



# Long-Term Surveillance Plan for the U.S. Department of Energy L-Bar, New Mexico, (UMTRCA Title II) Disposal Site, Seboyeta, New Mexico

September 2004



U.S. Department  
of Energy



**Office of Legacy Management**

**Long-Term Surveillance Plan**

**for the**

**U.S. Department of Energy  
L-Bar (UMTRCA Title II) Disposal Site  
Seboyeta, New Mexico**

September 2004

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 .....	2-4
	2.3.1 Site Ownership.....	2-4
	2.3.2 Directions to the Disposal Site.....	2-4
	2.3.3 Description of Surface Conditions.....	2-4
	2.3.4 Permanent Site Surveillance Features.....	2-5
	2.3.5 Site Geology.....	2-5
2.4	Tailings Impoundment Design .....	2-9
	2.4.1 Encapsulation System .....	2-9
	2.4.2 Surface Water Diversion System .....	2-9
2.5	Ground Water Conditions.....	2-11
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
	3.7.1 Ground Water Monitoring.....	3-8
	3.7.2 Vegetation Monitoring.....	3-11
3.8	Records .....	3-11
3.9	Quality Assurance.....	3-11
3.10	Health and Safety.....	3-12
4.0	References.....	4-1

## Tables

Table 1–1. Requirements of the LTSP and the Long-Term Custodian of the L-Bar Site .....	1–2
Table 3–1. Transects Used During First Inspection of the L-Bar, New Mexico, Disposal Site.	3–2
Table 3–2. DOE Criteria for Maintenance and Emergency Measures .....	3–7
Table 3–3. Alternate Concentration Limits and Alternative Abatement Standards for L-Bar, New Mexico, Disposal Site .....	3–8
Table 3–4. Ground Water Monitoring Plan for L-Bar, New Mexico, Disposal Site .....	3–8

## Figures

Figure 2-1. General Location Map of the L-Bar, New Mexico, Disposal Site .....	2–2
Figure 2-2. L-Bar, New Mexico, Disposal Site Vicinity Map .....	2–3
Figure 2-3. Site Marker at L-Bar, New Mexico, Disposal Site .....	2–6
Figure 2-4. Warning Sign at L-Bar, New Mexico, Disposal Site .....	2–7
Figure 2-5. Typical Geological Section of the L-Bar, New Mexico, Disposal Site .....	2–8
Figure 2-6. Typical Tailings Impoundment Cross Section .....	2–10
Figure 2-7. Surface Water Diversion System .....	2–12
Figure 3-1. Map of Inspection Transects for the L-Bar, New Mexico, Disposal Site .....	3–3
Figure 3-2. Location of Monitor Wells in Ground Water Monitoring Network .....	3–11

## Appendices

Appendix A—Real Estate Information

Appendix B—Initial Site Inspection Checklist

Appendix C—Erosion Monitoring Program

## Plate

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Plate 1—Disposal Site Map

# 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 Kennecott (SOHIO Western) uranium mill tailings disposal site near Seboyeta, New Mexico. 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 the site, monitoring, maintenance, annual and other reporting requirements, 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 two categories of mill tailings sites, Title I and Title II. Title I includes former uranium mill sites that were unlicensed, as of January 1, 1978, and essentially abandoned. Title II includes uranium-milling sites under specific license as of January 1, 1978. In both cases, the licensing agency is the U.S. Nuclear Regulatory Commission (NRC), or in the case of certain Title II disposal sites, an Agreement State. The former SOHIO Western L-Bar site is a Title II site under UMTRCA. The State of New Mexico is not 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 such a manner as to protect the 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 L-Bar Disposal Site are addressed in various sections of the LTSP ([Table 1-1](#)).

The plans, procedures, and specifications in this LTSP are based on the guidance document, *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 L-Bar Site

<b>Requirements of LTSP</b>		
	<i>Requirement</i>	<i>Location</i>
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
<b>Requirements for the Long-Term Custodian (DOE)</b>		
	<i>Requirement</i>	<i>Location</i>
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 December 2003, DOE formally established the Office of Legacy Management (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.” As such, the responsibilities of the Long-Term Surveillance and Maintenance (LTS&M) Program are now administered by LM.

Previously in 1988, DOE had designated the Grand Junction facility as the program office for managing LTS&M of 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 LTS&M Program to fulfill these LTS&M responsibilities.

## 2.0 Final Site Conditions

Reclamation at the L-Bar mill facility near Seboyeta, New Mexico, consisted of demolishing site structures, excavating, and disposing of the contaminated structural materials and contaminated mill site soils within the L-Bar tailings impoundment disposal cell.

### 2.1 Site History

Mining and milling at L-Bar commenced in 1977 and continued until 1981 when the mine closed due to the economics of the uranium industry. A total of 2,111,700 tons of ore was processed through the mill, comprised of approximately 898,500 tons from the L-Bar mine and 1,213,200 tons of toll ore from the United Nuclear Corporation St. Anthony mine and the Anaconda Jackpile mine (BP 1989 and Kennecott 1998).

Solid and liquid wastes were pumped in slurry form into the tailings impoundment for disposal. The slurry consisted of 38 percent solids, of which 80 percent were sand and 20 percent were slimes. Tailings fluid was decanted from the impoundment and recycled back through the mill. Ultimately, some fluid was lost to seepage and evaporation. The L-Bar mill used a sulfuric acid-leach process to extract uranium from the ore. The tailings impoundment was constructed by building a starter dam with weathered Mancos shale. The impoundment contains approximately 700,000 cubic yards of tailings distributed over 100 acres (Kennecott 1998).

All mining at the L-Bar site was underground. The underground workings have been closed and the shafts have been sealed. All above ground structures, including the mine and mill buildings, have been demolished in accordance with NRC regulations (BP 1989).

### 2.2 General Description of the Disposal Site Vicinity

The L-Bar Disposal Site is in Cibola County approximately 47 miles west of Albuquerque, New Mexico, and 10 miles north of Laguna Pueblo ([Figure 2-1](#)). The disposal site is located on part of the former L-Bar ranch, and is approximately 4 miles east-southeast of the village of Seboyeta. The site was previously owned by SOHIO Western Mining Company and was transferred to DOE for long-term custody.

Cibola County is sparsely populated in the area around the L-Bar site. The nearest incorporated town is Laguna, located about 10 miles to the south-southwest. Additionally there are four small villages nearby: Pagate, Bibo, Seboyeta, and Moquino. [Figure 2-2](#) illustrates the site and principal geographic features of the area.

The site climate can generally be classified as arid continental. Dry cold winters and dry hot summers characterize this type of climate. Rainfall is meager and the major portion occurs during June through October. Daytime cloud cover is usually less than 50 percent throughout the year. The rugged topography of the area causes temperature, relative humidity, precipitation, and winds to vary considerably over short distances (SOHIO 1974).

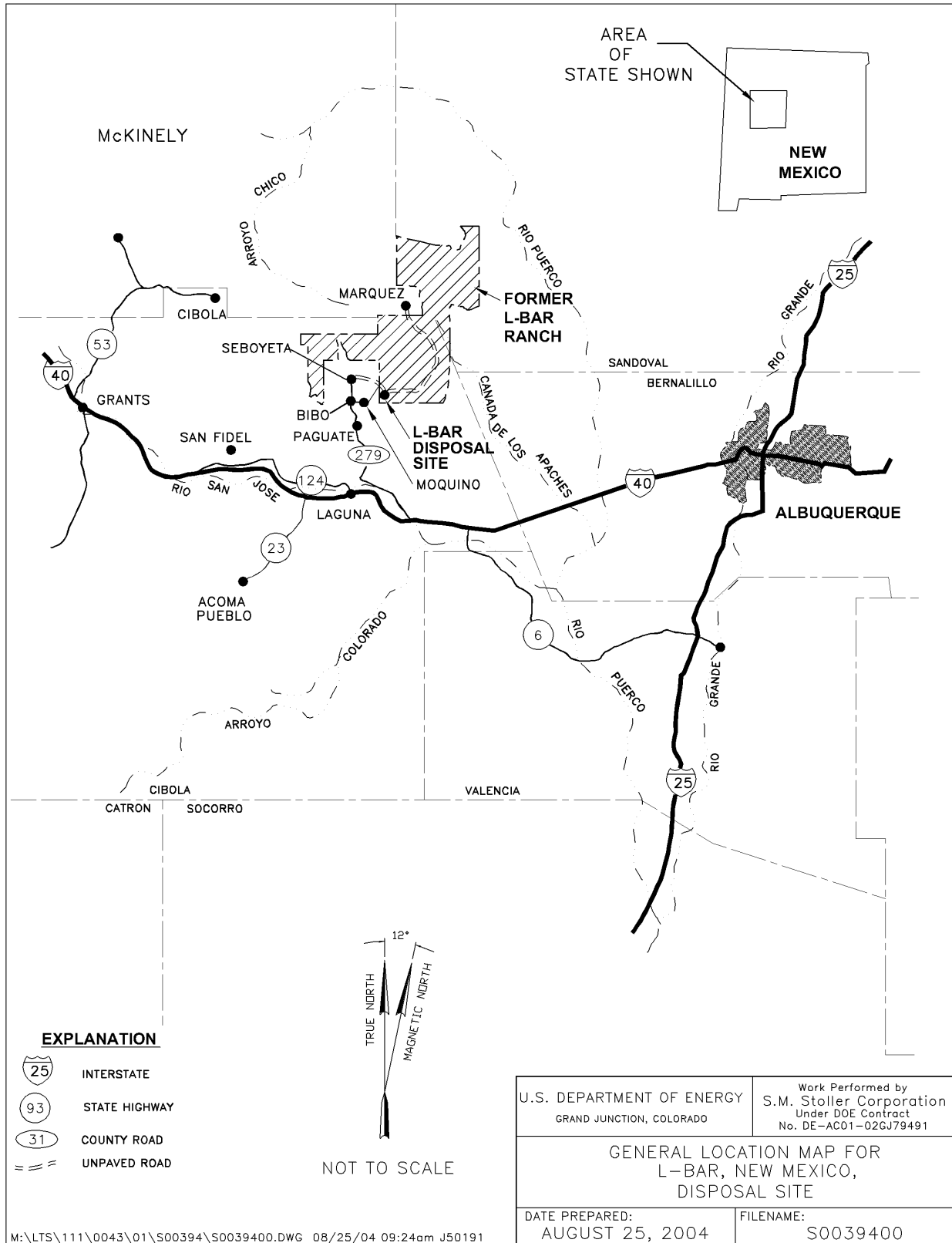


Figure 2-1. General Location Map of the L-Bar, New Mexico, Disposal Site



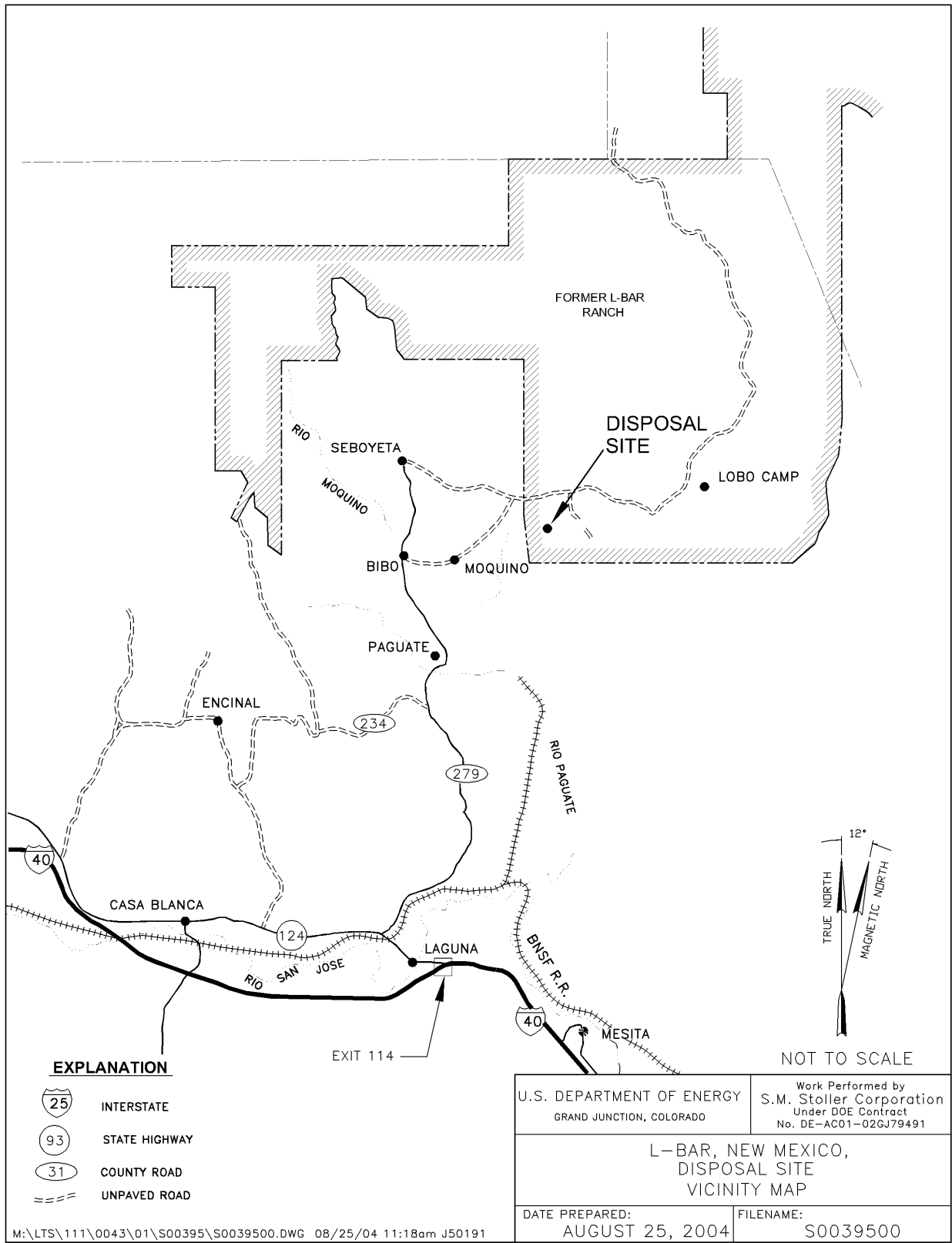


Figure 2-2. L-Bar, New Mexico, Disposal Site Vicinity Map

Average annual precipitation for the site is estimated between 8 and 10 inches. The prevailing wind direction is from the north, northwest, and north-northwest. Mean daily minimum temperatures in January range from the teens to low 20s (Fahrenheit) and mean daily maximum temperatures in July are in the 90s (Fahrenheit).

The disposal site lies within an ephemeral drainage, with site elevations ranging from about 6,300 feet above mean sea level (MSL) at the southeast boundary to about 6,100 feet above MSL at the west boundary. The topography of the disposal site is varied, being relatively steep along the east and south boundaries to moderately level along the north and west boundaries. Surface drainage is generally to the west.

The primary land use in the immediate surrounding vicinity is livestock grazing. The construction of ground water supply wells and residences on the disposal site property must be precluded in perpetuity. The ground water use restriction is accomplished through federal ownership of the property.

## **2.3 Disposal Site Description**

### **2.3.1 Site Ownership**

The United States Government owns the 740-acre L-Bar Disposal Site property. Supporting real estate information is presented in [Appendix A](#). The site consists of a 100-acre tailings impoundment located on the 740-acre parcel and is illustrated on Plate 1.

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

From Albuquerque, take Interstate 40 west to exit 114, Laguna. Bear right (north) on State Highway 124 and travel a few miles to the intersection with State Highway 279. Turn right (north) on Highway 279 and travel approximately 10 miles to the village of Seboyeta. Turn right (east) from Seboyeta on State Route 334 and travel approximately 2 miles to the L-Bar Disposal Site, which is on the right (south) side of the road, as shown in Figure 2–2.

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

The 740-acre disposal site area that DOE is responsible for includes the 100-acre tailings impoundment, the ground water monitor well network, the engineered diversion channels, and other site improvements.

The surface of the tailings embankment will continue to naturally revegetate with native species which will control wind and water erosion and mitigate moisture infiltration to the radon barrier level. The embankment surface has been graded to a minimal slope to promote drainage while preventing significant runoff water velocities, thereby minimizing the potential for cover erosion. The tailings embankment dam face is sloped at 20 percent and is armored with riprap to prevent erosion. Diversion channels north, east, and south of the tailings embankment control storm water run on and run off. These channels have riprap armoring in areas where projected water velocities would otherwise cause erosion. A sediment trap also exists at the upstream entrance to the East Channel, near the beginning of the South Channel. The engineered features of the site are fenced to prevent livestock intrusion.

### 2.3.4 Permanent Site Surveillance Features

Boundary monuments, a site marker, and warning signs will be the permanent long-term surveillance features at the L-Bar site. These features will be inspected and maintained as necessary as part of the passive institutional controls for the site.

Eight boundary monuments are placed on the final site boundary, one at each turning point of the 740-acre disposal site property boundary. One unpolished granite marker with an incised message identifying the relative location of the L-Bar tailings impoundment is placed on site property just inside the official site entrance (Figure 2-3). The 30 warning signs display the DOE 24-hour telephone number (Figure 2-4). The positions of the permanent site surveillance features are shown on Plate 1.

### 2.3.5 Site Geology

The L-Bar tailings impoundment is situated geologically in the San Juan Basin immediately south of the Mount Taylor volcanics. The geology is characterized by several thousand feet of Mesozoic and Paleozoic sedimentary rocks overlying a Precambrian age basement complex of quartzite, granite, and schists. The sediments dip gently northwestward in the vicinity of the tailings impoundment. The sedimentary sequence consists primarily of interbedded sandstones and shales but also includes units of conglomerate and limestone. Tertiary-Quaternary basaltic necks and plugs, such as the Cerro Negro plug to the northwest of the tailings pile, have intruded the sedimentary sequence locally. The volcanic activity associated with the intrusives was geographically extensive and was related to volcanic activity responsible for the Mount Taylor volcanic field (Kennecott 1996).

The formations of interest in the vicinity of the disposal site are the Morrison Formation, Dakota Sandstone, Mancos Shale, Tertiary igneous intrusives, and Quaternary alluvium (Kennecott 1996). The general stratigraphy is shown in Figure 2-5.

The Morrison Formation ranges from about 400 to 600 feet thick at the site. The formation is divided into subunits referred to as the Recapture Member, Westwater Canyon Member, and the Brushy Basin Member. The ore-bearing formation, known as the Jackpile Sandstone, is the uppermost stratum of the Brushy Basin Member. At the L-Bar site it is 50- to 100-feet thick. This unit is the primary uranium ore-bearing sandstone in the Laguna Mining District.

The Dakota Sandstone in the general area of the tailings pile is relatively thin, ranging from 5- to 10-feet thick. The Cretaceous Mancos Shale constitutes the uppermost bedrock unit in the L-Bar area. The Mancos Shale includes the Tres Hermanos sandstone units. The Mancos Shale controls the local topography, with sandstones forming high steep-walled cliffs and the shales underlying most of the gently inclined slopes above and below the cliffs. The Mancos Shale is about 430 feet thick in the area of the L-Bar tailings impoundment (Kennecott 1996).

# L - BAR, NEW MEXICO

**DATE OF CLOSURE:**

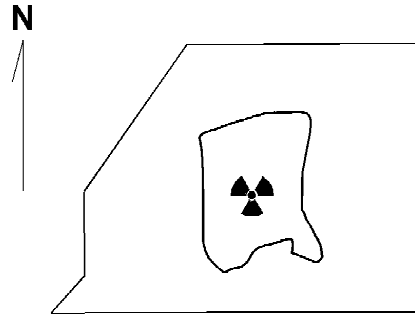
**APRIL 2000**

**TONS OF TAILINGS:**

**2,070,120**

**RADIOACTIVITY:**

**205 Curies, Ra-226**



0 0.5 1 MILE

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 L BAR, NEW MEXICO DISPOSAL SITE	
DATE PREPARED: AUGUST 25, 2004	FILENAME: S0062100

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Figure 2-3. Site Marker at L-Bar, New Mexico, Disposal Site

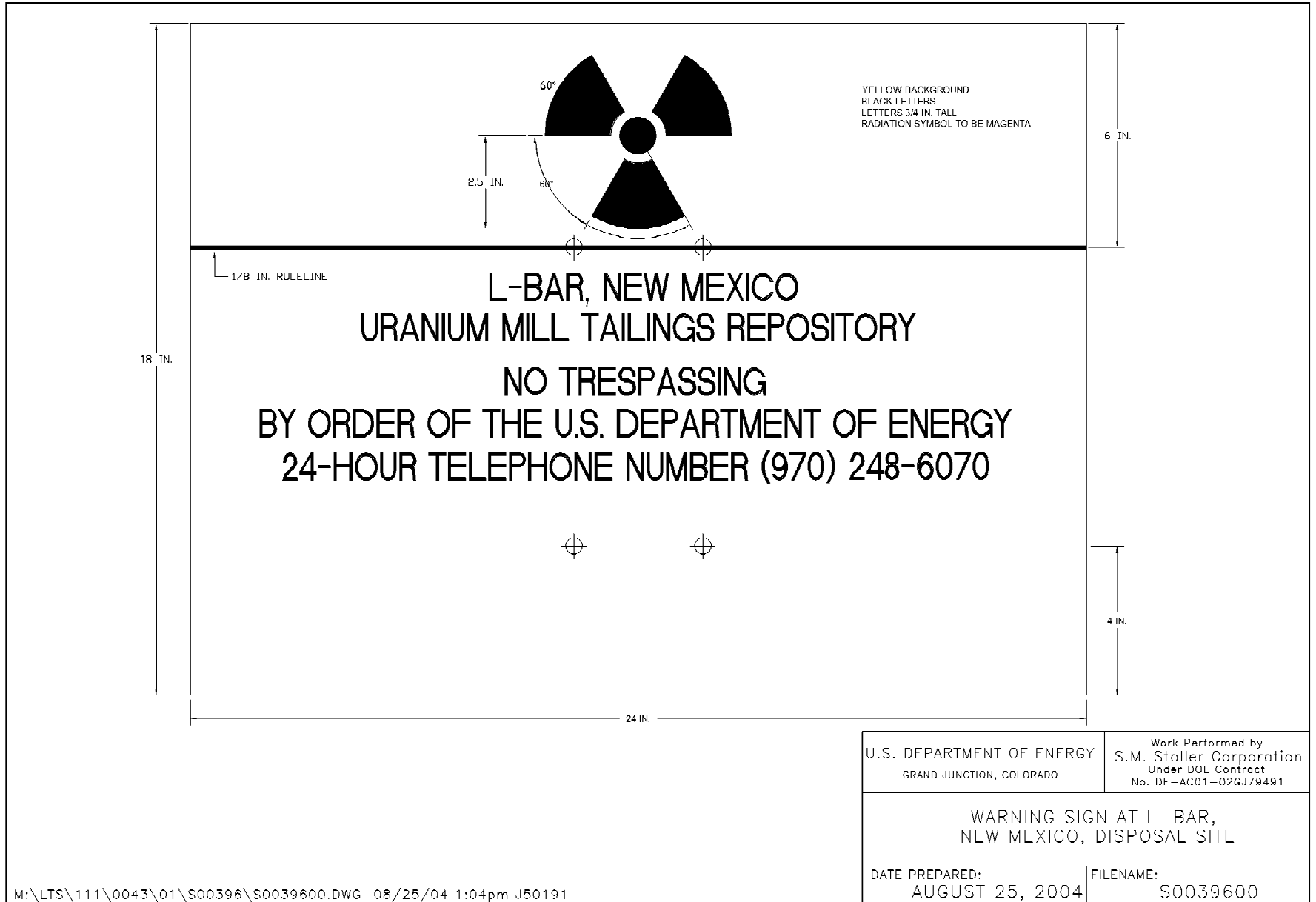
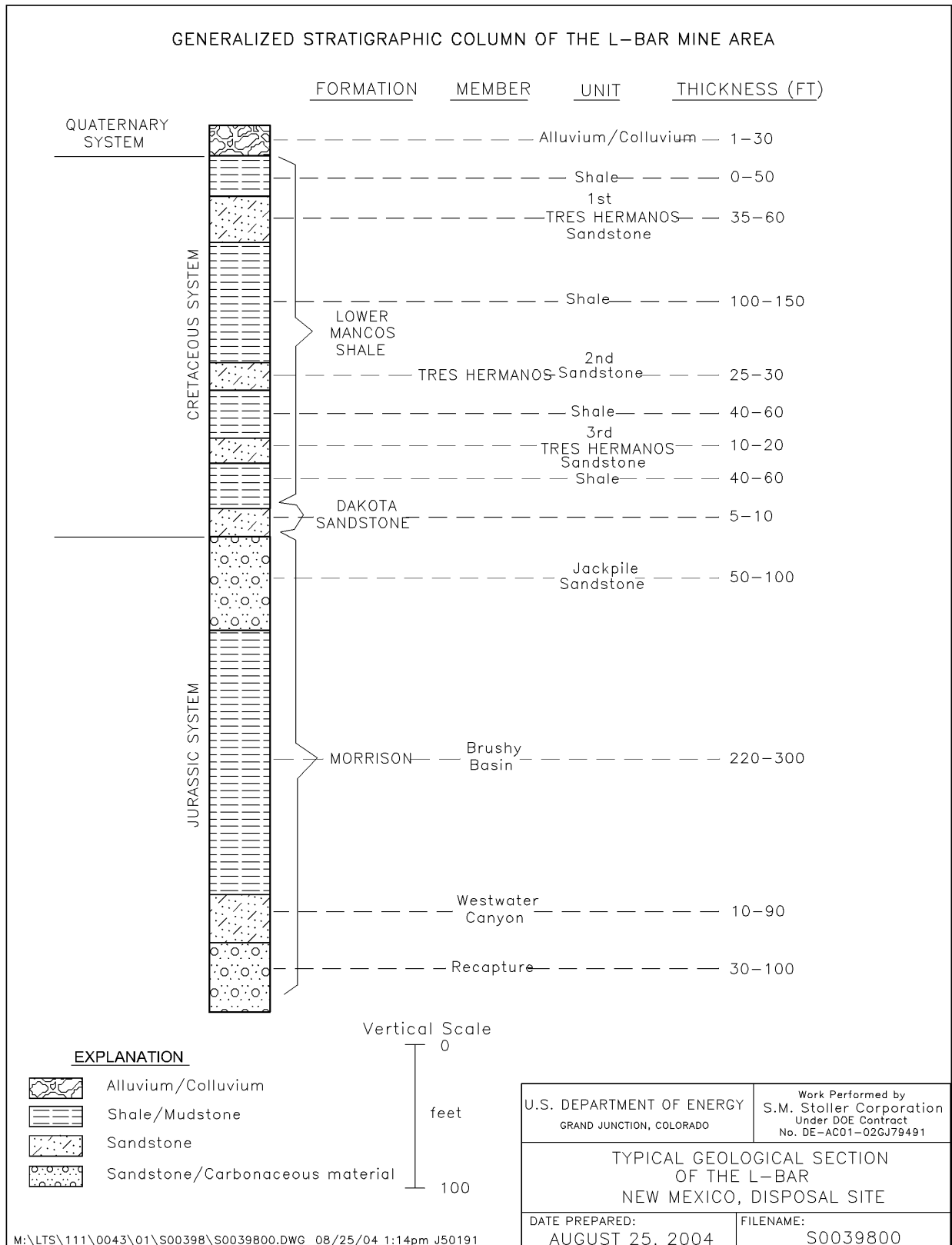


Figure 2-4. Warning Sign at L-Bar, New Mexico, Disposal Site



*Figure 2-5. Typical Geological Section of the L-Bar, New Mexico, Disposal Site*

## 2.4 Tailings Impoundment Design

The tailings impoundment was constructed by damming the head of a natural drainage basin. The basin was chosen because of its relatively thick, low-permeability alluvial clay surface deposits within the impoundment. The impoundment bottom was scarified and treated with waste salt from potash mines to increase the soil swelling capacity and reduce the hydraulic conductivity of the clays, thereby further reducing seepage through the bottom of the tailings pond area. The tailings were then transferred as slurry from the mill to the impoundment and pumped into the basin upstream of the dam (Kennecott 1996).

The reclaimed tailings impoundment covers approximately 100 acres. The cover is sloped minimally to promote positive drainage while allowing the use of vegetation to mitigate wind and water erosion of the impoundment surface. The containment dam has a 20 percent slope and is rock-armored to prevent erosion and degradation.

### 2.4.1 Encapsulation System

The objective of the tailings impoundment cover is to isolate the uranium mill tailings, specifically 11e(2) byproduct material, from the surrounding environment. This is accomplished by reducing radon gas emission rates to below regulatory standards, minimizing infiltration of meteoric water that could potentially leach contaminants into the subsurface, and physically containing the contaminated materials to prevent dispersion.

The tailings cover system was designed as a minimum 4.1-foot thick compacted clay layer that consists primarily of weathered Mancos shale. The final reclamation construction placed an additional 325,000 cubic yards of final cover making the cover an approximate average thickness of 6 feet, with some sections containing cover soils as much as 10 feet in thickness. A typical cross-section of the tailings cover is shown on [Figure 2–6](#). Drainage from the cover is directed toward a controlled discharge swale located on the western side of the tailings impoundment. This swale is designed to collect all runoff from the top of the cover and direct it over the dam face to a discharge channel below the dam to the west. The cover has been designed with a slope of 0.001 to control runoff but minimize erosive effects. The swale ditch is 162 feet long and armored with riprap (BP 1989).

### 2.4.2 Surface Water Diversion System

The surface water diversion system around the tailings impoundment area consists of three diversion channels and a sediment trap. These channels were designed to accommodate Probable Maximum Flood discharges and isolate the disposal area from the effects of all upstream runoff (BP 1989 and SOHIO 1999).

The East Channel will carry the majority of the runoff from storm events and route this water off site to the north. The East Channel has a slope of approximately 0.1 percent. A significant portion of the flow in the East Channel first passes through the sediment trap, allowing a large percentage of the entrained sediment to settle out before continuing down the East Channel. The South Channel diverts storm water from the higher terrain immediately south of the tailing

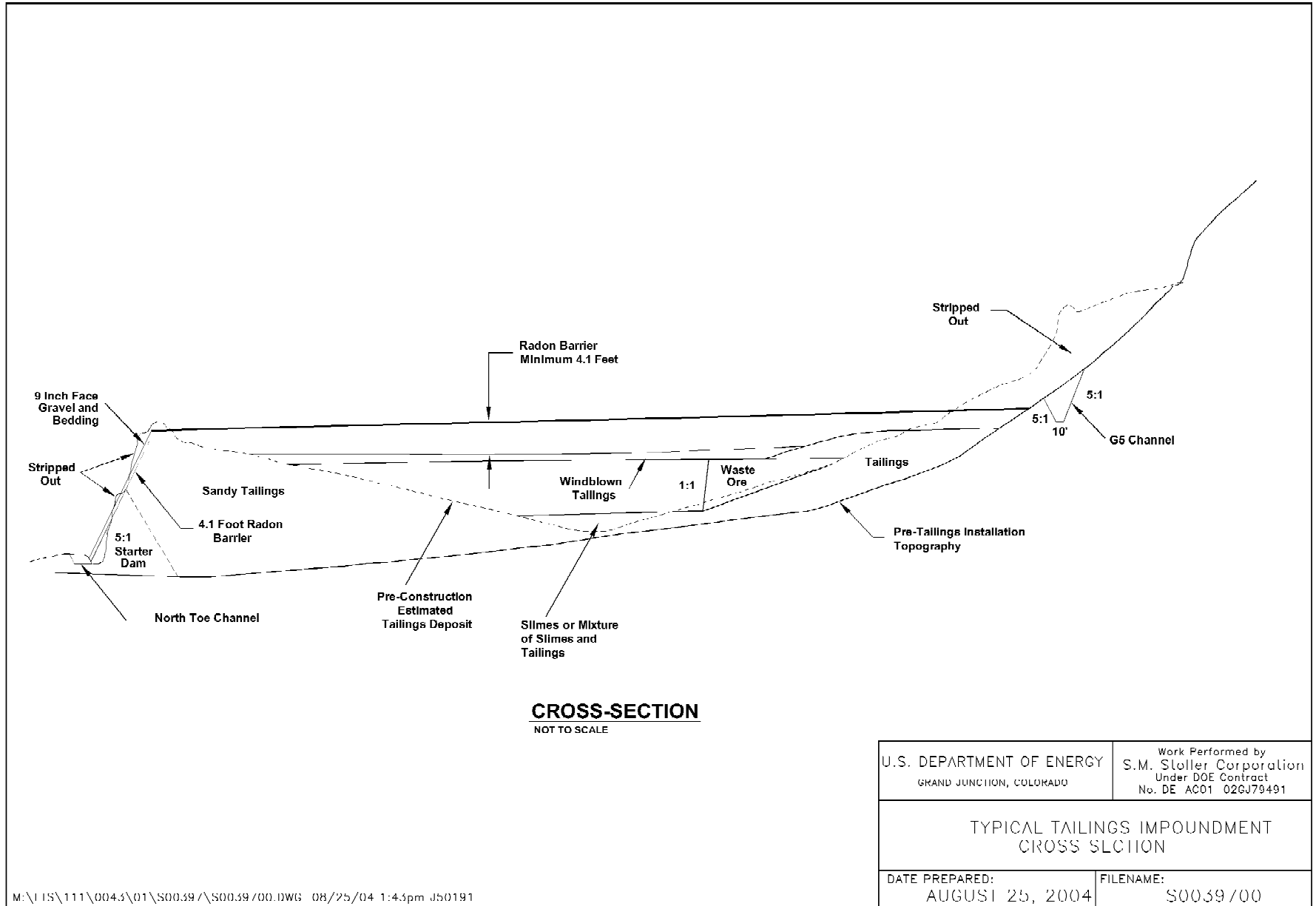


Figure 2-6. Typical Tailings Impoundment Cross Section



impoundment toward the channel outlet to the west. The North Channel protects the tailings impoundment on the north side and diverts storm water to the west, away from the site (SOHIO 1999).

The design calculations show the sediment trap to have a design life of 600 years. At that time the trap would have to be cleaned out. The 10 CFR 40, Appendix A, Criterion 10 long-term custody fee was augmented accordingly to accommodate the cost of cleaning out the sediment trap.

The perimeter drainage channels discharge into the natural drainage areas of the site to the north and southwest of the tailings impoundment. The design of riprap protection in the channel outlets was based on NRC guidance (NRC 1990). The surface water diversion system is shown in [Figure 2-7](#).

## 2.5 Ground Water Conditions

A Detection and Monitoring Program (DMP) was in operation from 1981 through 1990. The DMP included pumping approximately 38 million gallons of tailings seepage and ground water. In 1990, SOHIO developed a Corrective Active Program (CAP) that was incorporated into the site license in response to data from the previous environmental monitoring program. The CAP was intended to collect and contain as much seepage as possible from the tailings area. Between the DMP and the CAP, approximately 65 million gallons of water have been extracted from the recovery wells at the L-Bar site. All recovered water and tailings solutions were treated on site by evaporation (Kennecott 1998).

The hazardous constituents identified at the L-Bar site in accordance with 10 CFR 40, Appendix A, Criterion 13, are selenium, nickel, radium, thorium, and uranium. Ground water monitoring results indicate that the site is in compliance with ground water protection standards (GPS) for hazardous constituents at the point of compliance (POC) wells with the exception of uranium and, occasionally, selenium.

Alternate concentration limits (ACLs) for uranium and selenium were proposed by Kennecott and have been accepted by NRC (NRC 1999). Flow and transport modeling predict that the point of exposure (POE) will not experience any effects from tailings fluid migration over the 1,000-year disposal site design life (Kennecott 1998).

The New Mexico Water Quality Control Commission has authorized alternative abatement standards (AASs) for chloride, sulfate, nitrate, and total dissolved solids (TDS) (WQCC 2003), enabling the termination of the licensee's ground water discharge permit.

The ground water monitoring plan is described in detail in Section 3.7.1.

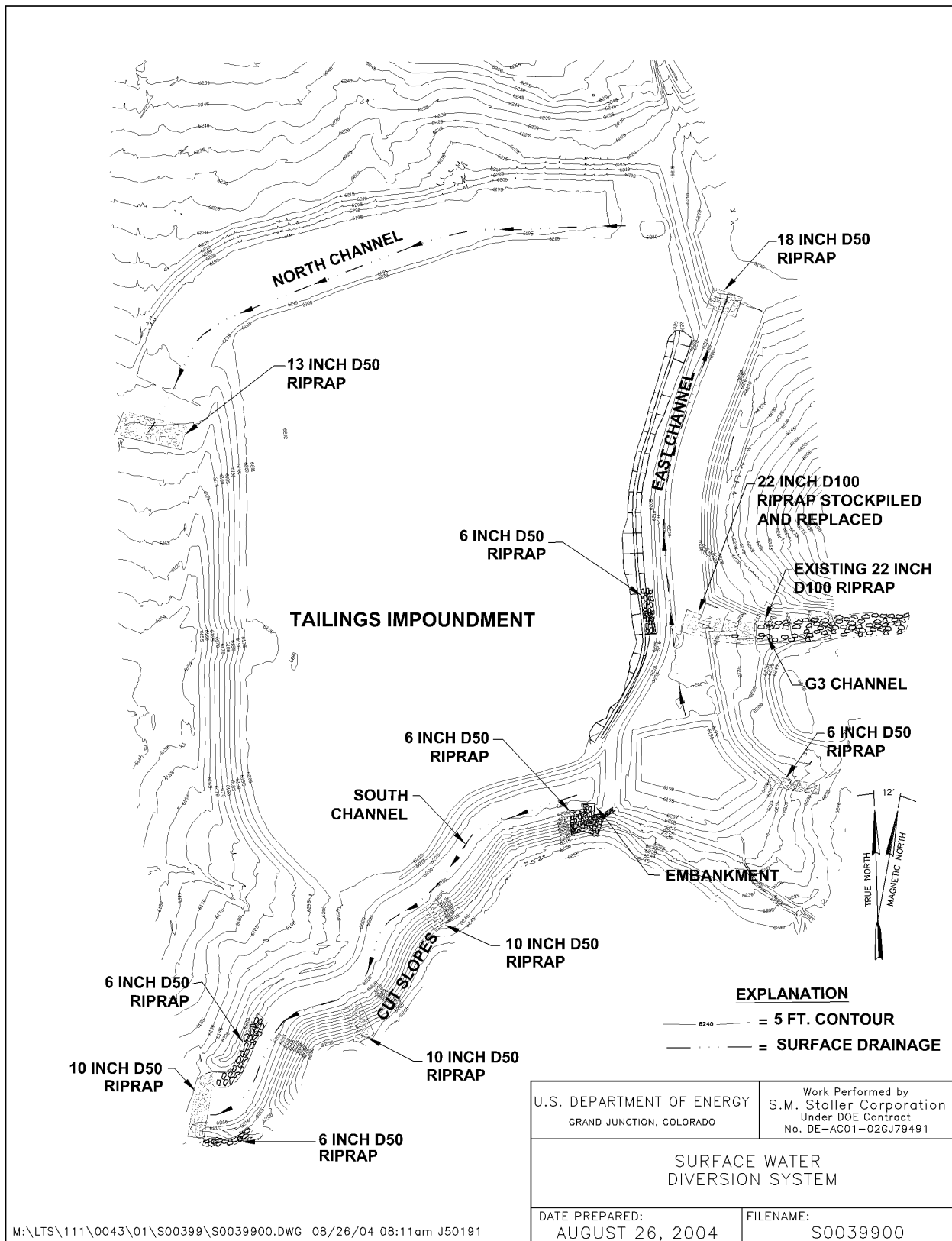


Figure 2-7. Surface Water Diversion System

## **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 August 26, 1994, the State of New Mexico exercised its right of first refusal and declined the long-term custody of the L-Bar site (State of New Mexico 1994). Because the State declined this right, the site was transferred to DOE for long-term custody.

When NRC accepts this LTSP and terminates Kennecott's license, SUA-1472, the site will be included under NRC's general license for long-term custody (10 CFR 40.28 [b]). Concurrent with this action, a deed and title to the site will be transferred from Kennecott to DOE.

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 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 may not conflict with the requirements of the general license. Additionally, representatives of NRC must be guaranteed permanent right-of-entry for the purpose of periodic site inspections. Access to the L-Bar site is accomplished via public roads.

### **3.2 Requirements of the General License**

To meet the requirements of NRC's 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.

1. Annual site inspection. (Section 3.3)
2. Annual inspection report. (Section 3.4)
3. Follow-up inspections and inspection reports, as necessary. (Section 3.5)
4. Site maintenance, as necessary. (Section 3.6)
5. Emergency measures in the event of catastrophe. (Section 3.6)
6. Environmental monitoring, if required. (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 L-Bar 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 variance. Any variance to this inspection frequency will be explained in the inspection report. DOE will notify NRC and the State of New Mexico 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 L-Bar Disposal Site will be divided into sections called *transects*. Each transect will be individually inspected. Proposed transects for the first inspection of the L-Bar site are listed in [Table 3–1](#) and shown on [Figure 3–1](#).

*Table 3–1. Transects Used During First Inspection of the L-Bar, New Mexico, Disposal Site*

<b>Transect</b>	<b>Description</b>
Site Perimeter, Outlying Areas, and Balance of Site	Site perimeter and surrounding watershed basin, which includes the site entrance, boundary monuments, warning signs, fencing, monitor wells, and site marker.
Cover of Tailings Impoundment	Repository impoundment cover.
Containment Dam	Riprap placement and integrity.
Diversion Channels	Riprap placement and integrity, sediment buildup.

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 dam, seepage from the tailings impoundment, seepage at First Tres Hermanos evapotranspiration area between wells MW–61 and MW–100, condition of vegetation, and animal or human intrusions that could result in adverse impacts. Disposal site and disposal cell inspection techniques are described in detail in Attachment 4 of the Guidance Document (DOE 2001).

In accordance with [Appendix C](#) of this document, Erosion Monitoring Program, cap markers installed across the cover will be used to evaluate wind erosion of cover materials.

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, well installation, or other change in land use.

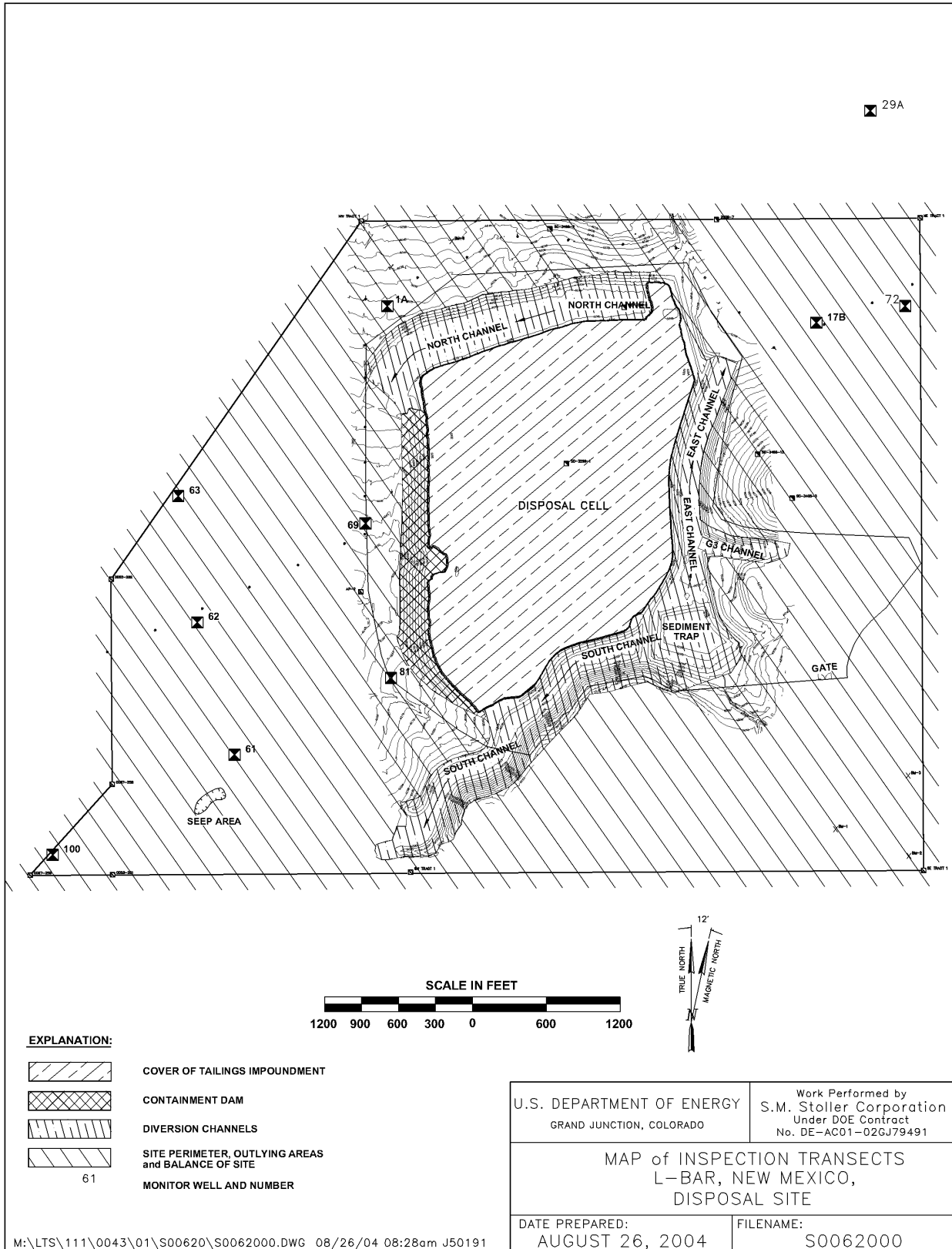


Figure 3-1. Map of Inspection Transects for the L-Bar, New Mexico, Disposal Site

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. If evidence of seepage from the impoundment is discovered, a sample should be acquired if adequate flow exists. Results of the sample analysis would be reported in the annual report unless more immediate reporting is warranted by the sample analysis results.

### **3.3.3 Inspection Checklist**

The inspection is guided by the inspection checklist. The initial site-specific inspection checklist for the L-Bar Disposal Site is presented in [Appendix B](#).

The checklist is subject to revision. At the conclusion of an annual site inspection, inspectors will revise the checklist, if necessary, in anticipation of 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 will typically 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 that 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 L-Bar 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 may be required (1) as a result of discoveries made during a previous annual site inspection or (2) as a result of changed site conditions reported by a citizen or outside agency.

### 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.

1. A condition is identified during the annual site inspection, or other site visit that requires personnel, perhaps personnel with specific expertise, to return to the site to evaluate the condition.
2. 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 the Cebolleta Land Grant, local law enforcement, and emergency response agencies to facilitate notification in the event of significant trespass, vandalism, or natural disaster. These agencies will be requested to notify DOE or provide information should a significant event occur 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 (non-routine) 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. 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;
- Notify New Mexico Environment Department (NMED);
- Begin the DOE Environment, Safety, and Health Reporting process (DOE Order 231.1A);

- 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 the required 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 tailings impoundment has been designed and constructed to negate the need for routine maintenance.

The cover of the tailings impoundment was constructed with minimal slope to promote positive drainage while minimizing runoff water velocities. The cover will naturally revegetate with indigenous plant species that are expected to endure for the long-term. Because of the vegetation and slopes, adverse wind or water erosion impacts that would require maintenance are not anticipated. The tailings impoundment area is fenced to prevent damage from livestock grazing in the vicinity.

If an inspection of the disposal site cell reveals failure or degradation of an as-built feature, repairs will be conducted to re-establish the as-built condition. DOE will perform routine site maintenance, where and when needed based on best management practices. Reports of routine site maintenance will be summarized in the annual site inspection report.

It is anticipated that it will be necessary to clean out the sediment trap after 600 years to maintain the as-built run on/run off control design conditions (DE&S 2000).

### **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 reclamation cell 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 will, however, serve as a guide for appropriate DOE responses. The table shows that the difference between routine maintenance and emergency responses 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<sup>a</sup>

Priority	Description	Example	Response
1	Breach of disposal cell with dispersal of radioactive material.	Failure of containment dam.	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 eliminate problem.

<sup>a</sup>Other changes or conditions will be evaluated and treated similarly on the basis of perceived 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, DOE will notify:

Fuel Cycle Facilities Branch  
 Division of Fuel Cycle Safety and Safeguards  
 Office of Nuclear Material Safety and Safeguards  
 U.S. Nuclear Regulatory Commission

within 4 hours of discovery of any Priority 1 or 2 event in Table 3–2. The phone number for the required 4-hour contact to the NRC Operations Center is (301) 816-5100.

DOE will also notify NMED within 4 hours of the discovery of any Priority 1 or 2 event in Table 3–2. The telephone number for the 4-hour contact to NMED is (505) 827-9329.

## 3.7 Environmental Monitoring

### 3.7.1 Ground Water Monitoring

Ground water monitoring conducted at the L-Bar site is intended to address both NRC and NMED concerns. NRC has granted ACLs for uranium and selenium at the POC wells (NRC 1999). The New Mexico Water Quality Control Commission has approved AASs for chloride, sulfate, nitrate, and TDS (WQCC 2003) in addition to uranium and selenium. Table 3-3 lists the ACLs and the AASs. Table 3-4 summarizes the ground water monitoring plan. Locations of monitor wells in the ground water monitoring network are shown on Figure 3-2. The AASs are divided into two groups: those applicable in the source zone and those applicable in the affected area (SOHIO 2002).

Table 3-3. Alternate Concentration Limits and Alternative Abatement Standards for L-Bar, New Mexico, Disposal Site

Analyte	New Mexico Standard <sup>a</sup>	ACL	AAS Source Zone	AAS Affected Area
Uranium	5.0 mg/L	13.0 mg/L	13.0 mg/L	NA
Selenium	0.05 mg/L	2.0 mg/L	2.0 mg/L	NA
Chloride	250 mg/L	NA	1,127 mg/L	NA
Sulfate	4,000 mg/L	NA	13,110 mg/L	5,185 mg/L
Nitrate	10.0 mg/L	NA	1,180 mg/L	NA
TDS	5,880 mg/L	NA	20,165 mg/L	7,846 mg/L

<sup>a</sup>Sulfate and TDS standards are background values.

The POC wells correspond to the source zone.

Table 3-4. Ground Water Monitoring Plan for L-Bar, New Mexico, Disposal Site

Well Designation	Monitoring Frequency	Analytes	Comments
MW-1A	Annually for first 3 years, then once every 3 years	Uranium, Selenium, TDS, Chloride, Sulfate, Nitrate, pH, electrical conductivity, water level	POC well; source zone well
MW-17B	Annually for first 3 years, then once every 3 years	Uranium, Selenium, TDS, Chloride, Sulfate, Nitrate, pH, electrical conductivity, water level	POC well; source zone well
MW-29A	Annually for first 3 years, then once every 3 years	Uranium, Selenium, TDS, Chloride, Sulfate, Nitrate, pH, electrical conductivity, water level	Background well
MW-61	Annually for first 3 years, then once every 3 years	Uranium, Selenium, TDS, Chloride, Sulfate, Nitrate, pH, electrical conductivity, water level	Seepage indicator well
MW-62	Annually for first 3 years, then once every 3 years	Uranium, Selenium, TDS, Chloride, Sulfate, Nitrate, pH, electrical conductivity, water level	Seepage indicator well; affected area well
MW-63	Annually for first 3 years, then once every 3 years	Uranium, Selenium, TDS, Chloride, Sulfate, Nitrate, pH, electrical conductivity, water level	POE; seepage indicator well
MW-69	Annually for first 3 years, then once every 3 years	Uranium, Selenium, TDS, Chloride, Sulfate, Nitrate, pH, electrical conductivity, water level	POC well; source zone well
MW-72	Annually for first 3 years, then once every 3 years	Uranium, Selenium, TDS, Chloride, Sulfate, Nitrate, pH, electrical conductivity, water level	POE well on east property boundary
MW-81	Annually for first 3 years, then once every 3 years	Uranium, Selenium, TDS, Chloride, Sulfate, Nitrate, pH, electrical conductivity, water level	POC well; source zone well

Table 3-4 (continued). Ground Water Monitoring Plan for L-Bar, New Mexico, Disposal Site

Well Designation	Monitoring Frequency	Analytes	Comments
MW-100	Annually for first 3 years, then once every 3 years	Uranium, Selenium, TDS, Chloride, Sulfate, Nitrate, pH, electrical conductivity, water level	POE well on west property boundary
Moquino – Old	Annually for first 3 years, then once every 3 years	Uranium, Selenium, TDS, Chloride, Sulfate, Nitrate, pH, electrical conductivity, water level	Water users backup well
Moquino – New	Annually for first 3 years, then once every 3 years	Uranium, Selenium, TDS, Chloride, Sulfate, Nitrate, pH, electrical conductivity, water level	Water users supply well

The intent of the initial annual sampling is to determine the effect of discontinuing the barrier well pumping on ground water quality at the site. If annual monitoring results demonstrate that seepage is under control, after 3 years of annual monitoring the sampling frequency will be reduced to once every 3 years. Ground water monitoring will continue as long as a New Mexico Standard, listed in Table 3-3, is exceeded at any well. Other future changes in the ground water monitoring program, that may be warranted, would require NRC approval.

If an ACL or AAS is exceeded, DOE will inform NRC of the exceedance and conduct confirmatory sampling. If confirmatory sampling verifies the exceedance, DOE will develop an evaluative monitoring work plan and submit that plan to NRC for review prior to initiating the evaluative monitoring program. Results of the evaluative monitoring program will be used, in consultation with NRC, to determine if corrective action is necessary.

Upon receipt of permission of the Moquino Water Users Association, the two water supply wells would be sampled for the same analytes and at the same frequency as MW-29A, the background well. Monitoring results will be included in the annual inspection report in the same manner as the other ground water monitoring results are reported. If the monitoring results exhibit trends that indicate water quality is being impacted by constituents originating on the L-Bar site, then DOE, in collaboration with NRC and NMED, will determine what corrective actions may be necessary. Ground water modeling predictions and site ground water contaminant trends indicate that the natural processes of advection, adsorption, dilution and dispersion will result in natural attenuation of the ground water contaminant plume (Kennecott 1998). Results of ground water monitoring will be included in the annual inspection report (Section 3.4) for the years that sampling has been conducted. The report will also include a ground water contour map, an ISO-concentration map for sulfate, and time versus concentration plots for sulfate.

Performance reviews will be conducted at 10-year intervals for the first 30 years and every 30 years thereafter. The performance review will evaluate the observed data and discuss any long-term (decade or more) trends in the water quality data and water level data. The performance reviews may be included in the annual inspection report.

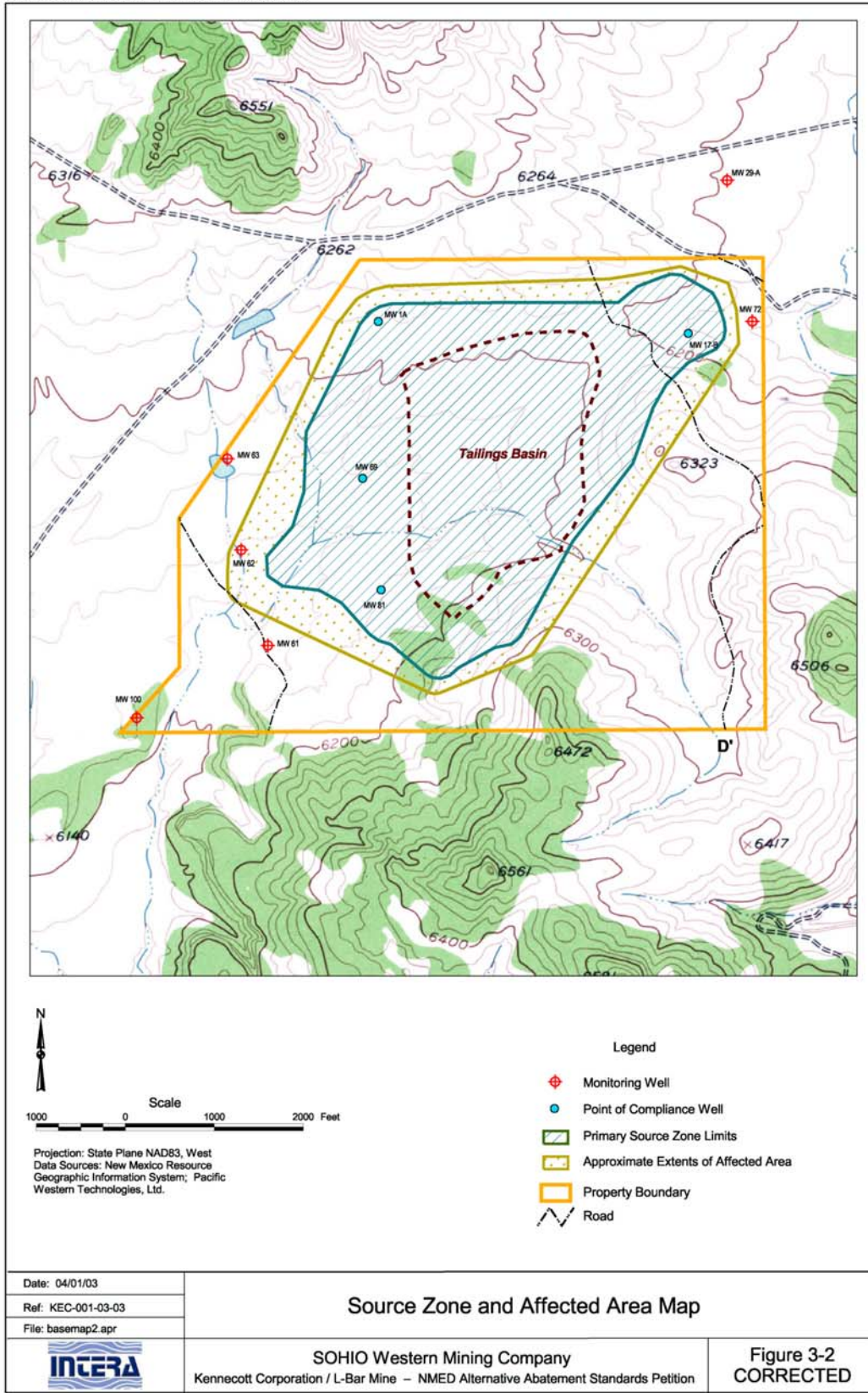


Figure 3-2. Location of Monitor Wells in Ground Water Monitoring Network

### **3.7.2 Vegetation Monitoring**

The disposal site will naturally revegetate as a part of the final site reclamation. Vegetation at the disposal site is expected to help maintain erosional stability. Annual visual inspections will be conducted to verify the continued health of the on site vegetation and to assure that undesirable plant species do not proliferate at the site. Natural plant community succession caused by fire or other natural forces is expected and will not adversely impact the performance of the containment system.

Special consideration will be given to the condition of vegetation on the impoundment cover, in accordance with Appendix C, "Erosion Monitoring Program." Vegetation species and density will be evaluated. This vegetation is expected to help mitigate wind and water erosion. If significant erosion (Section 3.3.2) that is capable of compromising the design function of the cover is discovered, DOE in collaboration with NRC will develop an action plan to address the situation. Possible actions include reseeding, recontouring, and selective armoring of affected surfaces.

## **3.8 Records**

DOE-LM receives and maintains select records at their office in Grand Junction, Colorado, to support post-closure site maintenance. These records are being maintained by LM because they 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.

### *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 L-Bar site will comply with DOE Order 414.1A, *Quality Assurance (QA)* and ANSI/ASQC E4-1994, *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs* (American Society for Quality Control 1994).

QA 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 2004). 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

American Society for Quality Control (ASQC), 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.

BP America, 1989. *L-Bar Uranium Mine Reclamation and Closure Plan*, prepared by INTERA Technologies, Inc., February.

DE&S (Duke Engineering & Services), 2000. *L-Bar Uranium Mill Tailings Site Reclamation Completion Report*, prepared for SOHIO Western Mining Company, December.

Kennecott Corporation, 1996. *Final Report: Hydrogeology Investigation of the L-Bar Uranium Mill Tailings Pile, Cibola County, New Mexico*, prepared by INTERA, December.

Kennecott Energy Company, 1998. *Alternate Concentration Limits Application for the L-Bar Site*, prepared by Duke Engineering & Services, August.

SOHIO Petroleum Company, 1974. *Applicant's Environmental Report, L-Bar Uranium Mine and Mill*, August.

SOHIO Western Mining Company, 1999. *L-Bar Uranium Facility Revised Sediment Evaluation and Riprap Design*, prepared by Shepherd Miller Inc., January.

———, 2002. *Alternative Abatement Standards Petition*, prepared by Intera Inc., December.

State of New Mexico, 1994. Letter to Mr. Joseph E. Virgona, Project Manager, U.S. Department of Energy from Ms. Judith M. Espinosa, Secretary of the State of New Mexico, Environment Department, declining custody of all UMTRCA Title II sites within the State of New Mexico, August.

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

———, 2003. *Environment, Safety, and Health Reporting*, DOE Order 231.1A, August.

———, 2004. *Office of Land and Site Management Project Safety Plan*, DOE-LM/GJ636-2004, prepared for the U.S. Department of Energy, Office of Legacy Management, Grand Junction, Colorado, June.

U.S. Nuclear Regulatory Commission, 1990. Nuclear Regulatory Commission Final Staff Technical Position, *Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailings Sites*, August.

\_\_\_\_\_, 1999. Letter from N. King Stablein, NRC, to John E. Trummel, Kennecott, *Acceptance of Groundwater Alternate Concentration Limits for the L-Bar Site, Amendment 31 to License SUA-1472*, May.

Water Quality Control Commission (WQCC), State of New Mexico, 2003. *Decision and Order Granting Alternative Abatement Standards*, July.



## **Appendix A**

### **Real Estate Information**

## LEGAL DESCRIPTION

Figure 1 (attached) illustrates Tract 1 and the Option Tract as presented in the legal description below.

### TRACT 1

A tract of land, being a portion of the South L-Bar Ranch within the Cebolleta Land Grant, in Township 11 North, Range 5 West, New Mexico Principal Meridian, Cibola County, New Mexico; and being more particularly described by metes and bounds survey as follows:

Beginning at a point on the west boundary line of the South L-Bar Ranch, as described by metes and bounds survey performed by Douglas F. Sterck, L.S. 4995, and presented as Exhibit B in a special warranty deed between Sohio Western Mining Company and Kap Rock Pipe & Supply, Inc., filed in the office of the McKinley County Clerk, March 3, 1989, and recorded in Book 43JKT on Pages 015 to 034, said point being the southwest corner of the tract herein described (set a 5/8" aluminum rod with aluminum cap stamped "SW Tract 1"); whence the 13 Mile Corner on the South Boundary of the Cebolleta Grant, as described in the aforementioned deed (found 3 1/4" brass cap on iron pipe stamped "CG13M/PPG 1917"), bears S 26028'45" W, 3,564.81 feet; and from whence corner "AP-1" of the aforementioned Sterck Survey (found 3" brass cap on iron pipe stamped "A.P. No. 1, West Bdry, So. L-Bar, L.S. 4995, 1975"), bears S 09014'06" E, 2,525.42 feet; thence,

N 09014'06" W, 2,317.45 feet on the west boundary line of the aforementioned South L-Bar Ranch, to corner "AP-2" of the aforementioned Sterck survey (found 3" brass cap on iron pipe in concrete stamped "AP NO. 2, West BDRY, SO. L-BAR, L.S. 4995, 1975"); thence,

N 00023'02" E, 3,010.01 feet on the west boundary line of the aforementioned L-Bar Ranch to the northwest corner of the tract herein described (set 5/8" aluminum rod with aluminum cap stamped "NW TRACT 1"); thence,

N 90000'00" E, 4,536.26 feet to the northeast corner of the tract herein described (set 5/8" aluminum rod with aluminum cap stamped "NE TRACT 1"); thence,

S 00000'00" E, 5,297.35 feet to the southeast corner of the tract herein described (set 5/8" aluminum rod with aluminum cap stamped "SW TRACT 1"); thence,

S 90000'00" W, 4,184.50 feet to the southwest corner of the tract herein described and point of beginning;

Said Tract 1 containing 543.6465 acres, more or less.

## OPTION TRACT

A tract of land, being adjacent to the South L-Bar Ranch within the Cebolleta Land Grant, in Township 11 North, Range 5 West (Projected), New Mexico Principal Meridian, Cibola County, New Mexico; and being more particularly described by metes and bounds survey as follows:

Beginning at a point on the west boundary line of the South L-Bar Ranch, as described by metes and bounds survey performed by Douglas F. Sterck, L.S. 4995, and presented as Exhibit B in a special warranty deed between Sohio Western Mining Company and Caprock Pipe & Supply, Inc., filed in the office of the McKinley County Clerk, March 6, 1989, and recorded in Book 43JKT on Pages 015 to 034, also filed in the office of the Cibola County Clerk, May 15, 1989 in Book 3 on pages 5659 to 5678, said point being the southeast corner of the tract herein described:

(found a 5/8" aluminum rod with aluminum cap stamped "SW Tract 1"); whence the 13 Mile Corner on the South Boundary of the Cebolleta Grant, as described in the aforementioned deed (found 3 1/4" brass cap on iron pipe stamped "CG13M/PPG 1917"), bears S26°28'45" W, 3,564.81 feet; and from whence corner "AP-1" of the aforementioned Sterck Survey (found 3" brass cap on iron pipe stamped "A.P. No. 1, West Bdry, So. L-Bar, L.S. 4995, 1975"), bears S09°14'06" E, 2,525.42 feet; thence,

S90°00'00"W 3,070.09 feet to the southwest corner of the tract herein described (set 5/8" rebar with a 1 1/2" aluminum cap stamped "12642-259")

N42°21'52"E 994.43 feet to the angle point in the Westerly Boundary of the tract herein described (set 5/8" rebar with 1 1/2" aluminum cap stamped "12642-258")

N00°00'00"E 1,665.24 feet to an angle point in the Westerly Boundary of the tract herein described (set 5/8" rebar with 1 1/2" aluminum cap stamped "0052-252"); thence

N35°15'29"E 3,548.23 feet to the northernmost point of the tract herein described being a point common to Tract-1 as previously surveyed by Koogle & Pouls Engineering, Inc. (found 5/8" aluminum rod with aluminum cap stamped "NW Tract, 1"); thence

S00°23'02"W 3,010.01 feet on the west boundary line of the aforementioned South L-Bar Ranch to corner "AP-2" of the aforementioned Sterck survey (found 3" brass cap on iron pipe in concrete stamped "AP NO. 2, West BDRY, So. L-BAR, L.S. 4995, 1975"); thence

S09°14'06"E 2,317.45 feet on the west boundary line of the aforementioned South L-Bar Ranch, to the place of beginning.

Said tract containing 194.6305 acres, more or less.

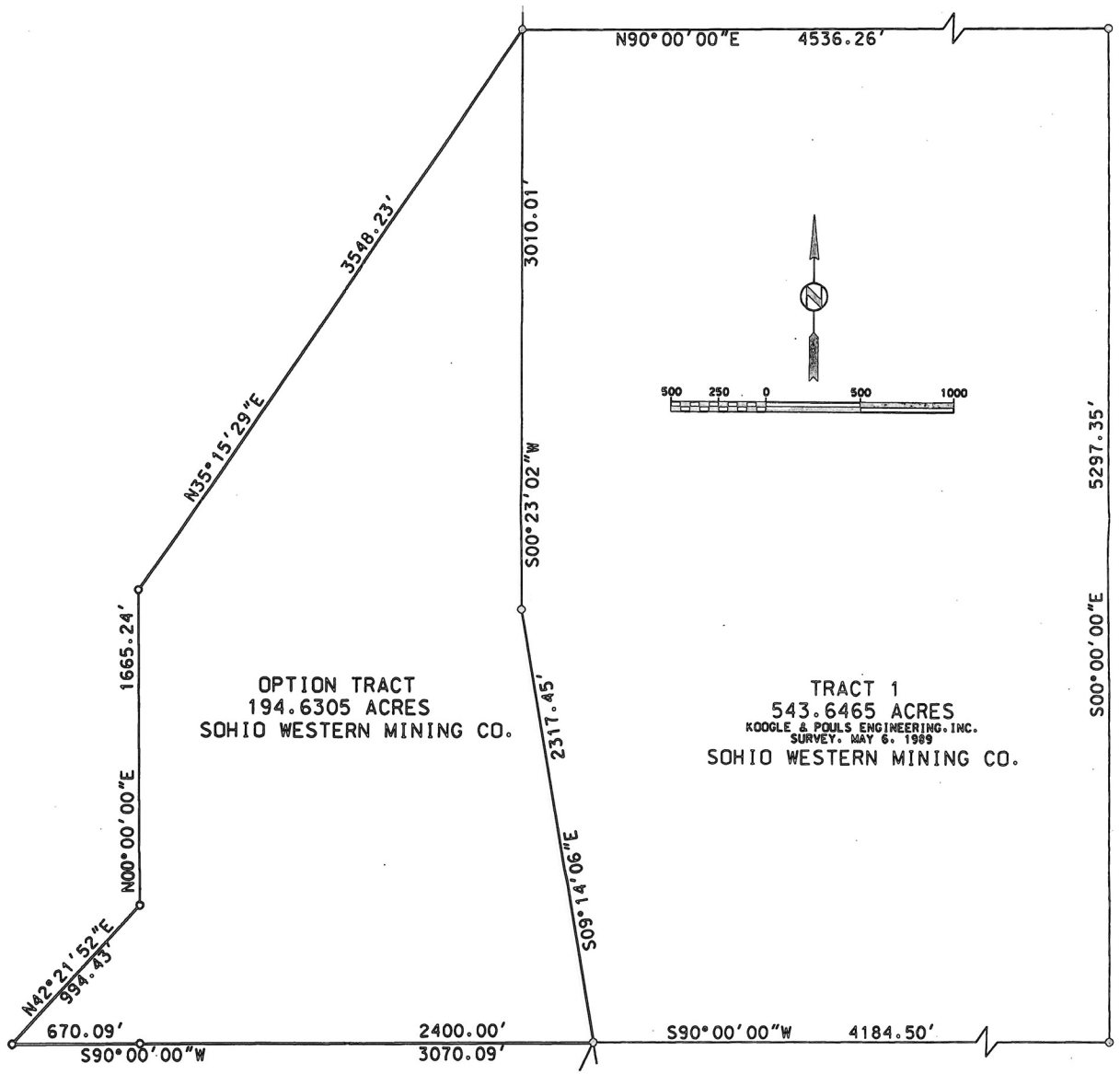
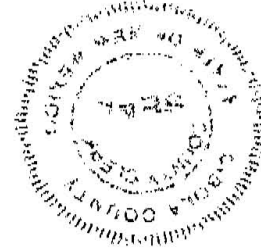


Figure A- 1. L-Bar Disposal Site Property Boundary

00-1207



When Recorded Return To:

Mr. Todd Roddy  
Attorney  
U.S. Army Corps of Engineers  
4101 Jefferson Place NE  
Albuquerque, NM 87109

Space above for County Recorder's Use

**WARRANTY AND QUITCLAIM DEED**

*KNOW ALL MEN BY THESE PRESENTS* that **SOHIO WESTERN MINING COMPANY**, a Delaware corporation ("Grantor") for good and valuable consideration, hereby grants to the **UNITED STATES OF AMERICA** ("Grantee") whose address is Department of Energy, United States of America, Grand Junction Office, 2597 B3/4 Road, Grand Junction, CO 81503, the real property described herein, situate in the County of Cibola, State of New Mexico.

*WITNESSETH:*

Whereas, the land and interest herein described have been used for the disposition of radioactive materials in accordance with the Uranium Mill Tailings Radiation Control Act of 1978, Pub. L. No. 95-604, 42 U.S.C. § 7901 *et seq*; and

Whereas, pursuant to the above referenced law, Grantor is authorized to transfer all the land and interests herein described, subject to the exceptions and reservations reflected herein, to Grantee.

*NOW THEREFORE*, in consideration of the premises and for other good and valuable consideration, the receipt of which is hereby acknowledged, Grantor, hereby grants to Grantee and its assigns, the surface estate of the real property situate in Cibola County, New Mexico, as more fully described in Part 1 of Exhibit A, which is attached hereto and made a part hereof (the "Property"), together with any appurtenant oil, gas and mineral rights owned or leased by Grantor appearing of record or enforceable in law or equity, reserving unto Grantor those interests set forth in Exhibit B attached hereto and made a part hereof and subject to the exceptions set forth in Exhibit C attached hereto and made a part hereof;

To Have and Hold the Property with the appurtenances thereof unto said Grantee, its successors and assigns forever with warranty covenants, subject to the aforesaid exceptions and reservations;

REC DATE: 09/24/2004 REC TIME: 03:41 <sup>CC</sup> BOOK: 13 PAGE: 9438  
CIBOLA COUNTY, NM, EILEEN M MARTINEZ - COUNTY CLERK DOC #: 2004 2680 \*\*

AND, for the same consideration paid, Grantor hereby quitclaims to Grantee:

any interest Grantor may have in the easement described in Part 2 of Exhibit A; and

any interest Grantor may have in and to any alleys, streets, ways, strips, or gores abutting or adjoining the Property.

IN WITNESS WHEREOF, Grantor has caused these presents to be executed by its duly authorized representative, this 22nd day of September 2004.

GRANTOR:  
SOHIO WESTERN MINING COMPANY

By: Mike D Edmonds  
Its: Treasurer

STATE OF WYOMING )  
 ) :ss:  
COUNTY OF CAMPBELL )

The foregoing instrument was acknowledged before me this 22<sup>nd</sup> day of September, 2004, on behalf of SOHIO Western Mining Company by Mike D Edmonds, its Treasurer.



Patty Traverso  
NOTARY PUBLIC

My Commission Expires:

Residing at:

October 18, 2005

Gillette, WY

REC DATE: 09/24/2004 REC TIME: 03:41 BOOK: 13 PAGE: 9439  
CIBOLA COUNTY, NM, EILEEN M MARTINEZ - COUNTY CLERK DOC #: 2004 2680

**EXHIBIT A  
TO  
WARRANTY AND QUITCLAIM DEED**

---

**The Property and Easements**

**Part 1 -- The Property**

**L-BAR SITE  
PROPERTY DESCRIPTION**

Per Plat of Tract 1 and the Option Tract to Tract 1  
Recorded 11/13/2002 Book 11, Page 7304, Cibola County, New Mexico

A CERTAIN TRACT OF LAND SITUATE WITHIN PROJECTED TOWNSHIP 11 NORTH, RANGE 5 WEST, N.M.P.M., BEING A PORTION OF THE CEBOLLETA LAND GRANT, CIBOLA COUNTY, NEW MEXICO, BEING COMPRISED OF THAT PARCEL KNOWN AS THE OPTION TRACT AS SHOWN AND DESIGNATED ON THE PLAT OF SURVEY OF THE OPTION TRACT ADDITION TO TRACT 1 FILED DECEMBER 10, 1999, IN CABINET A, SLIDE 179 AS DOCUMENT NUMBER 1999 3494 OF THE RECORDS OF CIBOLA COUNTY, NEW MEXICO, AND ALSO BEING COMPRISED OF THAT UNPLATTED TRACT OF LAND KNOWN AS TRACT 1 AS SURVEYED AND MONUMENTED BY KOOGLER AND POULS ENGINEERING COMPANY DURING THE YEAR OF 1989, SAID OVERALL TRACT BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHWEST CORNER OF THE TRACT, AS MARKED BY A #5 REBAR IN PLACE BEARING AN ALUMINUM SURVEYOR'S CAP STAMPED "12642-259" FROM WHICH POINT THE 13 MILE POST ON THE SOUTH BOUNDARY OF SAID CEBOLLETA LAND GRANT, AS MARKED BY A U.S.G.L.O. BRASS CAP MONUMENT IN PLACE BEARS S25°12'37"E AND 3517.63 FEET DISTANT;  
THENCE FROM SAID POINT OF BEGINNING N42°02'48"E A DISTANCE OF 994.43' TO AN ANGLE POINT MARKED BY A #5 REBAR IN PLACE BEARING AN ALUMINUM SURVEYOR'S CAP STAMPED "12642-258;"  
THENCE N00°19'25"W A DISTANCE OF 1665.14 FEET TO AN ANGLE POINT MARKED BY A #5 REBAR IN PLACE BEARING AN ALUMINUM SURVEYOR'S CAP STAMPED "12642-252;"  
THENCE N34°56'28"E A DISTANCE OF 3548.43 FEET TO THE NORTHWEST CORNER OF THE TRACT HEREIN DESCRIBED MARKED BY A #5 REBAR IN PLACE BEARING AN ALUMINUM SURVEYOR'S CAP;  
THENCE N89°41'00"E A DISTANCE OF 4536.39 FEET TO THE NORTHEAST CORNER OF THE TRACT HEREIN DESCRIBED MARKED BY A #5 REBAR IN PLACE BEARING AN ALUMINUM SURVEYOR'S CAP;

A-1

REC DATE: 09/24/2004 REC TIME: 03:41 BOOK: 13 PAGE: 9440  
CIBOLA COUNTY, NM, EILEEN M MARTINEZ - COUNTY CLERK DOC #: 2004 2680

THENCE S00°18'58"E A DISTANCE OF 5297.28 FEET TO THE SOUTHEAST CORNER OF THE TRACT HEREIN DESCRIBED MARKED BY A #5 REBAR IN PLACE BEARING AN ALUMINUM SURVEYOR'S CAP;  
THENCE S 89°40'56"W A DISTANCE OF 7254.58 FEET TO THE SOUTHWEST CORNER AND POINT AND PLACE OF BEGINNING AND CONTAINING 738.289 ACRES, MORE OR LESS.

**Access Road Easement No. 2**

A non-exclusive right to the "Access Road Easement No. 2" reserved by Sohio Western Mining Company in that certain Special Warranty Deed to The Board of Trustees of the Cebolleta Land Grant, dated June 5, 1989, recorded on November 6, 1989, Deed Book 3, Page 7872, in the Clerk's Office of Cibola County, New Mexico, which easement is identified as the Access Road Easement No. 2 and described on page 3 of the Exhibit A to that deed.

**Part 2**

**Easement to Monitoring Well**

That easement (for a monitoring well) granted by Cebolleta Land Grant to SOHIO Western Mining Company dated August 13, 2004, recorded on August 19, 2004, Book 13, Page 8113, in the Clerk's Office of Cibola County, New Mexico.

REC DATE: 09/24/2004 REC TIME: 03:41 BOOK: 13 PAGE: 9441  
CIBOLA COUNTY, NM, EILEEN M MARTINEZ - COUNTY CLERK DOC #: 2004 2680



**EXHIBIT B  
TO  
WARRANTY AND QUITCLAIM DEED**

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**Reservations**

Grantor hereby reserves unto itself the following interests in the Property:

1. All water, water rights and other interests in water appurtenant to, or held, owned or used in connection with any portion of the Property.
2. A nonassignable right of access over and across the Property for the purpose of Grantor, its corporate affiliates and their employees, agents and contractors, as well as governmental employees, accessing or inspecting any property or facilities located adjacent to or near the Property. To the extent feasible, such access shall be across existing roadways, including those roadways identified as the A-A Road, the B-B Road, the C-C Road and the D-D Road in that certain License to Use Roads, dated effective February 25, 2004, between SOHIO Western Mining Company and the Cebolleta Land Grant, recorded March 16, 2004 in Book 13, page 3380 in the Cibola County, New Mexico County Clerk's office. Such right of access shall include the right to upgrade and maintain such roads as Grantor deems appropriate.
3. The easements and easement rights reserved by Sohio Western Mining Company in that certain Special Warranty Deed to The Board of Trustees of the Cebolleta Land Grant, dated June 5, 1989, recorded on November 6, 1989, Deed Book 3, Page 7872, in the Clerk's Office of Cibola County, New Mexico (the "Special Warranty Deed"), including all rights reserved under paragraph 3 of that Special Warranty Deed and the right to designate and select additional easements upon, across and under the property transferred pursuant to said Special Warranty Deed; provided, however, that the rights reserved to "Access Road Easement No. 2" reserved under the Special Warranty Deed, which easement is identified as the Access Road Easement No. 2 and described on page 3 of the Exhibit A to said Special Warranty Deed shall be non-exclusive.

REC DATE: 09/24/2004 REC TIME: 03:41 BOOK: 13 PAGE: 9442  
CIBOLA COUNTY, NM, EILEEN M MARTINEZ - COUNTY CLERK DOC #: 2004 2680

**EXHIBIT C  
TO  
WARRANTY AND QUITCLAIM DEED**

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**Exceptions**

This Deed is made subject to the following exceptions and grantor makes no warranty or representation concerning the following:

1. All public roads, public utility easements, railroads and pipelines.
2. Rights of Overhead Power Lines traversing the premises as shown on Plat of Tract 1 and the Option Tract to Tract 1, Recorded 11/13/2002 Book 11, Page 7304, Cibola County, New Mexico.
3. Right-of-Way Easement, dated December 9, 1976, filed of record December 29, 1976, in Book 244, Page 9092 records of Valencia County, New Mexico.
4. Right-of-Way Easement, dated August 22, 1973, filed of record September 5, 1974, in Book 244, Page 3262 records of Valencia County, New Mexico.

REC DATE: 09/24/2004 REC TIME: 03:41 BOOK: 13 PAGE: 9443  
CIBOLA COUNTY, NM, EILEEN M MARTINEZ - COUNTY CLERK DOC #: 2004 2680

## **Appendix B**

### **Initial Site Inspection Checklist**

## Inspection Checklist: L-Bar

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

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

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

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

No.	Item	Issue	Action
1	Access	Access is from public thoroughfare, no prior contacts are necessary.	None.
2	Specific site surveillance features	See attached list.	Inspect.  Identify maintenance requirements.
3	Monitor wells	There are 10 wells in the monitoring network.	Inspect the 10 monitor wells each year.
4	Evapotranspiration area	The First Tres Hermanos aquifer has an evapotranspiration area.	Inspect area for evidence of seeps. Area may be damp and have phreatophytes without seeps. Sample if necessary.
5	Vegetation	The cover of the tailings impoundment has been revegetated to control wind and water erosion.	Inspect impoundment cover and note condition of vegetation. There should not be any grazing on the impoundment cover.
6	Riprap	Key surfaces have been armored with riprap for erosion protection.	Inspect riprap, note evidence of rock displacement or rock degradation.
7	Sediment trap	Sediment is expected to accumulate in the sediment trap. Trap is expected to require sediment removal in about 600 years.	Inspect sediment trap and note sediment deposition in trap and in diversion channels in general.
8	Impoundment Cover	Integrity of radon barrier	Inspect for evidence of significant differential settlement or subsidence.
9	Impoundment dam face and toe	Seepage	Inspect impoundment face and toe area for evidence of seepage. Sample if necessary.

## Checklist of Site Specific Surveillance Features: L-Bar

Feature	Comment
Access Road	
Entrance Gate	
Warning Signs	Total: 30
Perimeter Fence	Barbed-wire stock fence
Boundary Monuments	Total: 8
Site Marker	
Monitor Wells	Background Well,  MW-29A, northeast of disposal site  Downgradient NMED and POC wells,  MW-1A, MW-61, MW-62, MW-63, MW-69, MW-81, MW-100, west of tailings impoundment  MW-17B, MW-72, east of tailings impoundment

## **Appendix C**

### **Erosion Monitoring Program**

# **EROSION MONITORING PROGRAM FOR THE L-BAR SITE**

## **INTRODUCTION**

The Erosion Monitoring Program (EMP) has been developed to address potential erosion of the tailings pile clay cover (Cover) at the L-Bar Uranium Mill Tailings Disposal Site (Site) over time. Sohio has developed this plan at the request of the New Mexico Water Quality Control Commission as a condition for granting Alternate Abatement Standards for ground water at the L-Bar site. This monitoring will be performed to meet the requirements of these conditions.

## **GRID CONFIGURATION**

The EMP will consist of a grid of 20 evenly spaced monitoring points that will be installed on the cover. Each monitoring point will consist of a 5-foot length of half-inch diameter epoxy-coated iron bar (rebar), installed into the cover to an approximate one-foot depth above the surface. The rebar will be equipped with a metal tag indicating the numeric code of the reference point. This tag will be used for all monitoring activities.

The 20 monitoring points will be installed on an approximate 500-foot grid trending both east/west and north/south, comprising five east-west rows with four points in each row. The predominant wind direction at the site is from west/southwest to east/northeast due to the influence of Mount Taylor. The X, Y coordinates of each monitoring point will be surveyed using a hand-held GPS unit to identify its location. Upon completion of the grid, each monitoring point location will be measured on the grid from the adjacent monitoring points to provide accurate location information.

Each monitoring point will have three T-posts installed approximately six feet from the monitoring point to mark its location. The T-posts and monitoring points will be painted with high visibility surveyor paint. Each row will be represented by a letter (A, B, C, D, and E) and each monitoring point along the row will be represented by a number (1, 2, 3, and 4). Figure 1 (attached) shows the proposed locations of the grid points.

## **ANNUAL MONITORING PROTOCOL**

The reference points will be measured annually. The amount of erosion or soil build-up will be assessed by placing a four-foot long straight edge across the cover with the midpoint of the straightedge located at the reference point. This will serve to account for any soil build-up or scour caused by the rebar protruding from the surface. If there is soil build-up within 2 inches immediately adjacent to the re-bar, the soil will be removed to allow the measurement to be taken. Soil loss or gain will be measured by noting the vertical distance from the top of the rebar to the base of the straightedge. This length will be noted in the field logbook and tracked by monitoring personnel on an annual basis. During the initial inspections photographs will be taken of each of the monitoring locations. During subsequent inspections, photographs will be retaken at monitoring locations only if, in the judgment of the inspector, significant changes discernable in a photograph have occurred.

## **DECISION PROTOCOL**

It is anticipated that some of the monitoring points will experience erosion or soil build-up until the vegetative cover is re-established. The Site reclamation plan included an additional 0.5 feet of soil cover to account for wind erosion, for a minimum of 4.1 feet of radon barrier. In reality, the cover exceeds this thickness because of the settlement and additional soil placed during final reclamation construction. An additional 325,000 cubic yards of soil were placed on the cover in 1999-2000. This represents an additional 1.8 feet of average soil cover in addition to the original cover thickness. Thus, the average minimum soil cover thickness is approximately 6 feet.

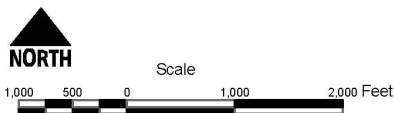
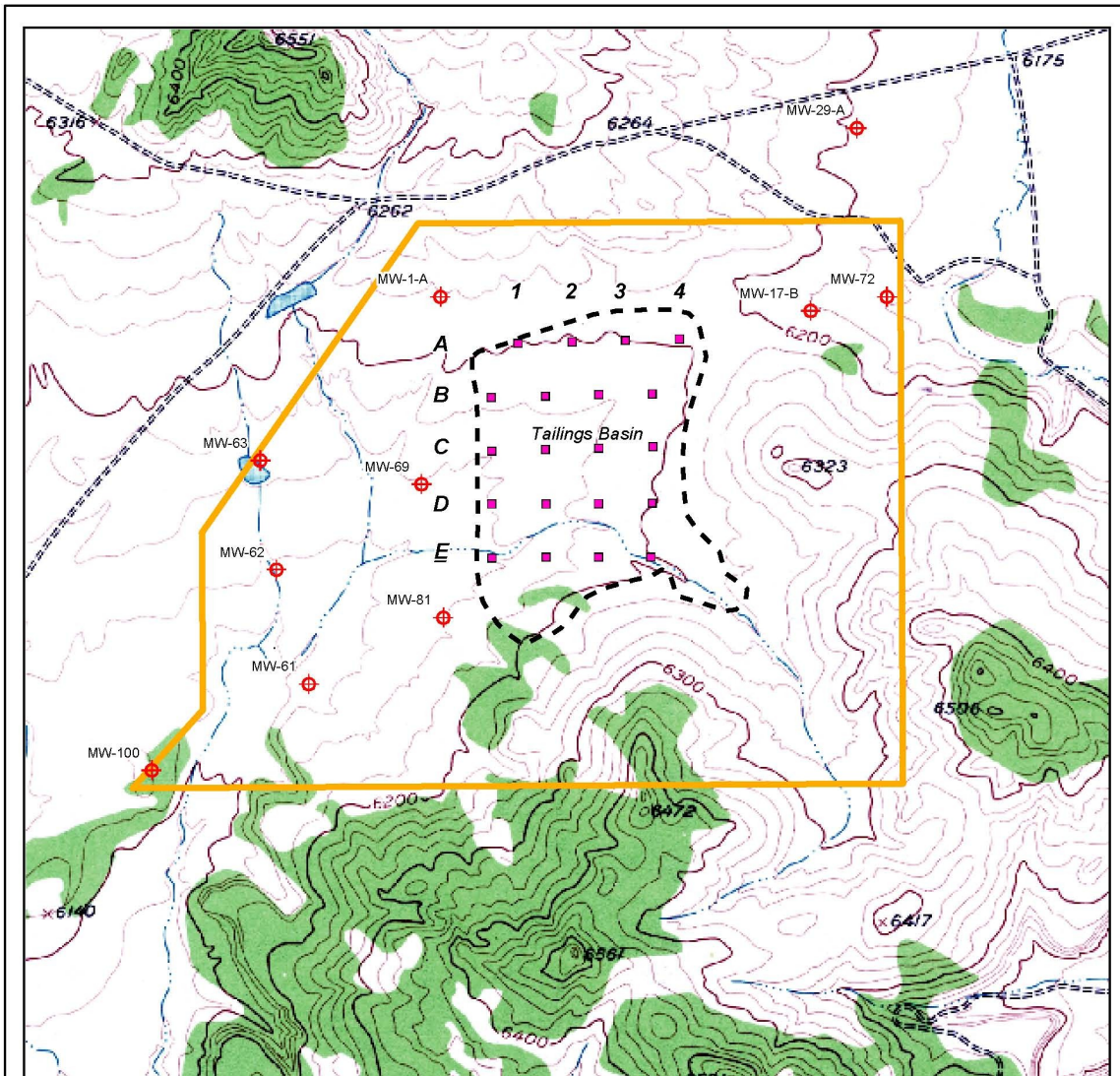
The decision point for considering the erosion “excessive” will be reached when 2 feet of erosion is noted at greater than 50% of the monitoring points. If this occurs, the Department of Energy (DOE) will initiate discussions with the Nuclear Regulatory Commission (NRC) staff to assess likely remedial scenarios. These scenarios would likely begin with additional radon emanation modeling or performance of a field gamma radiation survey to see if emissions are exceeding the permitted emission limits. Based on this data, DOE and NRC will develop an appropriate mitigation protocol, if required.

## **TERMINATION OF EROSION MONITORING**

It is anticipated that the site will restore its vegetative cover naturally in the same way it had restored vegetation prior to final reclamation construction. Natural vegetation has been shown to be an effective erosion mitigation technique at the Site. The predominant vegetation at the site consists of grasses and forbs. Average percent surface area coverage in a normal condition year for the L-Bar area is 25 percent (USDA, 1980). The DOE will suspend the formal wind erosion monitoring detailed in this appendix when the site has revegetated at least 20 percent of its cover surface area. Average vegetated area will be determined by selecting 10 random locations, gridded off on a 10 feet by 10 feet area and field-surveyed by standard agronomic methods to determine percent vegetated cover. When over half of these measured locations exceed the 20 percent cover criteria, the wind erosion-monitoring program will be discontinued. Annual erosion observation, however, will continue as described in the Long Term Surveillance Plan (LTSP) for the Site. If significant reduction in plant density is noted in the annual inspection then a rigorous vegetation cover measurement will be made. If the plant coverage is less than 20%, then the annual wind erosion monitoring will be reinstated and continue until the termination criteria have again been satisfied. In any case, annual wind erosion monitoring will be performed continuously for 20 years, and once every 10 years for the following 80 years.

Reference: United States Department of Agriculture, Soil Conservation Service, “Range Site Description, Section IIE, Technical Guide” NM MLRA 36-112-N.





Projection: State Plane NAD83, West  
 Data Sources: New Mexico Resource/Geographic Information System:  
 PacificWestern Technologies, Ltd.

Legend	
	LTSP (Long-term Surveillance Plan) Monitoring Well
	Erosion Monitoring Point w/ Grid Location (Surveyed)
	Property Boundary

Date: 02/04/04  
 Ref: KEC-001-03-03  
 File: erosion\_mon\_pts.mxd

### Erosion Monitoring Program - Surveyed Location of Monitoring Points



SOHIO Western Mining Company

Attachment 1

## **Concurrence Documentation**

This document was appended to the Long-Term Surveillance Plan after the plan was concurred in by the U.S. Nuclear Regulatory Commission



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

October 21, 2004

Mr. Jon Sink, Site Manager  
U.S. Department of Energy  
Grand Junction Office  
2597 B3/4 Road  
Grand Junction, CO 81503

SUBJECT: ACCEPTANCE OF THE LONG-TERM SURVEILLANCE PLAN FOR THE  
SOHIO WESTERN MINING COMPANY L-BAR URANIUM MILL TAILINGS SITE  
(TAC LU0067)

Dear Mr. Sink:

On September 22, 2004, the Sohio Western Mining Company (SWMC) transferred ownership of the L-Bar uranium mill tailings site near Seboyeta, New Mexico to the U.S. Department of Energy (DOE), as required by 10 CFR Part 40, Appendix A, Criterion 11, prior to license termination. In this regard, the DOE is the designated long-term custodian of the L-Bar site. Subsequently, by letter dated October 13, 2004, the DOE submitted the final Long-Term Surveillance Plan (LTSP) for the L-Bar site for review by the U.S. Nuclear Regulatory Commission (NRC) staff. The staff has completed its review of the LTSP and determined that the DOE has appropriately addressed the staff's comments provided by letter dated February 25, 2002, on DOE's November 21, 2001, draft LTSP. The staff also notes that the final LTSP incorporates the recommendations from the New Mexico Environment Department and the New Mexico Water Quality Control Commission for groundwater monitoring and erosion control monitoring, respectively.

The staff concludes that the final LTSP satisfies the requirements in 10 CFR Part 40, Appendix A, Criterion 12, and §40.28 for the long-term surveillance of a tailings disposal site. Accordingly, the NRC hereby accepts the LTSP for the L-Bar site. This acceptance establishes the DOE as the custodian and long-term caretaker of the L-Bar site under the general license specified in §40.28. In a concurrent action, the NRC has terminated SWMC's specific Source Materials License SUA-1472 for the L-Bar site.

An environmental assessment is not required for these actions as they are categorically excluded under 10 CFR Part 51.22(c)(11).

If you have any questions regarding this letter, please contact Rick Weller, the Project Manager for L-Bar at (301) 415-7287 or via e-mail to [RMW2@nrc.gov](mailto:RMW2@nrc.gov).

J. Sink

2

In accordance with 10 CFR 2.390 of the NRC's Rules of Practice, a copy of this letter will be available electronically from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,



Gary S. Janosko, Chief  
Fuel Cycle Facilities Branch  
Division of Fuel Cycle Safety  
and Safeguards  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 40-8904  
License No.: SUA-1472

cc: D. Bergman-Tabbert, DOE GJO  
M. Plessinger, Stoller GJO ✓  
J. Trummel, Kennecott  
M. Leavitt, NMED Santa Fe  
K. Myers, NMED Santa Fe  
S. Jordan, Nordhaus Law Firm