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NOV 21 2001

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

Subject: Draft Long-Term Surveillance Plan for the L-Bar, New Mexico, Title II Site

Dear Mr. Leach:

Enclosed are four copies of the draft *Long-Term Surveillance Plan for the U. S. Department of Energy L-Bar (UMTRCA Title II) Disposal Site, Seboyeta, New Mexico,* for NRC review. The document is based on the best information currently available to DOE. Please pay particular attention to the ground water monitoring section as it is intended to address State of New Mexico concerns in addition to NRC requirements. This Long-Term Surveillance Plan (LTSP) is intended to satisfy the requirements set forth in 10 CFR 40.28 whereby the long-term custodian must provide an LTSP to the NRC as a step in the licensing/license termination process.

Please call me at (970) 248-6037 if you have questions.

Sincerely,

Art Kleinrath

Art Kleinrath
Program Manager

Enclosures

cc w/o enclosure:
M. Plessinger, MACTEC-ERS

cc w/enclosure:
Project File LBAR 1.1 (A. Garcia)

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

November 2001

U.S. Department of Energy

GRAND JUNCTION OFFICE

Work Performed Under DOE Contract No. DE-AC13-96GJ87335 for the U.S. Department of Energy
Approved for public release; distribution is unlimited.

Long-Term Surveillance and Maintenance Program

Long-Term Surveillance Plan

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

November 2001

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

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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 40.28 (10 CFR 40.28) as the long-term custodian of the former Kennecott (SOHIO Western) uranium mill tailings disposal site near Seboyeta, New Mexico.

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 the 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 the NRC or an Agreement State, and when a site-specific LTSP, this document, is accepted by the 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 2001a). Rationale and procedures in the guidance document are considered part of this LTSP.

Table 1-1. Requirements of the LTSP and for the Long-Term Custodian (DOE) of the L-Bar Site

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

1.3 Role of the U.S. Department of Energy

In 1988, the DOE designated the Grand Junction Office (GJO) to be the program office for long-term surveillance and maintenance of all DOE remedial action project disposal sites, 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 these sites. The DOE established the Long-Term Surveillance and Maintenance (LTSM) Program at the GJO to carry out this responsibility.

The LTSM Program is responsible for the preparation, revision, and implementation of this LTSP, which specifies procedures for site inspection, monitoring, and maintenance. The LTSM Program is responsible for annual and other reporting requirements and for maintaining records pertaining to the site.

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 in 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 was part of the L-Bar ranch, situated on a private inholding on the Cebolleta land grant. Specifically, the site is approximately four miles east-southeast of the village of Seboyeta.

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: Paguate, Bibo, Seboyeta, and Moquino. Figure 2-2 illustrates the site and principal geographic features of the area.

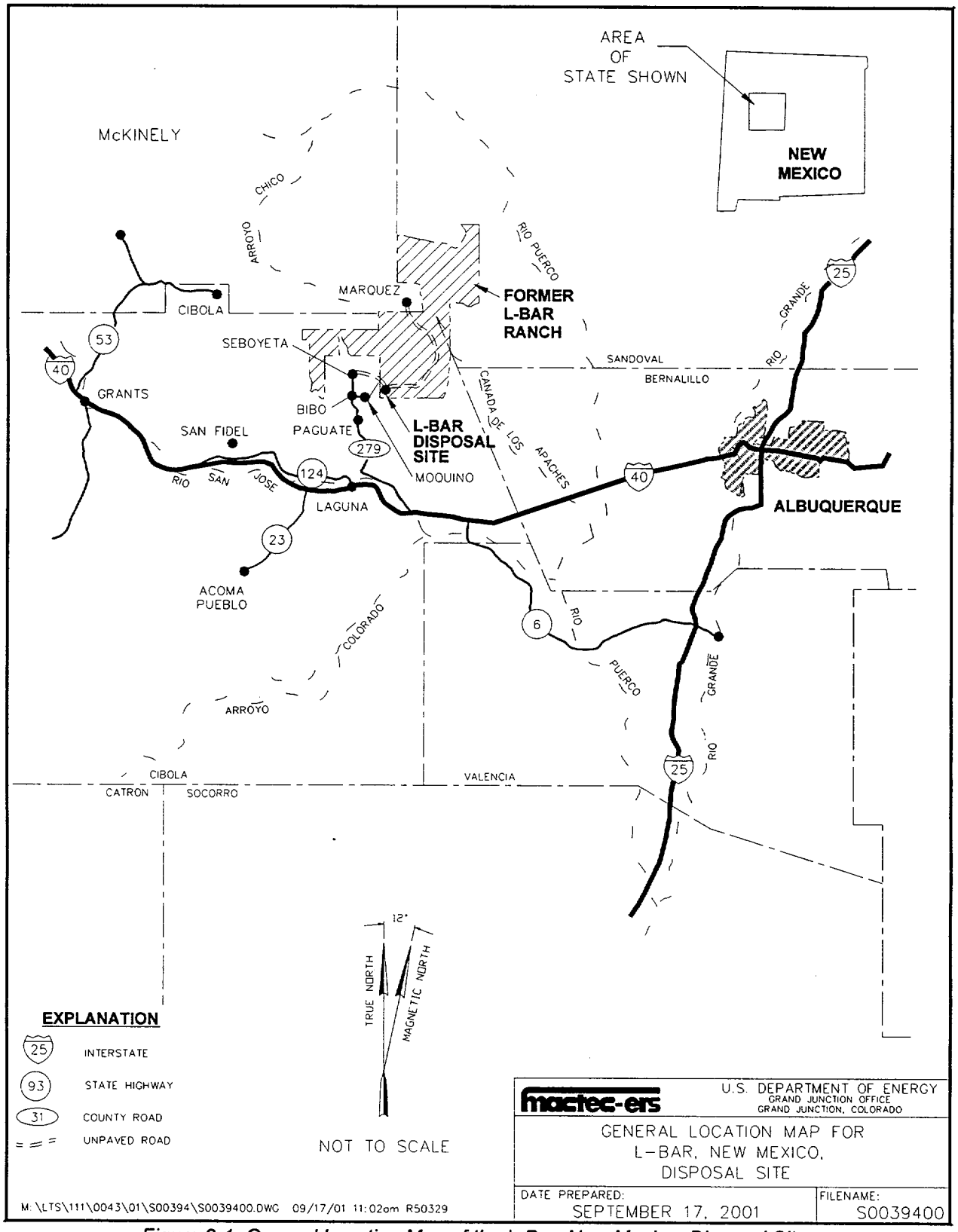

Figure 2-1. General Location Map of the L-Bar, New Mexico, Disposal Site

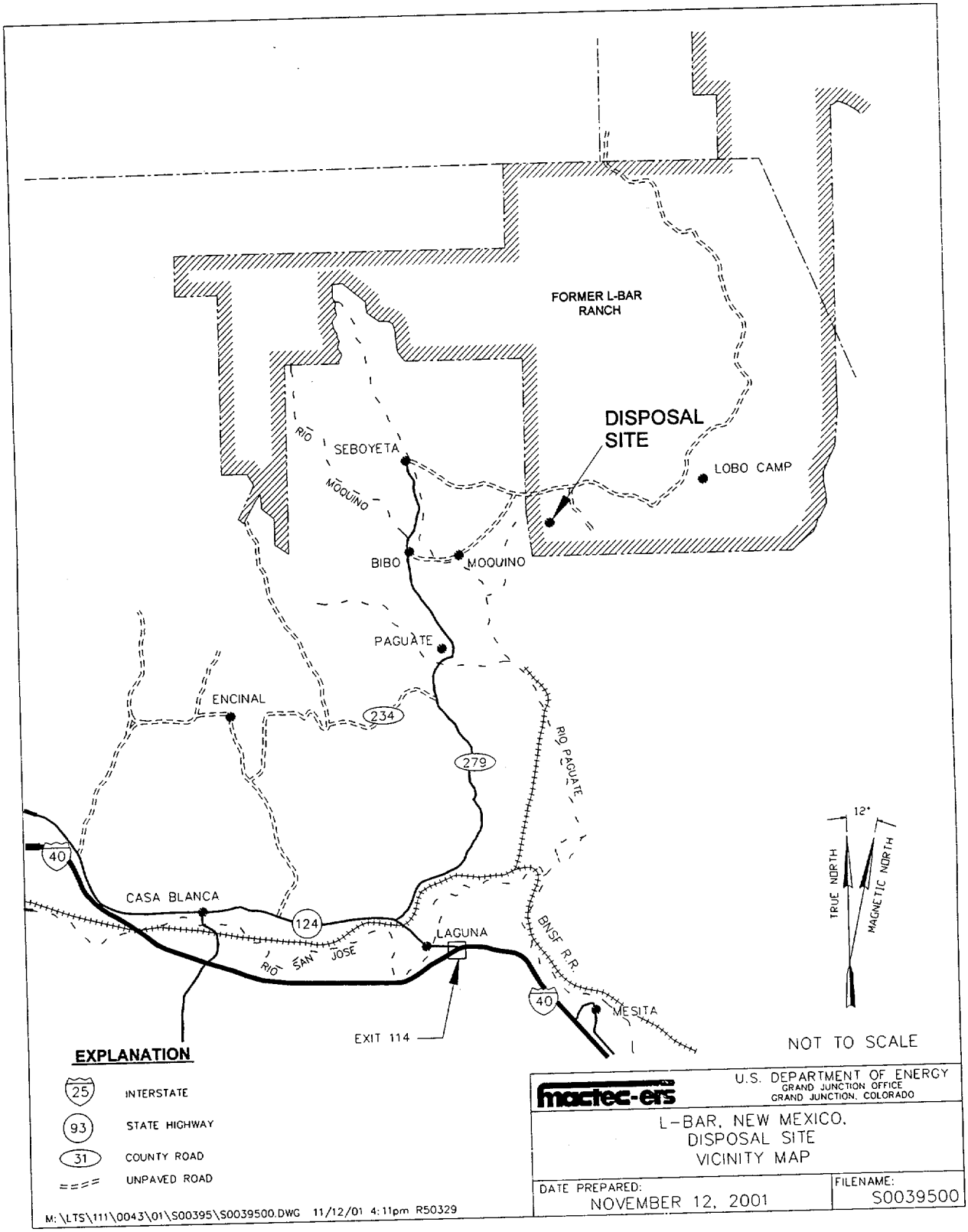

Figure 2-2. L-Bar, New Mexico, Disposal Site Vicinity Map

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).

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 6300 feet above mean sea level (MSL) at the southeast boundary to about 6100 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. The supporting real estate documentation 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 and travel approximately four 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 the 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 has been revegetated with native species to control wind and water erosion and to 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 on the southwest side of the embankment. 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.

Six boundary monuments are placed on the final site boundary, one at each corner of the 740-acre disposal site property. 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 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. The sedimentary sequence has been intruded locally by Tertiary-Quaternary basaltic necks and plugs, such as the Cerro Negro plug to the north of the tailings pile. 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).

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

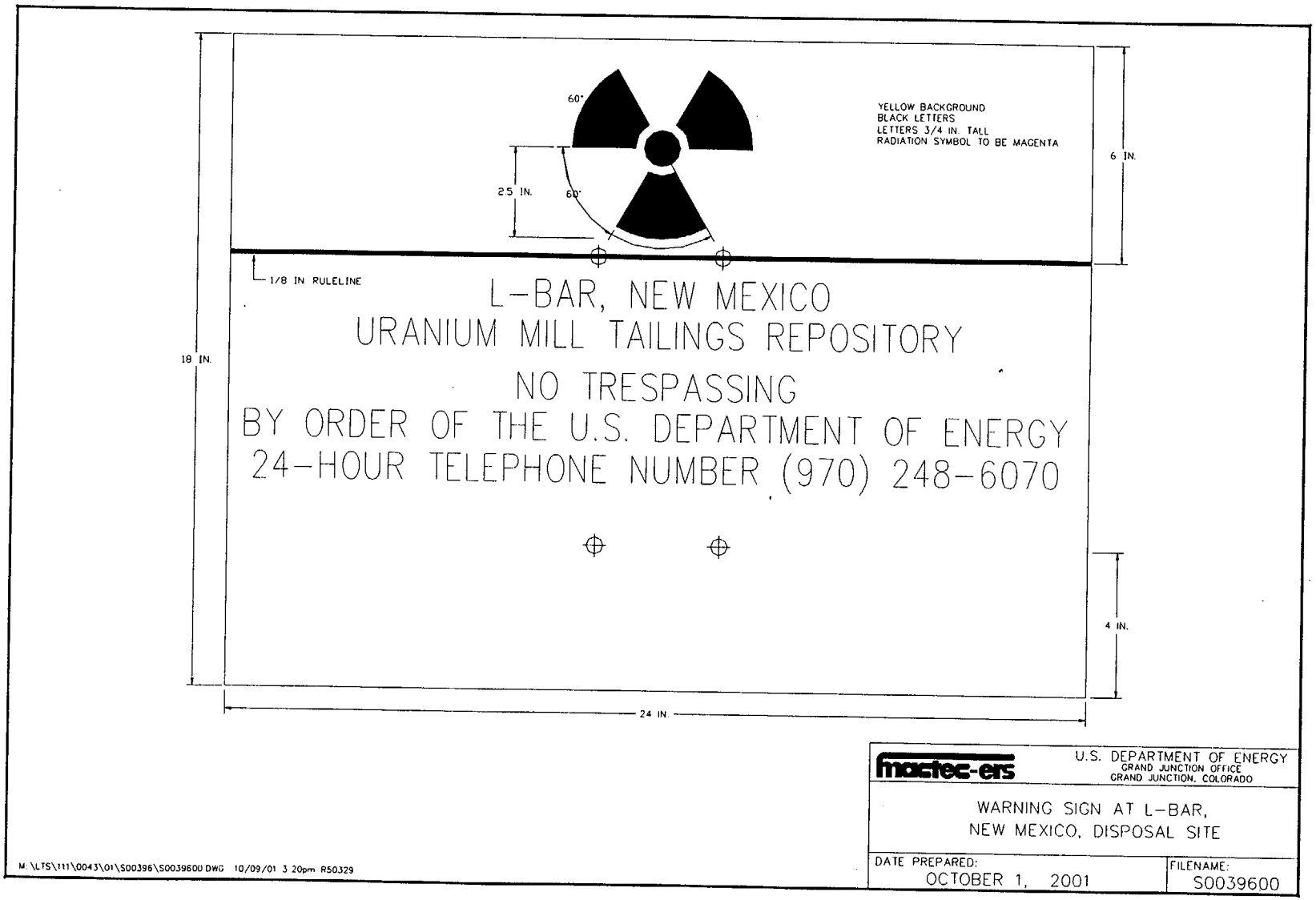

Figure 2-4. Warning Sign at L-Bar, New Mexico, Disposal Site

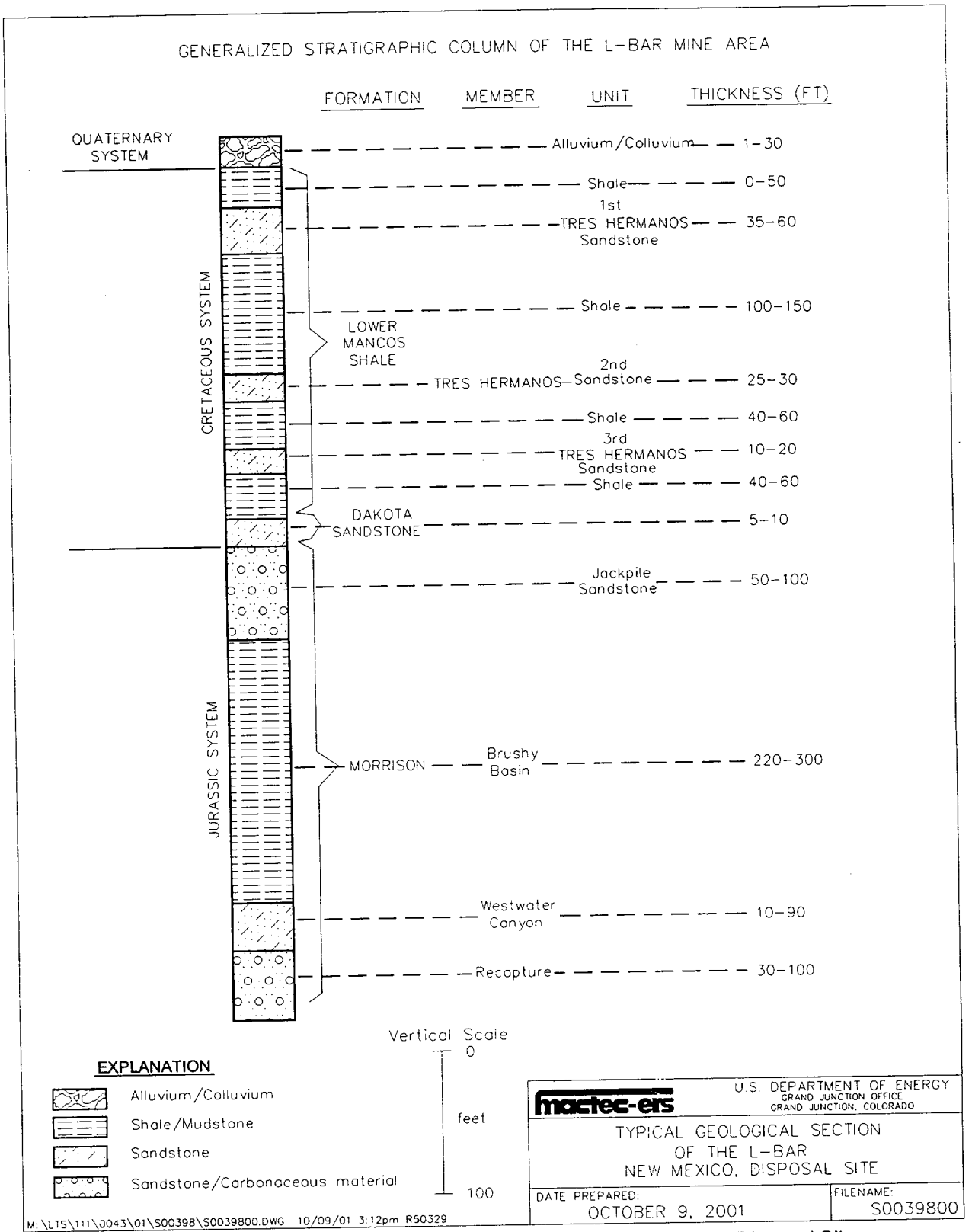

Figure 2-5. Typical Geological Section of the L-Bar, New Mexico, Disposal Site

2.4 Tailings Impoundment Design

The tailings impoundment was constructed by damming 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 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 is a 4.1-foot thick compacted clay layer that consists primarily of weathered Mancos shale. 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 (PMF) 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 stormwater from the higher terrain immediately south of the tailings impoundment toward the channel outlet to the west. The North Channel protects the tailings impoundment on the north side and diverts stormwater to the west, away from the site (SOHIO 1999).

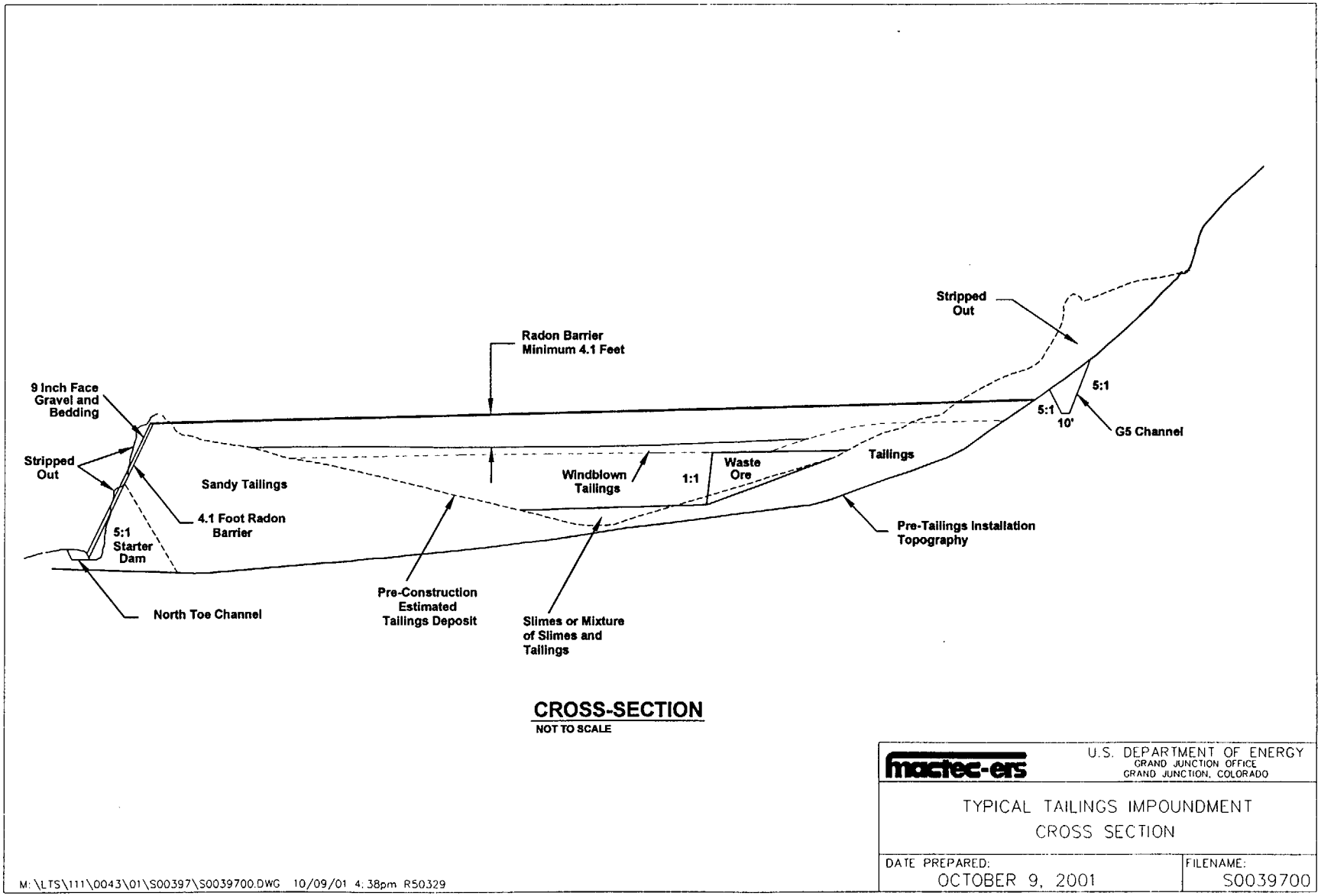

Figure 2-6. Typical Tailings Impoundment Cross Section

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 the 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 1000-year disposal site design life (Kennecott 1998).

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

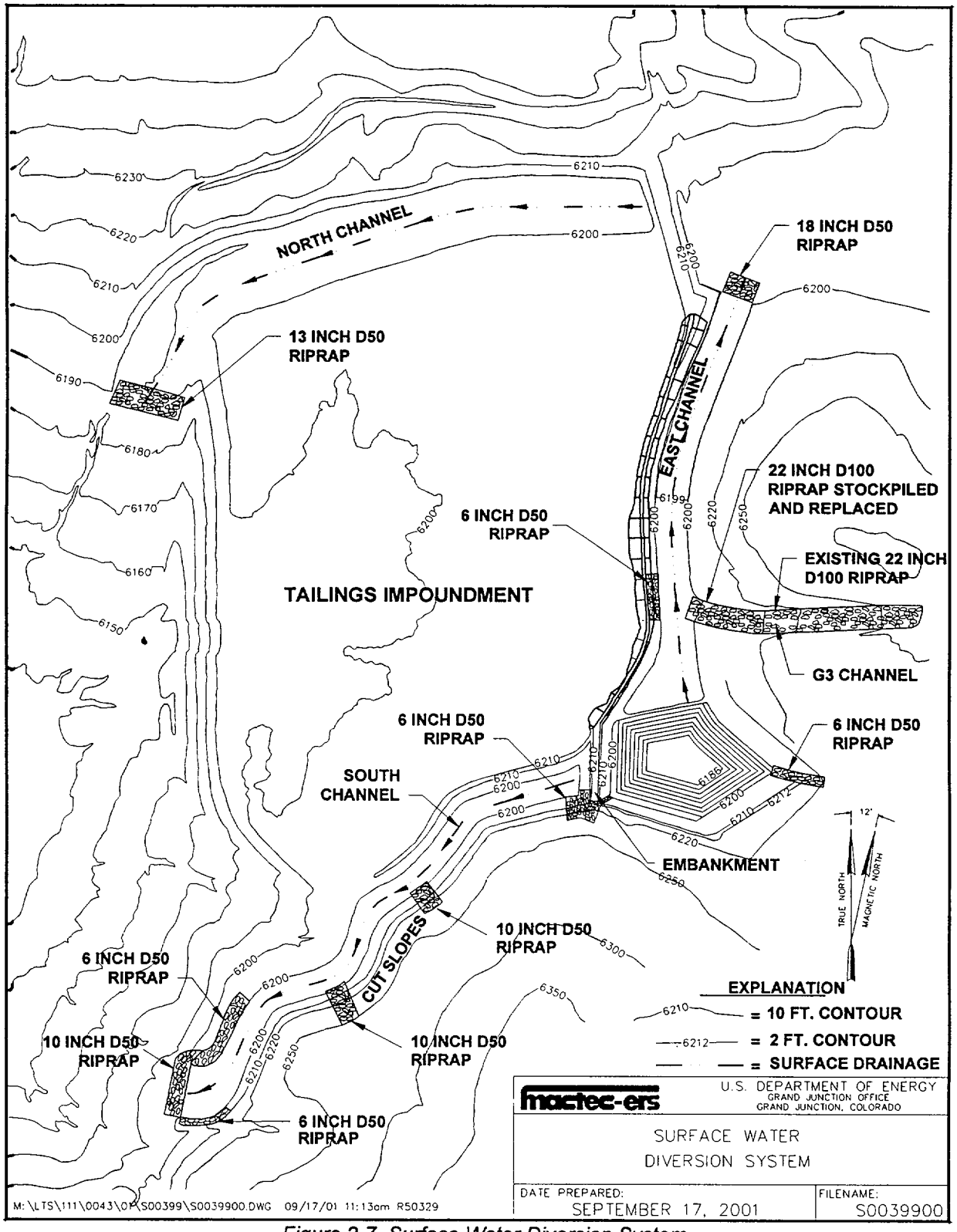

Figure 2-7. Surface Water Diversion System

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 the DOE for long-term custody.

When the NRC accepts this LTSP and terminates Kennecott's license, SUA-1472, the site will be included under the 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 the 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 the DOE's long-term custody of the site (10 CFR 40.28 [b]).

Should changes to this LTSP be necessary, the NRC must be notified of the changes, and the changes may not conflict with the requirements of the general license. Additionally, representatives of the NRC must be guaranteed permanent right-of-entry for the purpose of periodic site inspections. Access to the L-Bar site is accomplished via county roads.

3.2 Requirements of the General License

To meet the requirements of the 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, the DOE will inspect the L-Bar Disposal Site once each calendar year. The date of the inspection may vary from year to year, but the 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. The DOE will notify the 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

Transect	Description
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, condition of vegetation, and animal or human intrusions that could result in adverse impacts.

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

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.

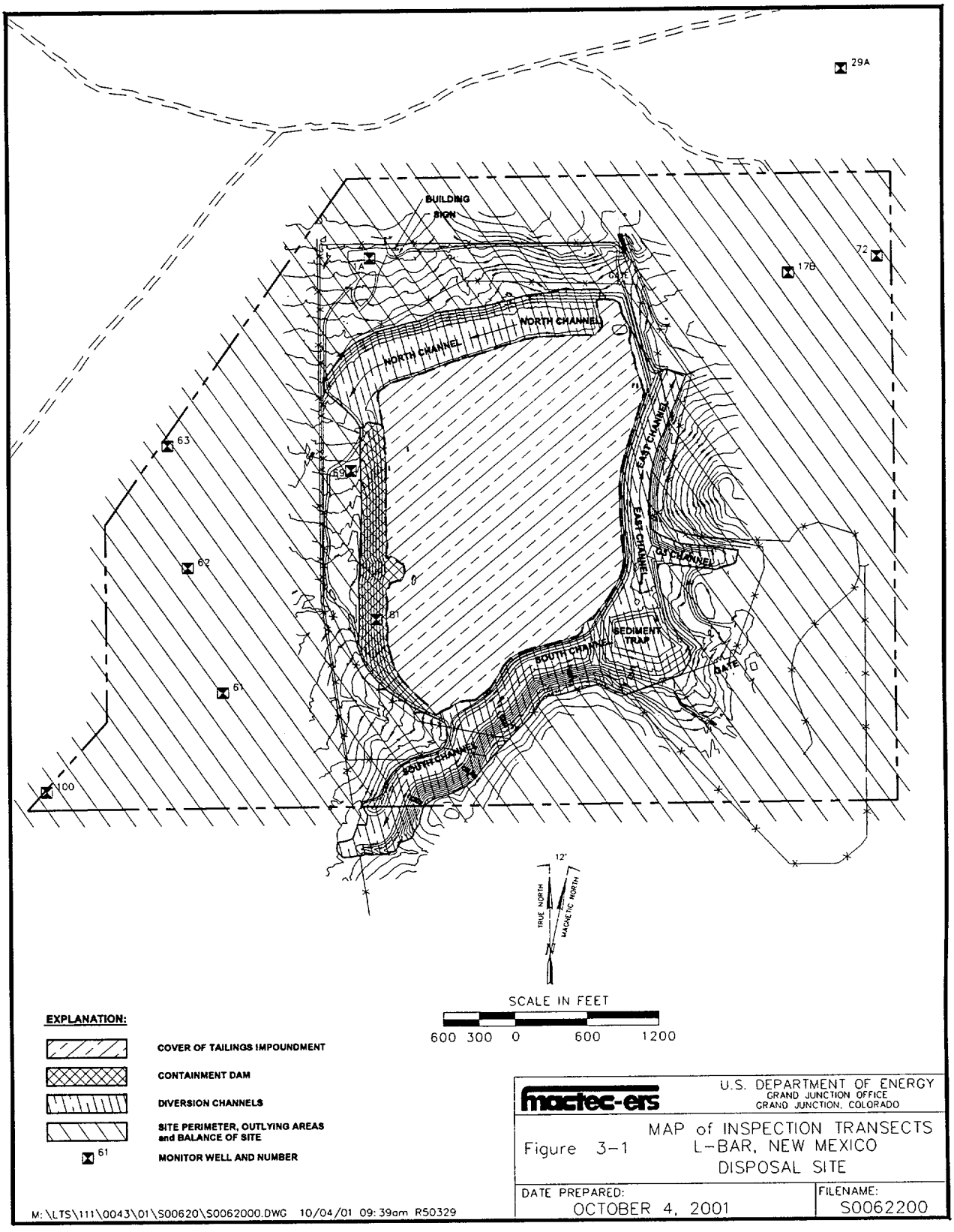

Figure 3-1. Map of Inspection Transects for the L-Bar, New Mexico, Disposal Site

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.

Included in the inspection checklist is a discussion on the preparation for the inspection, health and safety concerns, and the performance of the inspection itself.

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. Other revisions will include updating telephone numbers as part of the health and safety precautions noted in the Project Safety Plan (DOE 2000b).

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 the 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, the DOE will notify the 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). The 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. The 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 (nonroutine) 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;

- Begin the DOE occurrence notification process (DOE Order 232.1);

- 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 the DOE determines that it is advisable to notify the NRC or other outside agency of a problem at the site.

If follow-up inspections are required for more serious or emergency reasons, the DOE will submit to the 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 has been revegetated 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 the DOE will take in response to "unusual damage or disruption" that threaten or compromise site safety, security, or integrity. The 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. The DOE's priority (urgency) in column 1 of Table 3-2 bears an inverse relationship with the 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[a]

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.

[a]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, the DOE will notify:

Uranium Recovery and Low-Level Waste Branch
Division of Waste Management
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.

3.7 Environmental Monitoring

3.7.1 Ground Water Monitoring

The ground water monitoring conducted at the L-Bar site is intended to address both NRC and New Mexico Environment Department (NMED) concerns. The NRC has granted alternate concentration limits (ACLs) of 13.0 mg/liter for uranium and 2.0 mg/liter for selenium at the point of compliance (POC) wells (NRC 1999). As a best management practice DOE will also analyze ground water samples for total dissolved solids (TDS), sulfate, nitrate, and chloride, the constituents of concern to NMED. Table 3-3 summarizes the ground water monitoring plan. The locations of the monitor wells in the ground water monitoring network are shown on Figure 3-2.

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

Well Designation	Monitoring Frequency	Analytes	Rationale; ACLs
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; U = 13.0 mg/liter Se = 2.0 mg/liter
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; U = 13.0 mg/liter Se = 2.0 mg/liter
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	TDS, Chloride, Sulfate, Nitrate, pH, electrical conductivity, water level	Seepage indicator well; no ACLs
MW-62	Annually for first 3 years, then once every 3 years	TDS, Chloride, Sulfate, Nitrate, pH, electrical conductivity, water level	Seepage indicator well; no ACLs
MW-63	Annually for first 3 years, then once every 3 years	TDS, Chloride, Sulfate, Nitrate, pH, electrical conductivity, water level	POE well and seepage indicator well; no ACLs
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; U = 13.0 mg/liter Se = 2.0 mg/liter
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; no ACLs
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; U = 13.0 mg/liter Se = 2.0 mg/liter
MW-100	Only if notable seepage is observed in MW-61, 62, 63 or if ACL is exceeded in POC well	Uranium, Selenium, TDS, Chloride, Sulfate, Nitrate, pH, electrical conductivity, water level	POE well on west property boundary; no ACLs

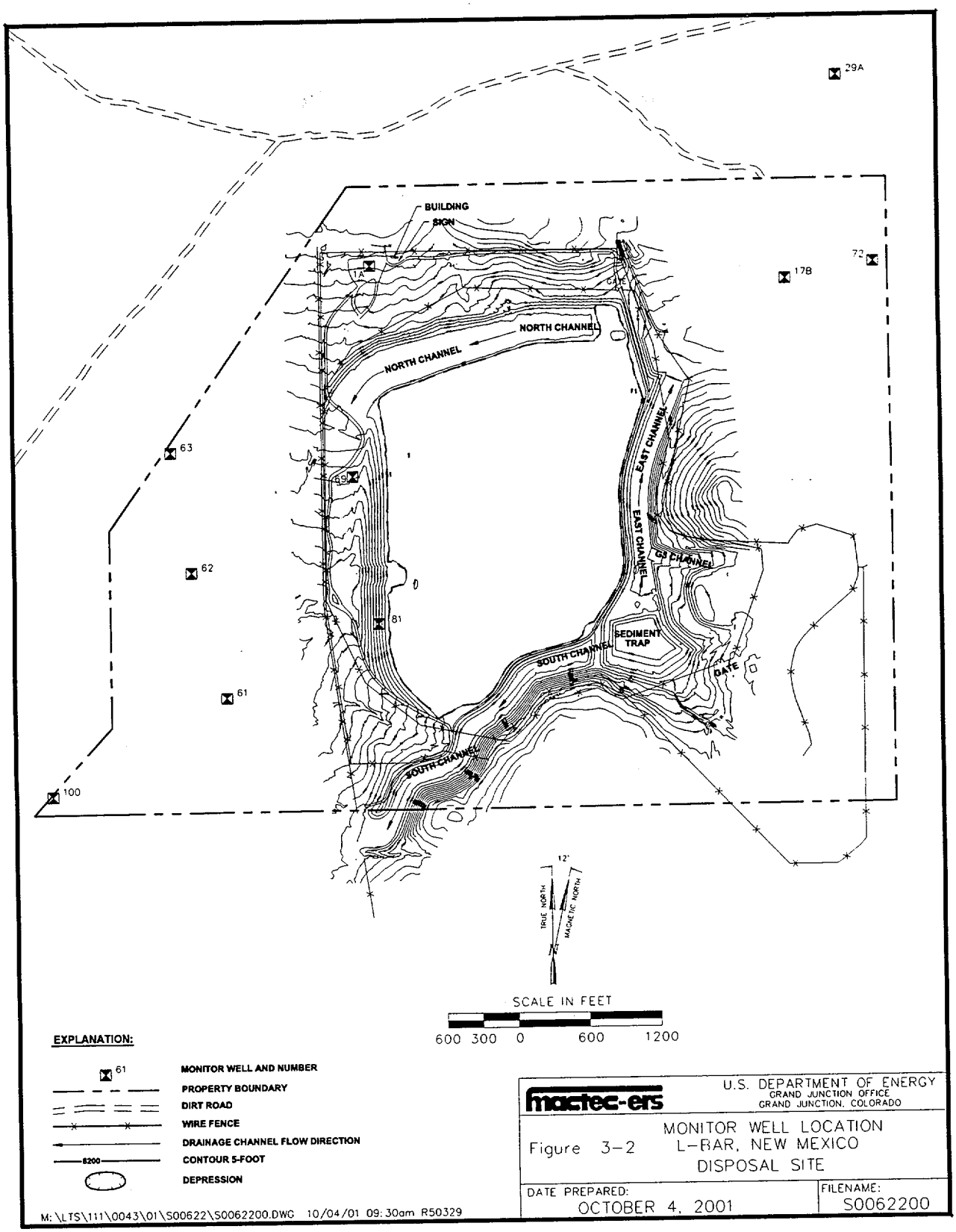

Figure 3-2. Location of Monitor Wells in Ground Water Monitoring Network

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. As shown in Table 3-3 MW-100 is sampled only if seepage indicators are detected in wells MW-61, 62, and 63 or if an ACL is exceeded at a POC well. 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.

Upon completion of 30 years of monitoring for the NMED constituents of concern, if no elevated constituents have been identified in the POE wells, and ground water contaminant concentration trends indicate that the site poses no further threat to the environment, ground water monitoring for TDS, nitrate, sulfate, and chloride will be discontinued. 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.

3.7.2 Vegetation Monitoring

The disposal site was revegetated as a part of the 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.

3.8 Records

The LTSM Program maintains site records in a permanent site file at the GJO facility. These records are available for inspection by government agencies or the public. Records consist of disposal site characterization, design, and construction documents. Annual inspection results are also part of the permanent site file.

All LTSM Program records are maintained in full compliance with DOE requirements:

1. DOE Order 1324.2A, Records Disposition

2. 36 CFR Parts 1220-1236, National Archives and Records Administration

3.9 Quality Assurance

The long-term care of the L-Bar site and all activities related to the annual surveillance and maintenance of the 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 procedures for LTSM Program activities are consistent with DOE orders, regulations, codes, and standards.

Immediate health and safety concerns are listed in the Project Safety Plan (DOE 2001b). Also in the Project Safety Plan are 24-hour emergency phone numbers for fire, hospital and ambulance, and police and sheriff. The plan is updated before each inspection to advise on-site personnel of new and continuing health and safety considerations. At a pre-inspection briefing, on-site personnel review the Safety Plan and are instructed on hazards that may be present at the site and health and safety procedures that must be followed.

Subcontractors (for maintenance) are advised of health and safety requirements through appropriate procurement documents. Subcontractors must submit health and safety plans for all actions subject to Occupational Safety and Health Administration (OSHA) requirements. Subcontractor health and safety plans will be reviewed and approved before the contract is awarded. Proposals from subcontractors without an adequate health and safety plan are rejected.

End of current text

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 1989.

DE&S (Duke Engineering & Services), 2000. L-Bar Uranium Mill Tailings Site Reclamation Completion Report, prepared for SOHIO Western Mining Company, December 8, 2000.

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

Kennecott Energy Company, 1998. *Alternate Concentration Limits Application for the L-Bar Site*, prepared by Duke Engineering & Services, August 24, 1998.

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

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

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 26, 1994.

U. S. Department of Energy, 1995. *Occurrence Reporting and Processing of Operations Information,* DOE Order 232.1, October 30, 1995.

_____, 2001a. *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 2001.

_____, 2001b. *Long-Term Surveillance and Maintenance Program Project Safety Plan*, prepared by the U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado.

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 1990.

_____, 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 21, 1999.

End of current text

Appendix A

Real Estate Documentation

Real Estate Documentation
will be included when available

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 monitor wells in the LTSM monitoring network.	Inspect the 10 LTSM monitor wells each year.
4	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.
5	Riprap	Key surfaces have been armored with riprap for erosion protection.	Inspect riprap, note evidence of rock displacement or rock degradation.
6	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.

Checklist of Site Specific Surveillance Features: L-Bar

Feature	Comment
Access Road	
Entrance Gate	
Entrance Sign	
Perimeter Fence	Barbed-wire stock fence
Boundary Monuments	Total: 6
Site Marker	
Monitor Wells	Background Well, MW-29A, northeast of disposal site Downgradient 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