listing the NRC Office, Division and Directorate, which will be notified if there is a Priority 1 or 2 event. The names of the NRC Office, Division and Directorate, have been changed since the LTSP was approved. To avoid this issue in the future, NRC staff would therefore recommend that the revised LTSP just state that the appropriate NRC offices will be contacted. For example, the last sentence of the section could state ".... and will notify appropriate offices at the NRC."

**DOE Response:** DOE concurs with the suggestion by NRC and the last sentence has been revised to read: "In accordance with 10 CFR 40.60, within 4 hours of discovery of any Priority 1 or Priority 2 event such as those listed in Table 5, DOE will contact the NRC 24-Hour Operations Center for Emergencies at (301) 816-5100 and will notify the appropriate offices at the NRC."

DOE also made several additional minor changes to update the revised LTSP, these include:

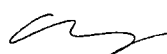
- Updating the 24-hour telephone number in section 2.3.4 to reflect the new DOE 24-hour telephone number.
- Replacing Figure 7 with a graphic showing the new entrance sign with the new 24-hour telephone number.
- Updating the Inspection Checklist in Appendix C in anticipation of the future Uravan site transfer to read the "Uravan Title II Burbank Repository Disposal Cell" rather than "Umetco Uravan Title II disposal cell."
- Updating the Specific Site Surveillance Features in the Inspection Checklist in Appendix C to reflect recent updates to the perimeter signs whereby the signs no longer incorrectly identify the site. Removing "signs identify the site as the Uravan repository" to "Location as indicated on the site map."

Upon NRC acceptance, this revised LTSP will supersede the original LTSP accepted on August 25, 1999 and be published as the final *Long-Term Surveillance Plan for the Naturita, Colorado, Disposal Site*. The NRC acceptance letter will be inserted into Appendix A NRC Concurrence and Licensing Documentation.

Please contact me at (970) 248-6621 or [Angelita.Denny@lm.doe.gov](mailto:Angelita.Denny@lm.doe.gov), if you have any questions. Please address any correspondence to:

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Sincerely,



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# Long-Term Surveillance Plan for the Naturita, Colorado, Disposal Site

September 2019



U.S. DEPARTMENT OF  
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# Contents

Abbreviations.....	iii
1.0 Introduction .....	1
1.1 Purpose .....	1
1.2 Legal and Regulatory Requirements .....	1
1.3 Role of Legacy Management.....	2
2.0 Final Site Conditions .....	3
2.1 General Description of Site and Vicinity .....	3
2.1.1 Site Ownership.....	3
2.1.2 Directions to the Site.....	3
2.2 Site History .....	5
2.3 Site Description .....	6
2.3.1 Disposal Cell.....	6
2.3.2 Disposal Cell Cover .....	6
2.3.3 Erosion Protection Features .....	10
2.3.4 Permanent Site Surveillance Features.....	10
2.3.5 Site Drawings and Photographs .....	13
2.4 Geology, Hydrology, and Groundwater Quality .....	14
2.4.1 Geology and Hydrology.....	14
2.4.2 Groundwater Quality .....	16
2.4.3 Groundwater Protection Strategy.....	17
2.5 Institutional Controls .....	17
3.0 Long-Term Surveillance Program.....	18
3.1 Requirements of the General License.....	18
3.2 Annual Site Inspections .....	18
3.2.1 Frequency of Inspections .....	18
3.2.2 Inspection Procedure.....	18
3.2.3 Inspection Checklist.....	19
3.2.4 Personnel.....	19
3.3 Annual Inspection Report.....	20
3.4 Follow-Up Inspections .....	20
3.4.1 Criteria for Follow-Up Inspections .....	20
3.4.2 Personnel.....	21
3.4.3 Reports of Follow-Up Inspections .....	21
3.5 Routine Site Maintenance and Emergency Measures .....	21
3.5.1 Routine Maintenance .....	21
3.5.2 Emergency Measures .....	21
3.5.3 Criteria for Routine Site Maintenance and Emergency Measures.....	21
3.5.4 Earthquakes.....	22
3.5.5 Reporting Maintenance and Emergency Measures.....	22
3.6 Environmental Monitoring .....	22
3.7 Institutional Controls Monitoring.....	23
3.8 Records .....	23
3.9 Quality Assurance .....	23
3.10 Safety and Health .....	23
4.0 References .....	24

## Figures

Figure 1. Location of the Naturita, Colorado, Disposal Site and Other LM Sites Associated with the Naturita Disposal Site .....	4
Figure 2. Naturita Processing Site, 1957 .....	5
Figure 3. Site Map Naturita, Colorado, Disposal Site .....	7
Figure 4. Disposal Cell Cross Section at the Naturita, Colorado, Disposal Site .....	8
Figure 5. Naturita Disposal Cell Top Slope Cover .....	9
Figure 6. Site Marker SMK-1 by the Entrance Gate .....	12
Figure 7. Entrance Sign.....	13
Figure 8. Generalized Geologic Column, Naturita, Colorado, Disposal Site .....	15

## Tables

Table 1. General License Requirements for the Naturita, Colorado, Disposal Site .....	2
Table 2. Permanent Site Surveillance Feature Location Coordinates.....	11
Table 3. Requirements of the General License and DOE Response.....	18
Table 4. Inspection Areas for the Annual Inspection of the Naturita, Colorado, Disposal Site ...	19
Table 5. DOE Criteria for Maintenance and Emergency Measures .....	22

## Appendixes

Appendix A	NRC Concurrence and Licensing Documentation
Appendix B	Site Ownership / Custody Documentation
Appendix C	Inspection Checklist
Appendix D	NRC Concurrence on Termination of Groundwater Monitoring

## Abbreviations

BLM	U.S. Bureau of Land Management
BM	boundary monument
CFR	<i>Code of Federal Regulations</i>
cm/sec	centimeters per second
DOE	U.S. Department of Energy
E	entrance
EMS	environmental management system
ft/yr	feet per year
ICs	institutional controls
LM	Office of Legacy Management
LTS&M	long-term surveillance and maintenance
LTSP	Long-Term Surveillance Plan
MCL	maximum contaminant limit
mg/L	milligrams per liter
NRC	U.S. Nuclear Regulatory Commission
P	perimeter
PMP	probable maximum precipitation
<sup>226</sup> Ra	radium-226
SM	survey monument
SMK	site marker
TDS	total dissolved solids
UMTRCA	Uranium Mill Tailings Radiation Control Act
USGS	U.S. Geological Survey

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## 1.0 Introduction

### 1.1 Purpose

This Long-Term Surveillance Plan (LTSP) explains how the U.S. Department of Energy (DOE) will fulfill general license requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27) as the licensee at the Naturita, Colorado, Disposal Site (site) and revises the original LTSP (DOE 1999). This revision incorporates changes that reflect the U.S. Nuclear Regulatory Commission (NRC) concurrence on April 15, 2014, with a request from the DOE Office of Legacy Management (LM) to terminate groundwater monitoring at the site (Appendix D). In addition, the title of the LTSP has been changed from *Long-Term Surveillance Plan for the Upper Burbank Disposal Cell, Uravan, Colorado*, because the town of Uravan no longer exists and the Upper Burbank disposal cell is now referred to as the Naturita disposal cell. Appendix B has been revised to include documentation of a 2003 agreement in which the Bureau of Land Management provides a right-of-way to DOE for the east and west toe drains (identified in the agreement as two storm water drainage structures) and a 2011 agreement in which Umetco Minerals Corporation (Umetco) allows DOE access to the west toe drain outlet (identified in the agreement as a diversion channel). These agreements were put in place after acceptance of the original LTSP, and they are included in this revised LTSP as a best management practice to maintain protectiveness and to inform all stewards of site conditions and controls.

### 1.2 Legal and Regulatory Requirements

Federal regulations in Title 10 *Code of Federal Regulations* Section 40.27 (10 CFR 40.27) establish requirements for licensing, custody, and long-term care of uranium mill tailings disposal sites remediated under Title I of the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978 (Title 42 *United States Code* Section 7901 [42 USC 7901] et seq.). NRC regulates a general license for the long-term custody and care of these sites. DOE is designated as the licensee for these sites. There is no provision for the termination of the general license or DOE's responsibility for the long-term custody at the site (10 CFR 40.27).

As the licensee, DOE is responsible for long-term surveillance and maintenance (LTS&M) at UMTRCA disposal sites under the general license. LTS&M includes managing land use and institutional controls (ICs) and conducting inspections, monitoring, maintenance, and other measures to ensure that remediated UMTRCA disposal sites continue to protect public health, safety, and the environment. DOE defines the LTS&M required at each UMTRCA disposal site in a site-specific LTSP, as accepted by NRC. Engineered disposal cells constructed under UMTRCA are designed to "be effective for up to one thousand years, to the extent reasonably achievable, and, in any case, for at least 200 years" (40 CFR 192.02 (a)).

The site was licensed on August 25, 1999, when NRC accepted the original *Long-Term Surveillance Plan for the Upper Burbank Disposal Cell, Uravan, Colorado* (DOE 1999) (Appendix A). This LTSP revises the original LTSP. Table 1 lists the requirements of 10 CFR 40.27 under the general license and the sections in this LTSP where each is addressed. The procedures and specifications in this revised LTSP are based on the *Guidance for Developing and Implementing the Long-Term Surveillance Plans for UMTRCA Title I and Title II Disposal Sites* (DOE 2012). The current version of that guidance document and this LTSP constitute DOE's operational plan for long-term custody and care of the site.

Table 1. General License Requirements for the Naturita, Colorado, Disposal Site

Requirements for the LTSP	LTSP Reference	10 CFR 40.27 Reference
Description of final site conditions	Section 2.0	(b)(2)
Site ownership documentation / legal description	Section 2.1.1	(b)(1)
Description of the long-term surveillance program	Section 3.0	(b)(3)
Criteria for follow-up inspections	Section 3.4.1	(b)(4)
Criteria for instituting maintenance or emergency measures	Section 3.5	(b)(5)
<b>Requirements for Surveillance and Maintenance</b>		
Notification to NRC of changes to the LTSP	Section 1.3	(c)(3)
NRC permanent right-of-entry	Section 2.1.1	(c)(4)
Notification to NRC of inspections, significant problems, or actions	Sections 3.4–3.6	(c)(5)

### 1.3 Role of Legacy Management

In December 2003, DOE established LM. The LM mission includes “implementing long-term surveillance and maintenance at sites to ensure sustainable protection of human health and the environment.” As part of that mission, LM is responsible for DOE’S compliance with 10 CFR 40.27 and implementation of the site-specific LTSP.

During the course of long-term stewardship, changes in site conditions or management requirements may require changes to the LTS&M activities for a particular site. Changes in site conditions or management requirements may include the need to collect new data, new reuse opportunities, and changes in physical site features. In such circumstances, LM revises the LTSP to describe the changes to site conditions or management requirements and any required changes to LTS&M activities. The revised LTSP must be submitted to NRC for acceptance (10 CFR 40.27(c)(3)).

LM implements an Environmental Management System (EMS) to incorporate life-cycle environmental considerations into LTS&M. Any changes in site conditions or LTS&M activities are subject to the same EMS processes as the previous conditions or activities. LM’s EMS process ensures that LM maximizes beneficial use of finite resources, minimizes wastes and adverse environmental impacts, and meets or exceeds compliance with applicable environmental, public health, and resource protection laws, regulations, and DOE requirements.

## **2.0 Final Site Conditions**

### **2.1 General Description of Site and Vicinity**

The site is located in a rural area of Montrose County, a county in western Colorado with a population of 41,471 (U.S. Census 2016). The site is approximately 17 road miles northwest of the town of Naturita, Colorado, on a mesa west of the San Miguel River canyon (Figure 1). Much of the land in the immediate vicinity of the site is controlled by the U.S. Bureau of Land Management (BLM) and is leased to ranchers for grazing. Numerous abandoned mines and mining roads are also near the site. The Uravan UMTRCA Title II disposal cell directly borders the site to the southeast.

The region is characterized by an arid climate and rugged topography. The average annual rainfall is about 13 inches per year. Rainfall occurs during the summer and fall in high-intensity, short-duration, late afternoon thunderstorms that are conducive to runoff. Precipitation in the winter occurs as snowfall (DOE 1995). Temperatures show considerable diurnal and seasonal variations. Winters are cold; average monthly temperatures are typically below freezing in December and January. Summers are warm; average monthly temperatures are in the 70s °F from June to August (DOE 2002). The topography of the region is primarily canyons and mesas. Principal streams in the vicinity of the site include the San Miguel River, Spring Creek, Atkinson Creek, and Tabeguache Creek (Umetco 2005).

#### **2.1.1 Site Ownership**

The site is owned by the federal government. A copy of the deed with the legal description of the property that contains the site is in Appendix B. Appendix B also includes documentation of an agreement with Umetco for access to the west toe drain outlet (identified in the agreement as a diversion channel), and right-of-way documentation for the east and west toe drains (identified in the agreement as two storm water drainage structures). These agreements were put in place after acceptance of the original LTSP, and they are included in this revised LTSP as a best management practice to maintain protectiveness and to inform all stewards of site conditions and controls. As the licensee under the general license, DOE must guarantee NRC permanent right-of-entry to the site.

#### **2.1.2 Directions to the Site**

The site can be reached by following these directions:

1. Take Colorado Highway 141 northwest out of the town of Naturita approximately 15 miles (between mile markers 75 and 76) (Figure 1).
2. Turn left (west-southwest) on County Road EE22. Almost immediately after leaving Highway 141, cross the bridge over the San Miguel River. Go up County Road EE22 along a narrow road approximately 1.6 miles.
3. County Road EE22 makes a sharp turn to the right (northwest). The site is a few hundred feet after the turn, just to the left of County Road EE22.
4. The site is enclosed within a barbed wire fence. Vehicle access is gained from County Road EE22 through a locked gate.



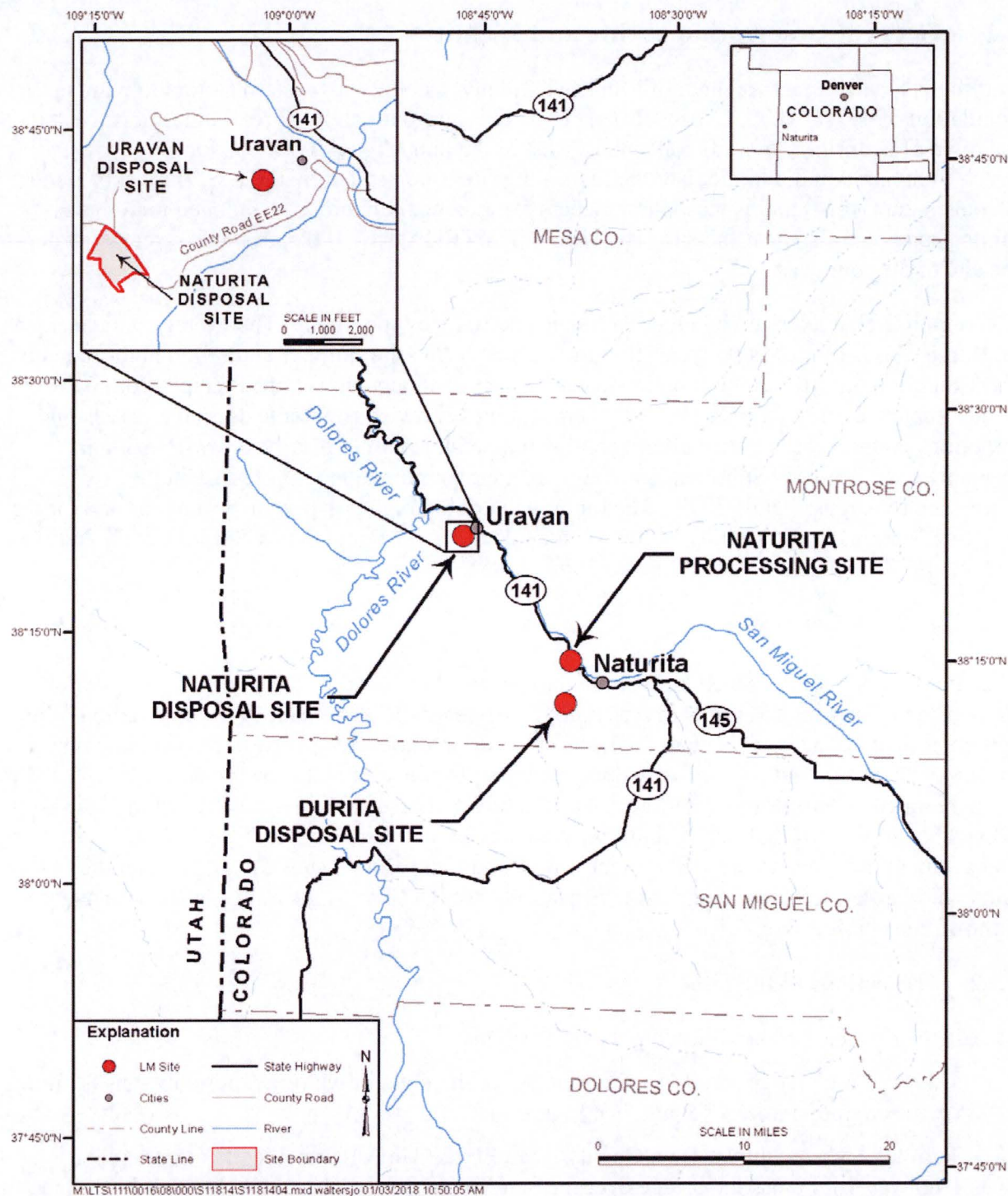


Figure 1. Location of the Naturita, Colorado, Disposal Site and Other LM Sites Associated with the Naturita Disposal Site

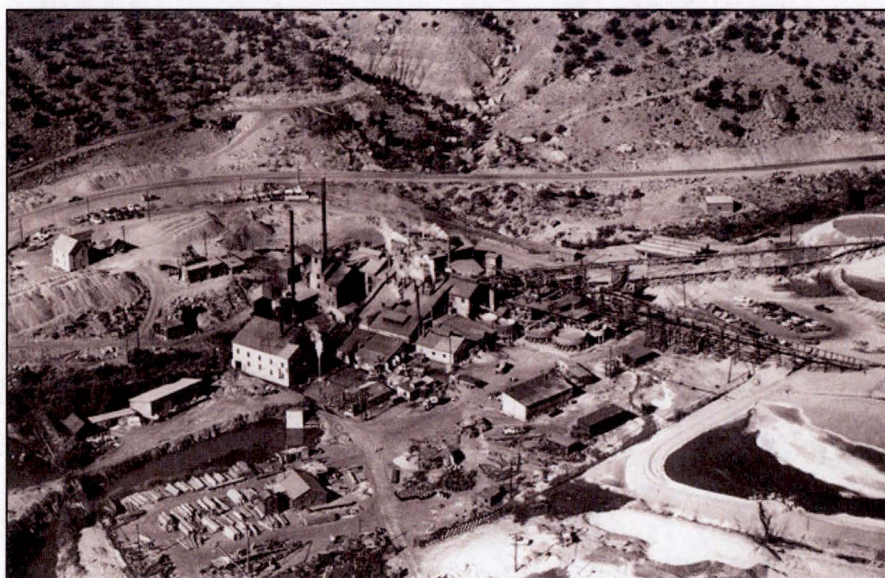


## 2.2 Site History

The Naturita disposal cell (disposal cell) and site were constructed to dispose of material generated from the remediation of the Naturita processing site. The mill at the Naturita processing site (Figure 2) operated intermittently beginning in the 1930s until 1958. Before 1942, only vanadium ores were processed; in 1942, operations were altered to include uranium recovery. From 1961 to 1963, Vanadium Corporation of America operated a uranium upgrader at the processing site. During the life of the mill, approximately 704,000 tons of ore was produced. The mill tailings were purchased by Ranchers Exploration and Development in 1976. From 1977 through 1979, 360,000 tons of tailings were transported to the nearby Durita, Colorado, Title II Disposal Site for reprocessing (Figure 1). DOE began characterization of the Naturita processing site in 1981. This included engineering assessments, radiological contamination evaluations, groundwater sampling, and remedial action evaluations.

DOE's surface remediation of the Naturita processing site began in January 1993 and ended in September 1998 (DOE 1998b). Between 1993 and 1997, DOE removed approximately 783,000 cubic yards of material from the Naturita processing site and adjacent properties and disposed of them in the disposal cell. Materials removed included subpile material (consisting of soils in the mill yard, ore storage area, and tailings pile areas), windblown tailings from areas adjacent to the processing site, building debris, and mill equipment (DOE 1998a). Material was left in supplemental standards areas where the radium-226 ( $^{226}\text{Ra}$ ) concentrations still exceeded the standard even though soil had been excavated to 1 foot below the water table or where removing the material would produce excessive environmental harm and increased risk to workers.

The disposal cell construction was completed in July 1998. The disposal cell is in the northwest end of a former rock quarry (the Burbank Pit) owned and developed by Umetco. The Burbank Pit was a large excavation in solid bedrock along the southern rim of a mesa, with rock slopes on three sides and an open end to the southeast. The disposal cell was originally referred to as the Upper Burbank disposal cell (DOE 1998a). This LTSP formally changes the name to the Naturita disposal cell.



*Figure 2. Naturita Processing Site, 1957*

## 2.3 Site Description

Engineered structures at the site include the disposal cell, disposal cell cover, and erosion-protection features. The disposal cell is designed to isolate the materials in the cell from the surrounding environment while the disposal cell cover and erosion-protection features achieve the necessary surface water drainage control and erosion protection to satisfy the longevity design requirements. Construction details of the engineering structures may be found in the completion report (MK-F 1998), which is summarized in this section.

### 2.3.1 Disposal Cell

The disposal cell is a northwest-pointed pentagon, measuring approximately 560 feet by 670 feet (Figure 3). The disposal cell occupies 9 acres of the 27-acre site. Before material was placed in the disposal cell, clay was scraped from the sandstone floor of the disposal cell. The walls of the excavation were cleared of sandstone rubble and sloped away from the floor. The disposal cell was constructed with minimum 2-foot-thick compacted clay sidewalls on three sides to prevent seepage of water laterally into exposed bedrock sidewalls of the pit. On the southeast side of the disposal cell (adjacent to the Uravan UMTRCA Title II disposal cell), the disposal cell has a 100-foot-wide compacted clay embankment to prevent lateral water seepage. The disposal cell is designed with the intent that water seeping from the disposal cell would flow down into the permeable bedrock (i.e., the Salt Wash Member of the Morrison Formation) beneath the disposal cell.

The disposal cell contains 793,193 cubic yards of material from the Naturita processing site, including 21,820 cubic yards of material from the vicinity property directly north of the site (MK-F 1998). Demolition debris, contaminated material from the mill yard, and contaminated material from the ore storage area were placed at the bottom of the disposal cell, followed by the tailings pile area materials and finally the windblown tailings and miscellaneous waste. Material in the disposal cell consists primarily of granular material such as silty sand, sand, sand and gravel, and cobble-sized rocks. The tailings pile from the Naturita processing site was not included in the disposal cell, but taken to the nearby Durita Title II site for reprocessing. The only tailings placed in the disposal cell were windblown tailings and a small amount of tailings found during remediation of the former mill site area. Material in the disposal cell contains an estimated total of 79 curies of  $^{226}\text{Ra}$  (DOE 1999). The lowest layer had the highest average  $^{226}\text{Ra}$  concentration and the uppermost layer had the lowest average concentration (NRC 1999).

### 2.3.2 Disposal Cell Cover

The disposal cell cover consists of (1) a 3-foot radon barrier (the first layer placed over the material in the disposal cell), (2) a 5.5-foot frost-protection layer, (3) a 6-inch bedding layer, and (4) a 1-foot riprap layer (Figure 4 and Figure 5). The radon barrier is fine-grained clay and has low permeability, forming a capillary break to maintain moisture in the radon barrier layer. The design for the radon barrier assumes the moisture of the material will sustain the cohesiveness of the radon barrier and mitigate disposal cell cover cracking. The radon barrier is protected from seasonal temperature and moisture fluctuations by the 5.5-foot frost-protection layer of compacted soil. The riprap layer was designed to resist erosion forces resulting from a probable maximum precipitation (PMP) event. The PMP for the site was determined to be a 1-hour thunderstorm with 8.2 inches of rainfall. The calculated surface water runoff resulting from the



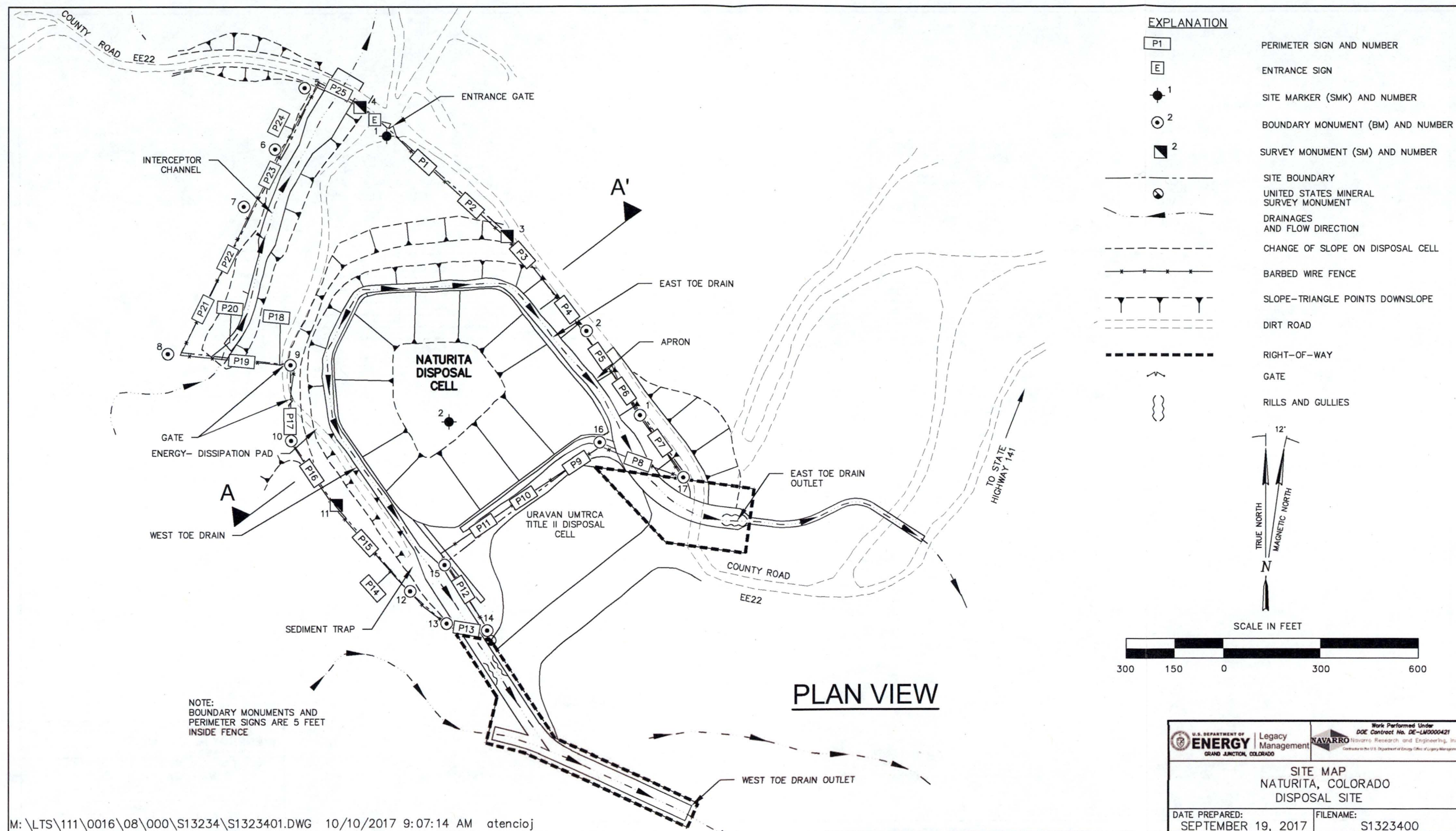


Figure 3. Site Map Naturita, Colorado, Disposal Site



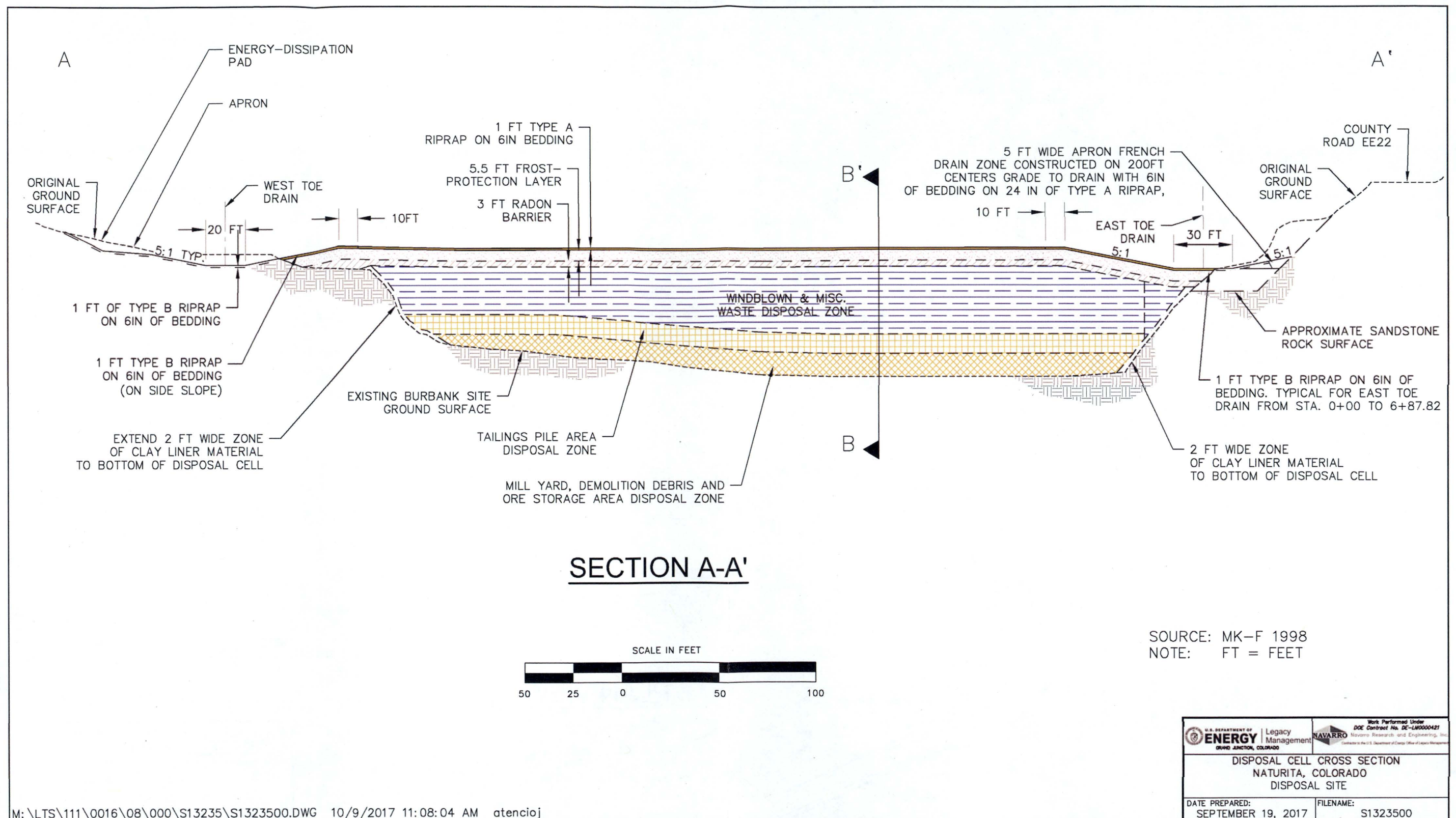


Figure 4. Disposal Cell Cross Section at the Naturita, Colorado, Disposal Site



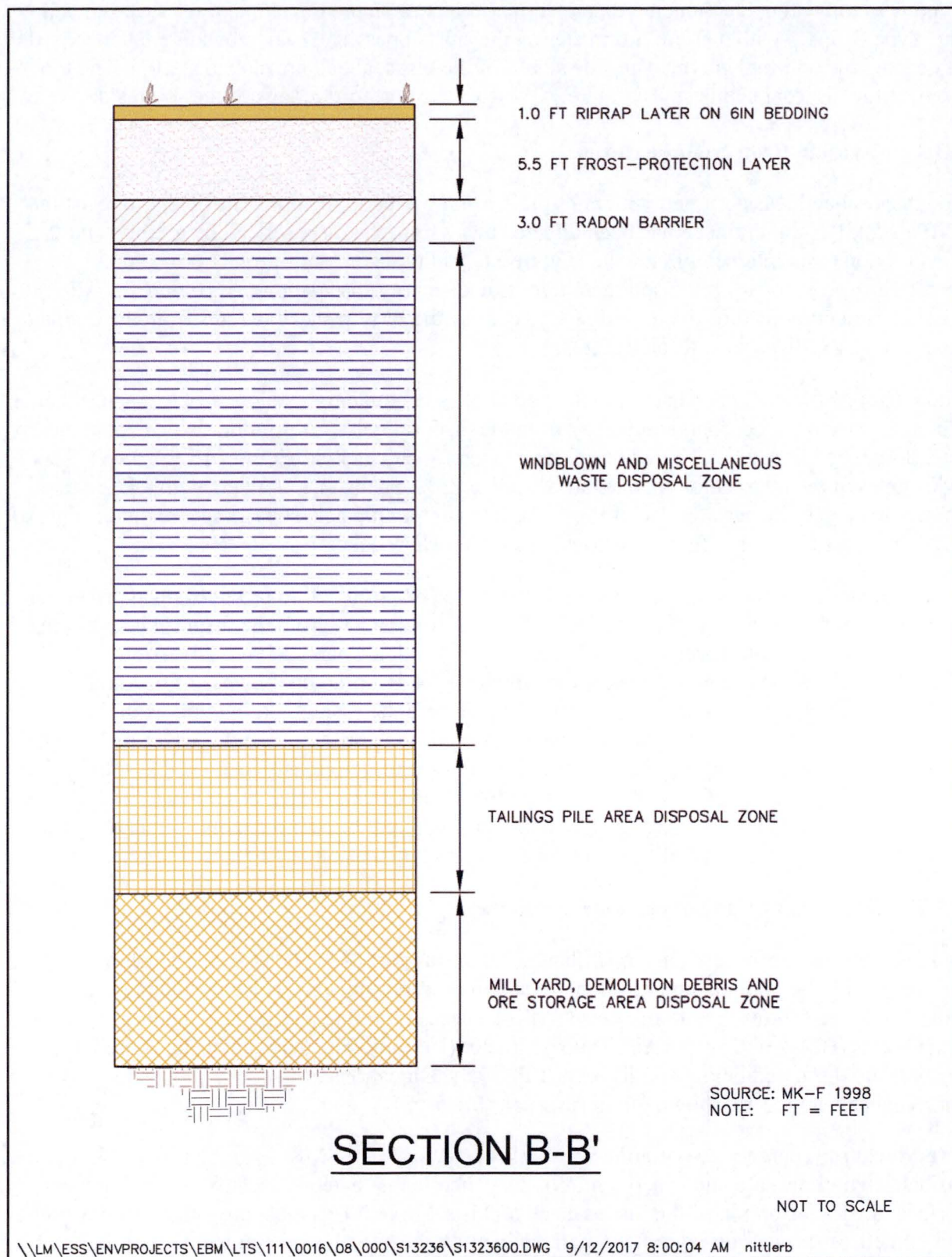


Figure 5. Naturita Disposal Cell Top Slope Cover



PMP was used to determine the required riprap size (DOE 1998a). The riprap layer consists of Type A riprap with a  $D_{50}$  (median diameter) of 1.5 inches on the top slope of the disposal cell and Type B riprap with a  $D_{50}$  of 5.6 inches on the side slopes. The 6-inch bedding layer consists of coarse sand and fine gravel. The side slopes of the disposal cell are sloped at 20%. The top slope of the disposal cell is approximately 3% from the north ridge toward the south side slope.

### 2.3.3 Erosion Protection Features

The disposal cell was designed with multiple erosion-protection features sufficient to resist the PMP event. Upland drainage has been directed away from the disposal cell by grading and the construction of an interceptor channel (Figure 3). Additional erosion-protection features include an apron, toe drains, a sediment trap, and an energy-dissipation pad (Figure 3). All erosion-protection features were designed to convey the PMP peak flow rates from the drainage basin above the disposal cell (DOE 1998a).

The interceptor channel is adjacent to the northwest site boundary, upslope of the disposal cell, to convey storm water around and away from the disposal cell. It is armored with Type B riprap on a 6-inch bedding layer. The width of the interceptor channel varies from 15 to 90 feet. The side slopes of the interceptor channel are sloped at 33%. Sandstone boulders with a  $D_{50}$  size of approximately 36 inches are placed above the interceptor channel. The riprap and dimensions of the interceptor channel mitigate erosional risks to the disposal cell.

An apron was constructed around the perimeter of the disposal cell to provide added protection at the base of the disposal cell and to channel runoff water away from the disposal cell into the east and west toe drains (previously referred to as Diversion Channel 1 and Diversion Channel 2). Both toe drains are rock-armored with Type B riprap on 6 inches of bedding. The west toe drain outlet is in the south corner of the site and the east toe drain outlet is in the southeast corner of the site (Figure 3). The west-southwest portion of the disposal cell is further protected by a sediment trap and an energy-dissipation pad (previously identified as the erosion blanket). To reduce runoff velocity, sandstone boulders with a  $D_{50}$  size of 36 inches and a minimum size of 24 inches were used in the apron, sediment trap, and energy-dissipation pad. Based on the very large size of the sandstone rock, rock gradation testing was not required.

### 2.3.4 Permanent Site Surveillance Features

DOE establishes permanent site surveillance features as part of the ICs to maintain control of the site and notify the public about any contamination. Permanent site surveillance features at the site include the following: site markers (SMKs), survey monuments (SMs), boundary monuments (BMs), and entrance (E) and perimeter (P) signs. The permanent site surveillance features are discussed below and listed in Table 2. The locations of the permanent site surveillance features are shown on the site map (Figure 3).

**Site Markers:** There are two granite site markers (SMK-1 and SMK-2) at the site. SMK-1 is just inside the entrance gate and is set in reinforced concrete that extends 3 feet below the ground surface. SMK-2 is on top of the disposal cell and is set in reinforced concrete that extends to the top of the frost-protection layer. The markers identify the site, the general location of the disposal cell, the date of closure (June 2, 1998), the mass of residual radioactive materials (971,762 dry tons), and the radioactivity (79 curies  $^{226}\text{Ra}$ ). A photo of one of the markers is shown in Figure 6.



**Survey Monuments:** Three survey monuments establish permanent horizontal control. SM-4 is in the north part of the site, northwest of the entrance gate. SM-3 is near perimeter sign P3 along county road EE22. SM-11 is between perimeter signs P15 and P16 on the southwest boundary of the site. The survey monuments, which are Berntsen RT-1 metal markers, are each set into the top of a truncated cone of reinforced concrete. Magnets in the survey monuments permit easier detection if they become buried over time. The survey monument identification number is stamped on the top of the metal cap.

*Table 2. Permanent Site Surveillance Feature Location Coordinates*

Location of Permanent Surveillance Features Naturita, Colorado, Disposal Site		
Feature	Latitude	Longitude
<b>Granite Site Markers</b>		
SMK-1	38.3627	-108.755117
SMK-2	38.36028	-108.754431
<b>Survey Monuments</b>		
SM-3	38.36184	-108.753803
SM-4	38.36295	-108.7554
SM-11	38.35958	-108.755656
<b>Boundary Monuments</b>		
BM-1	38.36034	-108.752364
BM-2	38.36105	-108.75295
BM-5	38.36313	-108.755842
BM-6	38.3626	-108.756161
BM-7	38.36211	-108.7565
BM-8	38.36087	-108.757322
BM-9	38.36076	-108.756136
BM-10	38.36012	-108.756128
BM-12	38.35886	-108.754856
BM-13	38.35858	-108.754456
BM-14	38.35853	-108.754014
BM-15	38.35908	-108.754478
BM-16	38.36011	-108.7528
BM-17	38.35982	-108.751892
<b>Perimeter Signs</b>		
P1	38.36248	-108.754717
P2	38.36211	-108.754197
P3	38.36169	-108.753636
P4	38.36123	-108.753156
P5	38.36083	-108.752797
P6	38.36054	-108.752536
P7	38.3601	-108.752147
P8	38.35995	-108.752383
P9	38.35994	-108.753053
P10	38.35964	-108.753622
P11	38.35941	-108.754058
P12	38.35887	-108.754275
P13	38.35832	-108.754242
P14	38.35888	-108.755258
P15	38.35926	-108.755339
P16	38.35985	-108.755919
P17	38.36029	-108.756156
P18	38.36117	-108.756306
P19	38.36079	-108.756681



Table 2. Permanent Site Surveillance Feature Location Coordinates (continued)

Location of Permanent Surveillance Features Naturita, Colorado, Disposal Site		
Feature	Latitude	Longitude
P20	38.36124	-108.756811
P21	38.36123	-108.757106
P22	38.36166	-108.756839
P23	38.36236	-108.756381
P24	38.36281	-108.756286
P25	38.36309	-108.755639



Figure 6. Site Marker SMK-1 by the Entrance Gate

**Boundary Monuments:** Fourteen boundary monuments define the corners of the site boundary. Berntsen Model A-1 federal aluminum survey monuments were used for the boundary monuments (BM-1 through BM-17). Boundary monuments are set in concrete with the boundary monument 1 to 10 inches above ground level. Several boundary monuments are set directly into bedrock rather than concrete. Magnets in the boundary monuments allow easier detection if they become buried. The boundary monument identification number is stamped on the top of the metal cap. Boundary monuments are offset 5 feet inside the site boundary.



**Entrance and Perimeter Signs:** LM-posted warning signs (18 × 24 inches) indicate property use around the site boundary. The entrance sign is near the entrance gate and site marker SMK-1. In addition to the entrance sign, 25 perimeter signs (P1–P25) are located at approximately 200-foot intervals along the site boundary, offset 5 feet inside the perimeter fence. These signs display the international trefoil symbol indicating the presence of radioactive materials and state that trespassing is forbidden. The entrance sign (Figure 7) has the same information as the perimeter signs, plus the name of the site (Naturita Colorado Uranium Mill Tailings Repository), the 24-hour telephone number for LM in Grand Junction, Colorado ([877] 695-5322), and the LM website address. All sign posts are embedded in concrete to a depth of approximately 3 feet below ground surface.



*Figure 7. Entrance Sign*

### **2.3.5 Site Drawings and Photographs**

Following completion of construction at the site, as-built conditions were documented with drawings and photographs in the completion report (MK-F 1998). The as-built drawings are filed and maintained in the permanent site file. The as-built drawings are used to document changes in physical site conditions over time and to develop corrective action plans, if required.



The as-built drawings were used to prepare the site map (Figure 3). The site map identifies the following site features:

- Topographic features
- Permanent site surveillance features
- Entrance road and gate/barricade
- Site boundary
- Disposal cell
- Interceptor channel
- East and west toe drain
- Apron
- Energy-dissipation pad
- Sediment trap

A photographic record of the final site conditions at the site is maintained in the site permanent file. This record consists of a series of aerial and ground photographs that provide a baseline visual record of site construction and final site conditions to complement the as-built drawings. These photographs provide a record of site conditions to monitor changes in site conditions (e.g., erosion patterns, vegetation changes, and land use) over time.

## **2.4 Geology, Hydrology, and Groundwater Quality**

The following section describes the geology, hydrology, and groundwater quality at the site as required under the general license. Due to site geology, hydrology, and groundwater quality, groundwater monitoring is not required as part of the site's LTS&M activities.

### **2.4.1 Geology and Hydrology**

The primary formations of concern beneath the site are, in descending order, the Salt Wash Member of the Morrison Formation (the Salt Wash Member), Summerville Formation, Entrada Sandstone, Kayenta Formation, and Wingate Sandstone. A generalized geologic column for the site is shown in Figure 8. Both the Salt Wash Member and the Summerville Formation are exposed at the surface in the hillside forming the mesa where the site is located. The disposal cell lies on the Salt Wash Member which consists primarily of interbedded sandstone, siltstone, and mudstone strata. The Salt Wash Member is approximately 100 feet thick and is underlain by the Summerville Formation. The Summerville Formation is an aquitard consisting of approximately 90 feet of massive, clayey mudstones, silty shale, clayey siltstones, and minor interbedded sandstones. Underlying the Summerville Formation is the Entrada Sandstone, a massive-to-crossbedded sparsely fractured sandstone which crops out in the canyon walls near the site and is generally in the unsaturated zone above the regional water table (DOE 1998a). The water table beneath the site is encountered at a depth of approximately 600 feet and coincides with the contact of the Kayenta Formation and Wingate Sandstone (NRC 1999). The Kayenta Formation consists of Jurassic sandstone with siltstone, shale, and conglomerate, conformably overlying the Wingate Sandstone, a well-sorted, fine, quartz sandstone (DOE 1998a). The Kayenta Formation—



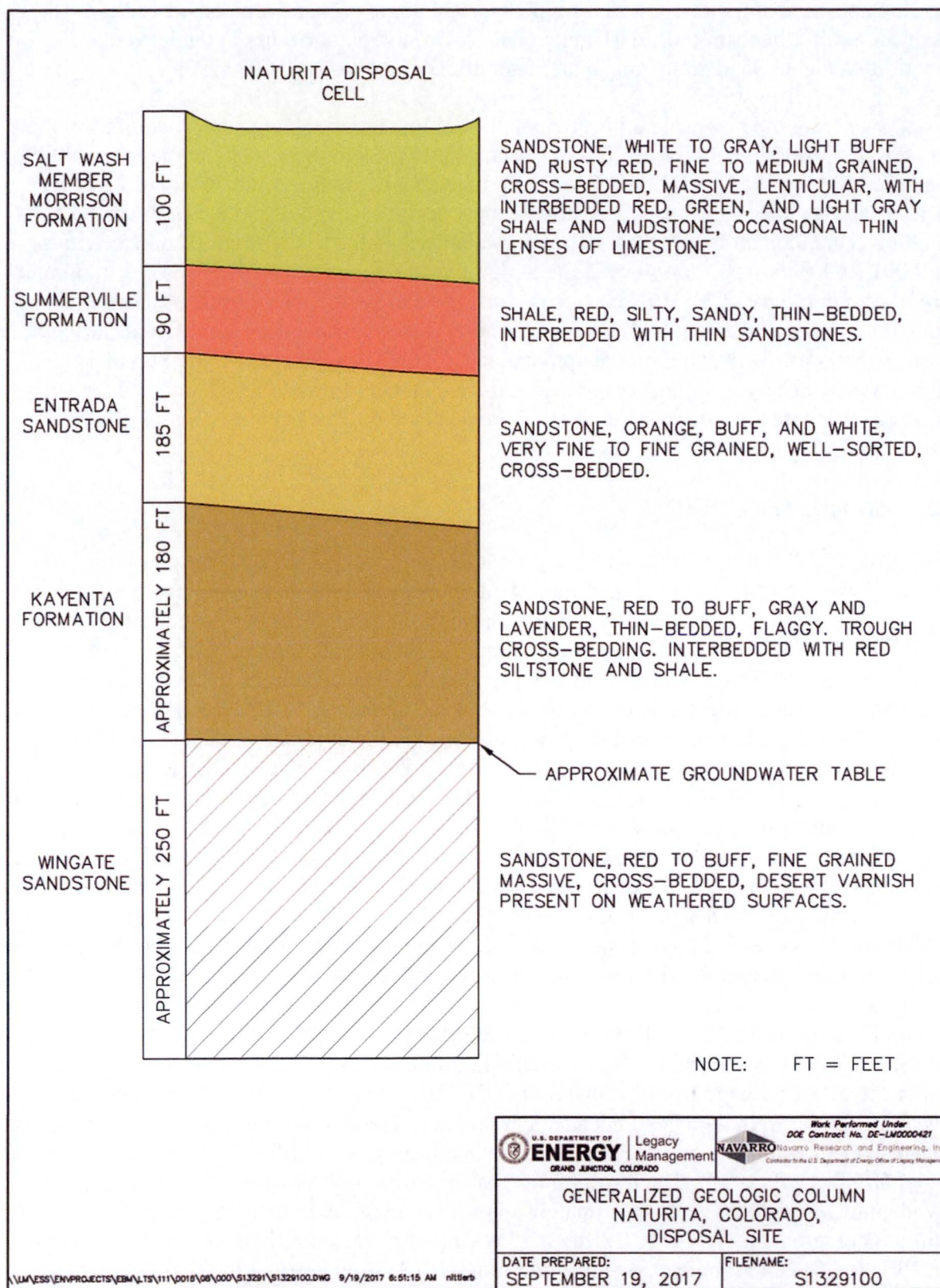


Figure 8. Generalized Geologic Column, Naturita, Colorado, Disposal Site



Wingate Sandstone units function as a single hydrogeologic unit and are considered to be the uppermost aquifer beneath the site (Umetco 2005). Groundwater occurs in the Kayenta Formation–Wingate Sandstone units under unconfined conditions (DOE 1998a).

Any seepage from the disposal cell is prevented from impacting the uppermost aquifer by the Summerville Formation aquitard. Constant-head packer tests in three wells in the Summerville Formation (CM 93-1, CM 93-2, and CM 93-3) indicate a hydraulic conductivity of less than 0.01 feet per year (ft/yr) ( $9.6 \times 10^{-9}$  centimeters per second [cm/sec]) in the Summerville Formation (Umetco and Peel 1994). Laboratory analyses indicate a hydraulic conductivity of less than 0.001 ft/yr ( $9.6 \times 10^{-10}$  cm/sec) in the Summerville Formation (DOE 1998a). A maximum hydraulic conductivity of  $1 \times 10^{-7}$  cm/sec is considered to be suitable for disposal cell covers (NRC 2003) and is consistent with low permeability material properties identified as acceptable for use as liners in waste containment applications (Daniel 1993). As such, the Summerville Formation provides hydrologic isolation from the underlying Entrada Sandstone and Kayenta Formation–Wingate Sandstone sequence and prevents the downward migration of groundwater (DOE 1998a).

## 2.4.2 Groundwater Quality

The original LTSP (DOE 1999) established a background well (CM93-1) and point of compliance well (CM93-2) in the uppermost aquifer (Kayenta Formation–Wingate Sandstone). Because of the geologic isolation between the disposal cell and the uppermost aquifer, it was believed unlikely that any disposal cell contamination would reach the uppermost aquifer. CM93-1 and CM93-2 were sampled from September 1993 to December 1995 and again in May 1997 for the constituents listed in Table 2.2 of the original LTSP (DOE 1999). Analytical results for constituents indicative of disposal cell seepage (arsenic, molybdenum, and uranium) were either very low or nondetectable (Kautsky 2003). Per the original LTSP, DOE did not continue sampling CM93-1 or CM93-2 (DOE 1999). Both wells however served as background wells for the downgradient Uravan UMTRCA Title II disposal cell. As such, Umetco sampled the wells from February 1994 through November 1998. Results of laboratory analyses indicate that total dissolved solids (TDS) concentrations are 3400 to 5070 milligrams per liter (mg/L) and dominated primarily by chloride (1350 to 2730 mg/L) and sodium (970 to 1400 mg/L) (EPA 2000). These exceed the secondary drinking water standards for both TDS (500 mg/L) and chloride (250 mg/L), making the groundwater unfit for human consumption.

Three monitoring wells (BR95-1, BR95-2, and BR95-3) were installed in late 1995 at the contact of the Salt Wash Member and the Summerville Formation to monitor water levels to evaluate whether there was seepage from the disposal cell (DOE 1999). Water quality samples were collected from the wells as a best management practice. The monitoring wells were sampled for indicator constituents (arsenic, molybdenum, and uranium) as identified in Table 2.2 of the original LTSP (DOE 1999). The results show that arsenic was at or below detection limits and molybdenum was detected at approximately an order of magnitude below the UMTRCA maximum contaminant level (MCL) (0.1 mg/L). Uranium concentrations increased moderately from 2001 to 2012 in monitoring wells BR95-1 and BR95-2, exceeding the UMTRCA MCL (0.044 mg/L). Uranium concentration in monitoring well BR95-1 consistently exceeded the UMTRCA MCL, but remained within a range of 0.10 mg/L to 0.12 mg/L (Kautsky 2013). These concentrations are assumed to be the result of naturally elevated uranium in the area and are within the range of uranium concentrations (0.1 mg/L to 0.6 mg/L) reported in literature for the

Salt Wash Member (Phoenix 1959). Water levels were essentially stable from 2002, indicating little or no transient drainage from the disposal cell (Kautsky 2013).

### **2.4.3 Groundwater Protection Strategy**

The original LTSP (DOE 1999) contained requirements for groundwater monitoring of the site in Section 2.6, "Ground Water Protection." In a letter dated October 31, 2013, DOE requested NRC concurrence to terminate groundwater monitoring at the site (Kautsky 2013). NRC concurred with the decision to terminate groundwater monitoring via a letter dated April 15, 2014 (Appendix D) (Orlando 2014). With this revision of the LTSP, groundwater monitoring will no longer be conducted by LM as part of LTS&M activities at the site. All groundwater monitoring wells at the site will be abandoned.

Groundwater monitoring is no longer required at the site for multiple reasons. As detailed in Section 2.4.1 and Section 2.4.2, leakage from the disposal cell is not impacting the uppermost aquifer and is unlikely to do so in the future due to the vertical distance to the uppermost aquifer and the Summerville Formation aquitard, from which there is no significant driving force to allow vertical drainage through. Transient groundwater at the contact of the Salt Wash Member and the Summerville Formation has had stable water levels and there has been no significant change in water quality results. Impact from the Salt Wash Member to the uppermost aquifer has not been observed (Orlando 2014). Furthermore, groundwater in the uppermost aquifer beneath the site is not a current or potential source of drinking water. This is mainly due to the TDS concentrations and the depth to groundwater (approximately 600 feet). The relatively low hydraulic conductivity ( $4.2 \times 10^{-5}$  cm/sec) also limits the feasibility of developing the groundwater resources beneath the site.

Groundwater use near the site is currently nonexistent and future uses are limited. The site is in a remote area approximately 17 miles from the nearest towns, Naturita and Nucla. The nearest residence to the site is approximately 5 miles to the east-southeast (upstream and upgradient). Because of the nature of the terrain and federal ownership of the site vicinity, there is no reason to believe that there will be any significant population increases near the site in the foreseeable future (EPA 2013).

## **2.5 Institutional Controls**

ICs are established at sites in order to protect human health and the environment, maintain the physical safety and security of the site, and to appropriately limit access to or use of land, facilities, and other real and personal properties. Per DOE Policy 454.1, ICs may include administrative or legal controls, physical barriers or markers, and methods to preserve information and data and inform the public of hazards and risks. ICs at the site, as applied by DOE Policy 454.1, consist of a proprietary control in the form of federal ownership of the property, and the following physical ICs: warning/no-trespassing signs (entrance and perimeter signs) along the property boundary, a perimeter fence, and a locked gate at the entrance to the site. DOE inspects physical ICs annually to confirm their integrity.

## 3.0 Long-Term Surveillance Program

### 3.1 Requirements of the General License

Requirements of the general license for the long-term surveillance program are in 10 CFR 40.27(b)(3) and 10 CFR 40, Appendix A, Criterion 12. Table 3 lists the requirements of the general license and the sections in this LTSP where each is addressed.

*Table 3. Requirements of the General License and DOE Response*

Requirement	LTSP Reference	General License Reference
Annual site inspection	Section 3.2	10 CFR 40, Appendix A, Criterion 12
Annual inspection report	Section 3.3	10 CFR 40, Appendix A, Criterion 12
Follow-up inspections and follow-up inspection reports, as necessary	Section 3.4	10 CFR 40, Appendix A, Criterion 12
Site maintenance and emergency measures	Section 3.5	10 CFR 40.27(b)(5)
Environmental monitoring, if required	Section 3.6	10 CFR 40.27(b)(3)

### 3.2 Annual Site Inspections

#### 3.2.1 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). Inspections may also be conducted to follow up on events or conditions that have or could affect the site, such as severe weather, vandalism, or earthquake. DOE will inspect the site once each calendar year. The date of the inspection may vary from year to year, but DOE will endeavor to inspect the site once every 12 months unless circumstances warrant variance. Any variance will be explained in the inspection report. NRC has requested that DOE provide them an annual inspection schedule and contacts NRC at least 30 days in advance of the inspection. DOE also provides scheduling information to the State of Colorado. These are completed as best management practices.

#### 3.2.2 Inspection Procedure

To ensure a thorough and uniform inspection, the site is divided into inspection areas. Each inspection area is inspected by walking the area so that the entire surface is inspected. Within each area, inspectors examine specific site surveillance features, such as survey and boundary monuments, signs, site markers, toe drains, and other features listed in Section 2.3.4, "Permanent Site Surveillance Features," and on the Inspection Checklist (Appendix C). Table 4 lists the inspection areas for the disposal cell.

Table 4. Inspection Areas for the Annual Inspection of the Naturita, Colorado, Disposal Site

Inspection Area	Description
1	Top of the disposal cell
2	Side slopes of the disposal cell
3	Access road from the entrance gate to the disposal cell
4	Site boundary
5	Outlying area

Inspectors also examine each inspection area for surficial changes that might compromise or threaten the safety, security, or integrity of the site. Such changes make include the success of previous maintenance, signs of erosion, settling, slumping, plant or animal encroachment, human intrusion; or vandalism. Photographs and measurements are used as necessary to support or supplement written observations. Inspectors note changes within 0.25 mile (0.40 kilometer) of the site that might be significant.

A new site inspection map will be prepared after each annual inspection using the site map (Figure 3) as a base. The site inspection maps become a part of the permanent site file. Site inspection maps will include, at a minimum, the following:

- Locations from which photographs were taken
- Locations and descriptions of new, anomalous, or unexpected features
- Features identified for observation or monitoring during previous inspections
- Date of inspection

### 3.2.3 Inspection Checklist

Inspectors are briefed and the inspection checklist is reviewed before each annual inspection. The checklist includes:

- Specific site surveillance features to be inspected
- Routine observations to be made
- Special issues or problems, if any, to be observed and evaluated

The checklist is reviewed annually and revised as necessary to reflect changes or new conditions at the site. A sample checklist is provided in Appendix C.

### 3.2.4 Personnel

Typically, two inspectors will perform the annual inspections. Inspectors will be experienced engineers or scientists who have the required knowledge, skills, and abilities to evaluate site conditions and recognize imminent or actual problems. Inspectors will be assigned for a given inspection on the basis of site conditions and inspector expertise. Areas of expertise include civil, geotechnical, and geological engineering; geology; hydrology; biology; and environmental science (e.g., ecology, soils, or range management).



### 3.3 Annual Inspection Report

DOE will report the results of the annual inspection to NRC in an annual inspection report which will include the results of all UMTRCA Title I sites' annual inspections. The annual inspection report will be sent to NRC within 90 days of the last Title I site inspection in the calendar year (10 CFR 40, Appendix A, Criterion 12). If the annual inspection report cannot be submitted in accordance with 10 CFR 40, DOE will notify NRC. Annual inspection reports are made available to the public and other agencies.

### 3.4 Follow-Up Inspections

Follow-up inspections are unscheduled inspections conducted in response to observations from annual inspections or other site visit, or unusual occurrences.

#### 3.4.1 Criteria for Follow-Up Inspections

Criteria for follow-up inspections are found at 10 CFR 40.27(b)(4). DOE will conduct a follow-up inspection when:

- A condition is identified during the annual 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. A 24-hour DOE contact telephone number is posted on the entrance sign and is intended for public use to request information or to report a problem at the site (Figure 7).

Once a new or changed condition is identified, DOE will evaluate the information and determine whether a follow-up inspection is warranted. Conditions that might require a follow-up inspection include changes in vegetation, erosion, storm damage, wildfires, low-impact human intrusion, vandalism, or the need to evaluate or design maintenance projects. DOE will use a graded approach with respect to follow-up inspections. Urgency will be proportional to the potential seriousness of the condition. Conditions that threaten the safety of the site or the integrity of the disposal cell, such as slope failure, severe storm, a major seismic event, wildfire impact, and deliberate human intrusion, might require a more urgent follow-up inspection or emergency measures. DOE can request the assistance of local agencies to confirm the seriousness of a condition before conducting a follow-up inspection or emergency measures (Section 3.5.2).

In the event of "unusual damage or disruption" (10 CFR 40, Appendix A, Criterion 12), that is, damage that might compromise or threaten the safety, security, or integrity of the site, DOE will:

- Notify NRC pursuant to 10 CFR 40, Appendix A, Criterion 12, or 10 CFR 40.60, whichever applies.
- Begin the DOE internal occurrence notification process (DOE Order 231.1B Chg 1).
- Respond with an immediate follow-up inspection or emergency response team.
- Implement emergency measures, as necessary, to prevent or contain exposure or release of radioactive materials (Section 3.5.2).

### **3.4.2 Personnel**

DOE will assign inspectors to follow-up inspections on the same basis as the annual site inspection (see Section 3.2.4).

### **3.4.3 Reports of Follow-Up Inspections**

Results of follow-up inspections for incidents or conditions that do not threaten disposal cell integrity will be included in the annual inspection report to NRC. Separate preliminary reports will not be issued unless DOE determines that it is advisable to notify NRC and other agencies of a potentially serious problem at the site. If a preliminary report is required, DOE will submit the preliminary report of the follow-up inspection to NRC within the 60-day period required by 10 CFR 40, Appendix A, Criterion 12.

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

### **3.5.1 Routine 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 has been designed and constructed to minimize the need for routine maintenance. If an inspection reveals damaged or missing site surveillance features (e.g., signs, site markers, and boundary monuments), the features will be repaired or replaced as necessary. If a structure has failed or has been degraded in a way that might compromise site protectiveness (but is not considered to be an emergency), repairs will be conducted to re-establish integrity of the disposal system.

### **3.5.2 Emergency Measures**

Emergency measures are actions DOE will take in response to “unusual damage or disruption” that threatens or compromises site safety, security, or integrity (10 CFR 40, Appendix A, Criterion 12). DOE will contain or prevent the dispersal of radioactive materials in the unlikely event of a breach in the disposal cell cover.

### **3.5.3 Criteria for Routine Site Maintenance and Emergency Measures**

DOE uses a graded approach for site intervention, from minor routine maintenance to large-scale reconstruction following disasters. Although 10 CFR 40.27 (b)(5) requires that increasingly serious levels of intervention trigger particular DOE responses, the criteria for those responses are not easily defined because the nature and scale of all potential problems cannot be foreseen. The information in Table 5 is not comprehensive and serves only as a guide for appropriate DOE responses. The table shows that the primary differences between routine maintenance and an emergency response is the urgency of the activity and the degree of threat or risk. DOE’s priority levels, in the first column of Table 5, bear an inverse relationship to DOE’s estimate of probability; the highest priority response is believed to be the least likely to occur.

Table 5. DOE Criteria for Maintenance and Emergency Measures

Priority	Description	Example	Response
1	Breach of disposal cell 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 measures 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 measures to repair the breach.
3	Maintenance of specific site surveillance features.	Deterioration/vandalism of signs, markers.	Repair at first opportunity.
4	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.

**Note:** Other changes or conditions will be evaluated and treated similarly on the basis of potential risks posed.

### 3.5.4 Earthquakes

The disposal cell was designed to resist seismic forces. The onsite peak horizontal acceleration used in the disposal cell design was 0.28 g (where g = acceleration due to gravity). This would allow the disposal cell to withstand a magnitude 6.9 event occurring at a distance of 9.31 miles from the site (DOE 1998a). As discussed in its LTSP guidance (DOE 2012), DOE subscribes to the U.S. Geological Survey (USGS) Early Warning Service for notification when an earthquake is of sufficient magnitude to threaten a disposal site. This service provides data on the magnitude of the event and the location of the epicenter. DOE will receive email notifications from the center when earthquakes of magnitude 3.0 or greater occur within 0.3° (about 70 miles) of the site. DOE will evaluate the peak ground acceleration produced by reported earthquakes to determine if further action, such as a follow-up inspection, is required.

### 3.5.5 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 Priority 2 event such as those listed in Table 5, DOE will contact the NRC 24-Hour Operations Center for Emergencies at (301) 816-5100 and will notify the appropriate offices at the NRC.

## 3.6 Environmental Monitoring

The only environmental monitoring required at the site is vegetation monitoring. As discussed in Section 2.4.3, groundwater monitoring has been discontinued. A plant specialist or other qualified person will periodically participate in site inspections to conduct vegetation monitoring. If the inspection does not coincide with the general growing season, the plant specialist can conduct a separate inspection at a more favorable time.

Volunteer plant growth is anticipated at the site and is not of concern unless it threatens the performance of engineered structures. Volunteer plant growth includes plants growing where

none were planned, such as in rock-lined toe drains, or unwanted plant species growing on the top slope of the disposal cell. Over the life of the disposal cell, it is expected that windblown soil or water flows may cause sediment loading over erosion-protection rock areas. These areas will be monitored, but as long as erosion protection is not diminished, removal of the sediments or plants will not be necessary. If volunteer plant growth or sedimentation occurs where the function of engineered structures might be degraded, DOE will evaluate the potential impact and select appropriate responses in consultation with NRC.

### **3.7 Institutional Controls Monitoring**

DOE will monitor ICs as part of the annual inspection. This includes monitoring land use at the site and the ICs identified in Section 2.5.

### **3.8 Records**

DOE receives and maintains selected records to support post-closure site maintenance. Inactive records are preserved in DOE collections or at a Federal Records Center. Site records contain critical information required to protect human health and the environment, manage land and assets, protect the 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 appropriate records management requirements as specified in the DOE LTSP development guidance document (DOE 2012).

### **3.9 Quality Assurance**

All activities related to the surveillance and maintenance of the site will comply with appropriate federal and local regulation, DOE orders, and other requirements as specified in the DOE LTSP development guidance document (DOE 2012). Quality assurance requirements are routinely fulfilled by the use of a work planning process, standard operating procedures, trained personnel, documents and records maintenance, and assessment activities. These requirements will be transmitted through procurement documents to subcontractors when appropriate.

### **3.10 Safety and Health**

Safety and health requirements and procedures for DOE activities are consistent with federal and local regulation, DOE orders, and applicable codes and standards as specified in the DOE LTSP development guidance document (DOE 2012). The DOE Integrated Safety Management process serves as the basis for the LMS contractor's Safety and Health Program. Project-specific safety plans are used to identify specific hazards associated with the anticipated scope of work and provide direction for the control of these hazards. During the preinspection briefing, inspectors are required to review project-specific safety plans and the LTSP to ensure that they have an understanding of the site. Prior to entering the site, all personnel accessing the site are briefed on the potential hazards and the safety and health requirements associated with the site and any work to be performed.

## 4.0 References

10 CFR 40. U.S. Nuclear Regulatory Commission, "Domestic Licensing of Source Material," *Code of Federal Regulations*.

10 CFR 40, Appendix A. U.S. Nuclear Regulatory Commission, "Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material From Ores Processed Primarily for Their Source Material Content," *Code of Federal Regulations*.

40 CFR 192. U.S. Environmental Protection Agency, "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings," *Code of Federal Regulations*.

42 USC 7901 et seq. "Uranium Mill Tailings Radiation Control Act," *United States Code*.

Daniel, D., 1993, "Case Histories of Compacted Clay Liners and Covers for Waste Disposal Facilities," International Conference on Case Histories in Geotechnical Engineering.

DOE (U. S. Department of Energy), 1995. *Baseline Risk Assessment of Ground Water Contamination at the Uranium Mill Tailings Site near Naturita, Colorado*, DOE/AL/62350-195.

DOE (U. S. Department of Energy), 1998a. *Remedial Action Plan and Site Design for Stabilization of the Naturita Title I Residual Radioactive Materials at the Upper Burbank Repository, Uravan, Colorado*, March.

DOE (U.S. Department of Energy), 1998b. *Remedial Action Plan for the Inactive Uranium Processing Site at Naturita, Colorado*, DOE/AL/62350-249, March.

DOE (U. S. Department of Energy), 1999. *Long-Term Surveillance Plan for the Upper Burbank Disposal Cell, Uravan, Colorado*, DOE/AL/62350-250, Rev. 1, Jacobs Engineering Group Inc., July.

DOE (U. S. Department of Energy), 2002. *Site Observational Work Plan for the Naturita, Colorado, UMTRA Project Site*, May.

DOE (U.S. Department of Energy), 2012. *Guidance for Developing and Implementing Long-Term Surveillance Plans for UMTRCA Title I and Title II Disposal Sites*, LMS/S00336, November.

DOE Order 231.1B Chg. 1, *Environment, Safety, and Health Reporting*, June 27, 2011.

DOE Policy 454.1, *Use of Institutional Controls*, April 9, 2003.

EPA (U.S. Environmental Protection Agency), 2000. *Umetco Minerals Corporation, Uravan Superfund Site, Uravan, Colorado, Five-Year Review Report*, March.

EPA (U.S. Environmental Protection Agency), 2013. *Potential for Future Use, Uravan Uranium Project (Union Carbide) Superfund Site*, August.

Kautsky, 2013. Mark Kautsky, Site Manager, Office of Legacy Management, U.S. Department of Energy, letter (about Notification to Terminate Groundwater Monitoring at the Naturita, Colorado, Uranium Mill Tailings Radiation Control Act [UMTRCA], Title I, Site) to U.S. Nuclear Regulatory Commission, October 31.

MK-F (Morrison Knudsen-Ferguson), 1998. *Naturita, Colorado, Final Completion Report*, prepared by Morrison Knudsen-Ferguson for the U.S. Department of Energy, November.

NRC (U.S. Nuclear Regulatory Commission), 1999. *Final Technical Evaluation Report for the Proposed Remedial Action at the Naturita Uranium Mill Tailings Site, Naturita, Colorado*, April.

NRC (U.S. Nuclear Regulatory Commission), 2003. *Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act of 1978* (NUREG-1620), June.

Orlando, 2014. Dominick A. Orlando, Senior Project Manager, Materials Decommissioning Branch, U.S. Nuclear Regulatory Commission, letter (about U.S. Department of Energy proposal to terminate groundwater monitoring at the Naturita, Colorado, Site) to Mark Kautsky, Office of Legacy Management, U.S. Department of Energy, April 15.

Phoenix, David A. 1959. *Occurrence and Chemical Character of Ground Water in the Morrison Formation in Geochemistry and mineralogy of the Colorado Plateau Uranium Ores*. U.S. Geological Survey Professional Paper 320, Robert M. Garrels and Esper @ Larsen III, eds.

U.S. Census (U.S. Census Bureau), 2016. "QuickFacts, Montrose County, Colorado," <https://www.census.gov/quickfacts/table/PST045215/08085>, accessed April 20, 2017.

Umetco Minerals Corporation, 2005. *Uravan Remedial Action Plan (83-C-2384 Final Consent Decree, Order, Judgment and Reference to Special Master, with Appendices)*, Grand Junction, Colorado, Revised May.

Umetco Minerals Corporation and Peel Environmental Services, 1994. *Hydrogeology of Club Mesa, Uravan, Colorado*, unpublished report.

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## **Appendix A**

### **NRC Concurrence and Licensing Documentation**



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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

August 25, 1999

Mr. George Rael, Director  
U.S. Department of Energy  
Environmental Restoration Division  
Albuquerque Operations Office  
ERD/UMTRA  
P.O. Box 5400  
Albuquerque, NM 87185-5400

SUBJECT: ACCEPTANCE OF THE LONG-TERM SURVEILLANCE PLAN FOR THE  
NATURITA, COLORADO, URANIUM MILL TAILINGS REMEDIAL ACTION  
PROJECT SITE

Dear Mr. Rael:

The U.S. Nuclear Regulatory Commission (NRC) staff hereby accepts the U.S. Department of Energy's (DOE's) Long-Term Surveillance Plan (LTSP), dated July 1999, as amended with appropriate replacement page changes, dated July 15, 1999, for the Naturita, Colorado, Uranium Mill Tailings Remedial Action Project site. This action establishes the Naturita site under the general license in 10 CFR Part 40.27.

The NRC staff made a determination that all of the previously identified open issues raised in NRC's transmittal dated June 4, 1999, have been adequately addressed in the July 1999 version of the LTSP for the Naturita site.

The LTSP satisfies the requirement set forth in the Uranium Mill Tailing Radiation Control Act of 1978 for the long-term surveillance of a disposal site, and all requirements in 10 CFR Part 40.27 for an LTSP. In accordance with DOE's guidance document for long-term surveillance, all further NRC/DOE interaction on the long-term care for the Naturita site will be conducted with DOE's Grand Junction Project Office.

G. Rael

-2-

August 25, 1999

If you have any questions concerning this subject, please contact Mr. Robert Carlson of my staff at (301) 415-8165.

Sincerely,

[D. Gillen for]

John J. Surmeier, Chief  
Uranium Recovery and  
Low-Level Waste Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

cc: W. Woodworth, DOE Alb  
F. Bosiljevac, DOE Alb  
S. Hamp, DOE Alb  
E. Artiglia, TAC Alb  
R. Edge, DOE GRJ  
R. Cornish, DOE Alb  
J. Deckler, CDPHE

**DISTRIBUTION w/Encl.:** NMSS r/f URLL r/f BSpitzberg/RIV  
CNWRA RCarlson DRom TJohnson  
JLusher WFord ACNW MLayton  
JHolonich CAbrams JKennedy

**DOCUMENT NAME: G:\URLL\RDC\NATURITA\_LTSP.WPD**

OFC	URLL	H	URLL	C	URLL
NAME	RCarlson		DGillen		JSurmeier
DATE	8/24/99		8/25/99	H	8/25/99

OFFICIAL RECORD COPY

This document should ~~not~~ be made available to the PUBLIC

(Initials)

(Date)

**Appendix B**

**Site Ownership / Custody Documentation**

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Reception No. \_\_\_\_\_  
Recorded at \_\_\_\_\_ o'clock \_\_\_\_\_

628173 05/16/1997 04:13P BB45 P8 WD  
1 of 1 R 6.00 D 0.00 N 0.00 CLK&REC MONTROSE CO

NAD 003007  
345094

**WARRANTY DEED**

Grantor(s), Umetco Minerals Corporation, a Delaware corporation

whose address is 2754 Compass Drive, Suite 280  
Grand Junction  
County of Mesa, State of  
Colorado 81506-8741

, for the consideration of  
Ten Dollars and Other valuable consideration  
(to be paid in hand paid, hereby sell(s)

and convey(s) to  
United States of America  
whose legal address is

No documentary transfer tax due

Attorney-Advisor

County of

and State of

the following real property in the

County of Montrose

and State of

Colorado, to wit:

BEGINNING AT A POINT WHICH LIES SOUTH 83°48'49" WEST, 3372.34 FEET FROM THE NORTHEAST CORNER OF SECTION 4, TOWNSHIP 47 NORTH, RANGE 17 WEST, NEW MEXICO PRINCIPAL MERIDIAN AND CONSIDERING THE NORTH LINE OF SAID SECTION 4 TO BEAR NORTH 83°47'29" WEST AND ALL BEARINGS CONTAINED HEREIN RELATIVE THERETO; THENCE SOUTH 36°18'12" EAST, 255.08 FEET, MORE OR LESS, TO THE NORTH LINE OF MILL SITE CLAIM URAVAN NO. 63 AS RECORDED IN THE OFFICE OF THE RECORDER OF MONTROSE COUNTY, COLORADO; THENCE NORTH 82°16'49" WEST ALONG SAID NORTH LINE 361.72 FEET; THENCE SOUTH 32°52'53" WEST, 503.91 FEET; THENCE SOUTH 33°25'51" EAST, 245.53 FEET, MORE OR LESS, TO THE NORTH LINE OF MILL SITE CLAIMS URAVAN NO. 66 AND 67 AS RECORDED IN THE OFFICE OF THE RECORDER OF MONTROSE COUNTY, COLORADO; THENCE NORTH 81°36'52" WEST ALONG SAID NORTH LINE, 134.18 FEET; THENCE NORTH 49°16'53" WEST, 152.74 FEET; THENCE NORTH 40°56'08" WEST, 331.13 FEET; THENCE NORTH 34°29'19" WEST, 238.62 FEET; THENCE NORTH 00°29'49" WEST, 233.37 FEET; THENCE NORTH 83°28'44" WEST, 342.58 FEET; THENCE NORTH 27°13'04" EAST, 515.21 FEET; THENCE NORTH 28°47'51" EAST, 202.47 FEET; THENCE NORTH 24°51'27" EAST, 220.23 FEET; THENCE SOUTH 61°15'07" EAST, 150.16 FEET; THENCE SOUTH 48°51'01" EAST, 611.42 FEET; THENCE SOUTH 37°27'22" EAST, 378.02 FEET; THENCE SOUTH 36°18'12" EAST, 308.00 FEET TO THE POINT OF BEGINNING, containing 26.65 acres.

also known by street and number as

with all its appurtenances, and warrant(s) the title to the same, subject to ~~1996 real property taxes, due and payable in 1997, and all subsequent taxes and assessments;~~ all reservations, easements, rights-of-way, notices and Final Consent Decree of record.

Signed this 22<sup>ND</sup> day of MAY, 1997.

WITNESS:

UMETCO MINERALS CORPORATION,  
A DELAWARE CORPORATION

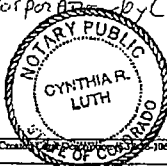
By: Dennis C. Macauley  
President - Attorney-in-Fact

STATE OF COLORADO,

County of Montrose } ss.

The foregoing instrument was acknowledged before me this 22<sup>ND</sup> day of MAY, 1997, by Dennis C. Macauley, President of Umetco Minerals Corporation, a Delaware Corporation, by Curtis D. Sealy, Attorney in Fact. My commission expires 2-7-99

"If in Denver, insert 'City and'.



Name and Address of Person Creating Newly Created Instrument (See 106.3, C.R.S.)

No. 897, Rev. 6-92. WARRANTY DEED (Short Form)

Bradford Publishing, 1743 Wazee St., Denver, CO 80202 — (303) 292-2500 — 3-94

NAD 015.10

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RECEPTION#: 831505, 01/19/2012 at  
02:06:22 PM, 1 OF 3, MODAGR R \$21.00  
FRANCINE TIPTON-LONG, MONTROSE  
COUNTY, CO CLERK AND RECORDER

**U.S. Department of Energy  
Modification to Agreement for Access to  
the Diversion Channel  
Naturita, CO, Disposal Site**

DATE: May 15, 2011

Agreement Number: DE-RO01-07LM70059A

**ADDRESS OF PREMISES:** The property is located in Township 47N, Range 17W, Section 4 in Montrose County, Colorado, as shown on Exhibit A (map) which is attached and made a part hereof.

**THIS MODIFICATION AGREEMENT**, entered into by and between Umetco Minerals Corporation, (Grantor), whose address is: P.O. Box 1029, Grand Junction, CO 81502, and the UNITED STATES OF AMERICA, by and through the Department of Energy, (Grantee) under the authority of the Uranium Mill Tailings Radiation Control Act (42 U.S.C. § 7901, et seq.).

**WITNESSETH:**

Grantor, in consideration of the faithful performance by Grantee of all activities and conditions herein contained, grants, consents and agrees to perpetual ingress and egress to and from approximately 0.6 acres on the Chemist No. 2 Claim containing the diversion channel at the south side of the Naturita Disposal Site, as shown on Exhibit A (map) which is attached and made a part hereof.

1. **GRANTOR PROPERTY** - The Chemist No. 2 Claim containing the diversion channel and use thereof, placed on or near the Naturita, Colorado, Disposal Site, shall remain the property of Grantor. Said diversion channel shall be maintained by Grantee in a good, safe, and workmanlike manner.
2. **TERM/TERMINATION** - This Agreement shall be effective May 15, 2011, and shall continue in full force in perpetuity, unless earlier modified or terminated by either party upon thirty (30) days written notice; provided however, that this Agreement shall terminate automatically, without need for notice, upon Closing the prospective transfer of the area of the Chemist No. 2 Claim by Grantor to Grantee.
3. **GRANTEE RESPONSIBILITY** - Grantee shall be responsible for any loss or destruction of, or damage to, Grantor's real and personal property caused by the activities of Grantee in exercising any rights hereby granted in this Agreement; PROVIDED, that such responsibility shall be limited to restoration of such real and personal property to a condition reasonably compared to its condition on the effective date of this Agreement by techniques of backfilling, seeding, sodding, landscaping, repair or replacement, and such other methods as may be agreed to between the parties.
4. **GRANTEE LIABILITY** - Grantee agrees to cooperate to the extent allowed by law, in the submittal of all claims pursuant to the Federal Tort Claims Act (28 U.S.C. § 2671, et seq.) for alleged loss, injuries, or damages, to persons or property arising from the acts of Grantee, duly authorized representatives, or contractors of Grantee, acting within the scope of their employment.
5. **INSURANCE** - Grantee shall cause its duly authorized representatives, or contractors who enter the property under this Agreement to carry reasonable liability insurance covering risk of liability caused by any of their activities. Upon request, Grantee's duly authorized representatives or contractors will provide Grantor certificates evidencing insurance coverage.
6. **PRIOR NOTIFICATION** - Grantor and its Grantee (if requested) will be notified forty-eight (48) hours prior to entering property under this Agreement. Inspection and maintenance activities will be conducted during normal business hours, unless Grantor provided consent for activities during other hours.



7. NOTICE - No notice, order, direction, determination, requirement, consent, or approval under this Agreement shall be of any effect, within the restrictions of this Agreement, unless provided in writing to the authorized representative at the address set out in Paragraph 8, AUTHORIZED REPRESENTATIVES.

8. AUTHORIZED REPRESENTATIVES

If to Grantee:

Department of Energy  
Laura E. Kilpatrick, Esq., Realty Officer  
(720) 880-4338  
2597 Legacy Way  
Grand Junction, CO 81503

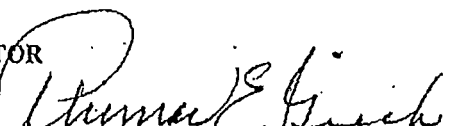
If to Grantor:

Umetco Minerals Corporation  
Mr. Tom Gieck  
(970) 256-8889  
P.O. Box 1029  
Grand Junction, CO 81502

IN WITNESS WHEREOF, the parties subscribed their names.

GRANTOR

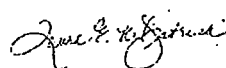
BY:

  
(Signature)

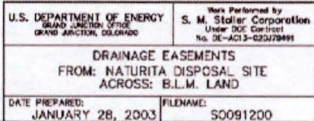
REMEDIATION LEADER  
(Title)

GRANTEE

BY:

 2011.05.04  
15:02:15 -06'00'  
Laura E. Kilpatrick, Esq.

U.S. Department of Energy, Certified Realty Officer  
(Official Title)





United States Department of the Interior  
Bureau of Land Management  
Uncompahgre Field Office  
2505 South Townsend  
Montrose, Colorado 81401

Serial No.: COC-59092

RIGHT-OF-WAY RESERVATION

KNOW ALL MEN BY THESE PRESENTS, That in accordance with Section 507 of the Federal Land Policy and Management Act of 1976 (90 Stat. 2781, 43 U.S.C. 1767) that the United States of America acting by and through the Bureau of Land Management (BLM), U.S. Department of the Interior, does hereby issue and reserve to the United States Department of Energy (DOE), and its assigns, a right-of-way to locate, construct, operate, and maintain two storm water drainage structures as described below. The right-of-way authorized herein is located on real property situated in the County of Montrose, State of Colorado, to wit:

New Mexico Principal Meridian, Colorado

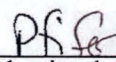
T. 47 N., R. 17 W.,

Sec. 4: NW¼ and lot 11.

The right-of-way area contains 3.114 acres more or less.

The right-of-way herein is more specifically described on the location survey plat filed on February 22, 2003, and entitled U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado, Drainage Easements, From: Naturita Disposal Site, Across: B.L.M. Land, dated January 28, 2003. Filename: S0091200, which survey plat is made a part hereof. The right-of-way reserved is for the full use of the above-described property for two storm water drainage structures associated with the Naturita Disposal Site (aka Upper Burbank Disposal Cell). DOE, its licensees, permittees, agents, and contractors including the people of the United States generally have the right of legal access to all public lands owned, administered, or controlled by the United States of America subject to reasonable rules and regulations of the Secretary of the Interior, and to the following terms and conditions:

1. The two storm water drainage structures constructed under the provisions of this right-of-way, along with all facilities placed thereon, shall be under the control and jurisdiction of DOE.
2. The agency having jurisdiction of the site alone, may extend or grant rights and privileges for use of the site to other users, including members of the public and other Government Departments and Agencies, States, and local subdivisions thereof. Such grants may be in the form of regulations, permits, easements, or licenses, as appropriate.
3. This reservation shall remain in effect in perpetuity from the date it is executed by an authorized officer of the BLM, or it may be terminated sooner if by mutual agreement of the BLM and DOE.
4. This right-of-way reservation is also made subject to the conditions attached as Exhibit A.

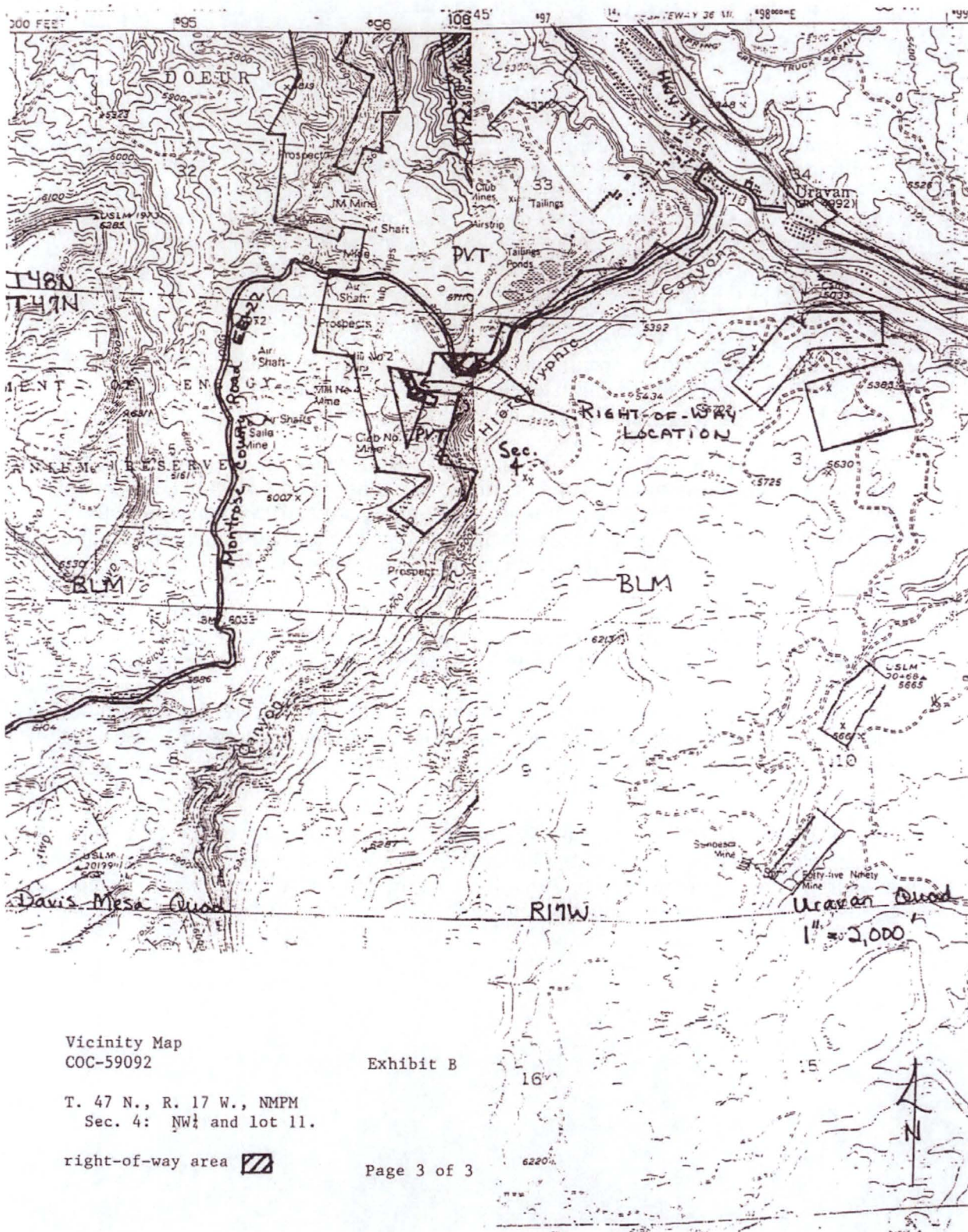
  
\_\_\_\_\_  
(Signature of Authorized Officer)  
Realty Specialist  
\_\_\_\_\_  
(Title)  
March 18, 2003  
\_\_\_\_\_  
(Date)  
Page 1 of 3



### STIPULATIONS

1. The right-of-way authorized herein is subject to any and all valid existing rights created by mining claims and mineral patent application COC-50406 filed by UMETCO Mineral Corporation, P.O. Box 1029, Grand Junction, Colorado 81502, for the Uravan No. 63, Uravan No. 64, Uravan No. 66 and Uravan No. 67 mining claims. It is recommended that authorization also be obtained from the mining claimant for the facilities authorized herein. The Bureau of Land Management cannot be held responsible for any adverse claims against this right-of-way grant that may arise from future actions of the mining claimant.
2. The holder shall construct, operate and maintain the facilities within this right-of-way in strict conformity with the Plan of Development entitled UMTRA Project - Naturita, Upper Burbank Disposal Cell at Uravan, Colorado, Temporary and Permanent Use of BLM Land, dated March 1996 which was filed with the right-of-way application and received on March 19, 1996. This document is referenced herein and made a part hereof. Any relocation, additional construction, or use that is not in accord with the approved Plan of Development shall not be initiated without the prior written approval of the authorized officer. Noncompliance with the above will be grounds for an immediate temporary suspension of activities if it constitutes a threat to public health and safety or the environment.
3. The holder shall designate a representative(s) who shall have the authority to act upon and to implement instructions from the authorized officer, as necessary.
4. The authorized officer may suspend or terminate in whole, or in part, any construction or maintenance activities, when in his judgement, unforeseen conditions arise which result in the approved terms and conditions being inadequate to protect the public health and safety or to protect the environment.
5. The exterior limits of the right-of-way area shall be clearly defined on the ground, as is reasonable, so that all activities associated with the construction, operation, maintenance and termination of the two storm water drainage structures shall be within the authorized limits of the right-of-way granted herein.






Vicinity Map  
COC-59092

Exhibit B

T. 47 N., R. 17 W., NMPM  
Sec. 4: NW $\frac{1}{4}$  and lot 11.

right-of-way area 

Page 3 of 3

**Appendix C**  
**Inspection Checklist**

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## NATURITA, COLORADO, UMTRCA TITLE I DISPOSAL SITE

### Status of Site Inspections

Date of this Revision:

20XX Inspection Date:

20XX Inspectors :

Next Annual Inspection (Planned):

Scheduled Inspectors:

No.	Item	Issue	Action
1	Access	Access is directly off County Road EE22. The Uravan Title II Burbank Repository disposal cell is contiguous with the DOE disposal cell.	No action necessary.
2	Protocols	Notify Colorado Department of Public Health and Environment (CDPHE) manager.	Contact CDPHE via email approximately 1 month before inspection to verify schedule. NRC and State receive inspection schedule updates.
3	Safety meeting	An onsite safety meeting is required to discuss all related safety and emergency issues.	Document meeting. Go through inspection job safety analysis (JSA) and Plan of the Day. Discuss safety issues. Interaction welcomed.
4	Specific site surveillance features	See attached table.	Inspect all.
5	Top and side slopes	Site integrity and long-term performance.	Specifically check south side of cell. Check for erosion, settling, slumping, rock degradation, vegetation, and biointrusion.
6	Toe drains and outlets	Site integrity and long-term performance. Minor sediment accumulation and erosion have been noted during previous inspections, however, neither was impacting the functions of the drains and outlets.	Check for erosion, sedimentation, rock degradation, and vegetation. Check conditions of the outlet channels to verify they are functioning as designed.
7	Interceptor channel	Site integrity and long-term performance. Minor sediment accumulation was noted near perimeter sign P4, but was not impacting the function of the channel.	Check for erosion, sedimentation, rock degradation, and vegetation. Determine if herbicide spraying is needed.
8	Reclaimed area	Disturbed area north of the disposal cell.	Check for erosion.
9	Outlying area	Note general stability.	Check for erosion or any activities that could affect the integrity of the site. Also check for any new development in general area.
10	Noxious weeds and deep-rooted plants	Russian knapweed, halogeton, and tamarisk were all noted on the site previously. Herbicides were subsequently applied to control these infestations.	Check for noxious weeds and mark locations of occurrences on the field map.



## Specific Site Surveillance Features—Naturita, Colorado, Disposal Site

Feature	Comment
Access road	County Road EE22.
Access gate	Northeast end of site. Two tubular steel gates, hung on galvanized steel gate posts, secured by chain and padlock.
Interior cell access road	Traverses site from the access gate, down the slope to the cell, and then along the southwestern perimeter of the cell. Erosion repair work was performed in March 2014.
Perimeter fence	Conventional barbed wire stock fence. There are two metal gates in this fence on the west for access to monitoring wells west of the disposal cell.
Entrance sign (1)	Immediately northwest of the access gate.
Perimeter signs (25)	Locations as indicated on the site map.
Site markers (2)	SMK-1, just inside and left of the entrance gate. SMK-2, on top of the disposal cell.
Survey monuments (3)	SM-3, SM-4, and SM-11. (See "Boundary monuments" in this table below.)
Boundary monuments (14)	There are 17 corners on the property. Survey monuments (SM-3, SM-4, and SM-11) mark three of the corners; boundary monuments (BM-1, BM-2, etc.) mark the remaining 14 corners.

**Appendix D**

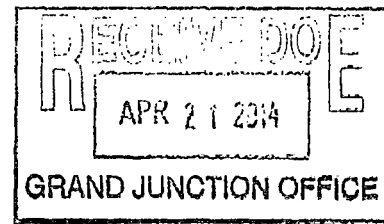
**NRC Concurrence on Termination of Groundwater Monitoring**

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

April 15, 2014



Mr. Mark Kautsky  
U.S. Department of Energy  
Office of Legacy Management  
2597 Legacy Way  
Grand Junction, CO 81503

SUBJECT: U.S. DEPARTMENT OF ENERGY'S PROPOSAL TO TERMINATE GROUND  
WATER MONITORING AT THE NATURITA, COLORADO TITLE I SITE (Docket  
Number WM-00066)

Dear Mr. Kautsky:

I am writing in response to your letter, dated October 31, 2013, in which the U.S. Department of Energy (DOE) requested the U.S. Nuclear Regulatory Commission's (NRC's) concurrence on DOE's decision to terminate ground water monitoring at the Naturita Colorado Uranium Mill Tailings Radiation Control Act (UMTRCA) disposal site (Agencywide Document Access and Management System (ADAMS) Accession Number ML13316B561). In your letter, which was received by the NRC on November 12, 2013, you stated that, if you did not receive a response from NRC within 45 days of the receipt of the letter, DOE will assume that NRC has concurred with DOE's decision. On December 16, 2013, NRC staff informed you via email that DOE should not make any changes to the groundwater monitoring at the Naturita disposal site without NRC authorization. You acknowledged the NRC staff's email on that same day.

Before we comment on your request to cease ground water monitoring, the NRC staff feel it is important to point out that both DOE and NRC have important long-term site maintenance and oversight responsibilities at UMTRCA Title I and Title II sites. Executing these responsibilities requires that both Agencies ensure clear communication about our activities at the sites. NRC's role as the regulatory authority at UMTRCA Title I and Title II sites requires that we concur on DOE's proposed actions. To ensure that NRC's concurrence on DOE's proposed actions is clear and appropriately documented, the NRC will only provide our concurrence on DOE's proposed actions in writing, once the NRC has concluded its review and has determined that DOE's proposed action will be protective of the public health and safety and the environment. Therefore, in the future and, absent a written response from NRC, DOE should not assume that DOE has NRC's concurrence on DOE's proposed actions at UMTRCA sites.

NRC staff has completed its review of your letter and request to cease ground water monitoring at the Naturita disposal site. Based on our review, we have concluded that leakage from the disposal cell is not impacting the uppermost aquifer, and it would be unlikely for future impacts to occur since the tailings do not contain a significant driving force to allow vertical drainage of constituents of concern from the cell into the underlying Salt Wash Member, which overlies the Summerville Formation aquitard. Although uranium levels in monitoring wells BR95-1, BR95-2, and BR95-3 have been moderately increasing since approximately 2001, water levels have not indicated any mounding or fluctuations that would be indicative of seepage from the disposal cell. In addition, arsenic, molybdenum, vanadium, and additional water quality parameters measured during the ground water sampling events have remained stable. The lack of a

significant driving force, stable water levels, and stable water quality measurements all indicate that the disposal cell has not impacted ground water at the site. Therefore, we do not object to your proposed action to cease monitoring ground water in monitoring wells BR95-1, BR95-2, BR95-3, CM93-1 and CM93-2.

NRC regulations at 10 CFR 40.27(b)(2) state that "[i]f the disposal site has continuing aquifer restoration requirements, then the licensing process will be completed in two steps. The first step includes all items other than ground water restoration. Ground water monitoring, which would be addressed in the LTSP, may still be required in this first step to assess performance of the tailings disposal units. When the Commission concurs with the completion of ground water restoration, the licensee shall assess the need to modify the LTSP and report results to the Commission. If the proposed modifications meet the requirements of this section, the LTSP will be considered suitable to accommodate the second step."

Section 2.6 of the LTSP for the Naturita site describes the ground water monitoring plan for the site. Because the monitoring of ground water from the disposal cell is described in the LTSP, DOE should revise the LTSP to remove the discussion of ground water monitoring and submit the revised LTSP to NRC in accordance with 10 CFR 40.27(c). In addition, NRC staff suggest that NRC and DOE discuss, and agree on, whether ongoing ground water monitoring may still be appropriate at the Naturita site prior to DOE's submission of the revised LTSP. We also suggest that this discussion include staff from the Colorado Department of Public Health and Environment.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's ADAMS. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,



Dominick A. Orlando, Senior Project Manager  
Materials Decommissioning Branch  
Decommissioning and Uranium Recovery  
Licensing Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Federal and State Materials  
and Environmental Management Programs

Docket No.: WM-00066

cc:

W. Naugle, CDPHE  
A. Gill, DOE/LM  
R. Bush, DOE/LM



