Department of Energy
Office of Legacy Management

FEB -1 2005

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Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
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Subject: Draft Final *Long-Term Surveillance Plan for the Durita (UMTRCA Title II) Disposal Site, Montrose County, Colorado*

Dear Mr. Pierson:

Enclosed are four copies of the Draft Final *Long-Term Surveillance Plan (LTSP) for the Durita (UMTRCA Title II) Disposal Site, Montrose County, Colorado* for NRC review. The document is based on the best information currently available to DOE. Please note that the section documenting site real property ownership is incomplete, as the site property has not yet been transferred to DOE. The U.S. Army Corp of Engineering (Sacramento District) is in the process of completing the real estate transfer from the Hecla Mining Company to the federal government.

This LTSP is intended to satisfy the requirements set forth in 10 CFR 40.28 whereby the long-term custodian must provide a LTSP to the NRC as a step in the licensing/license termination process.

When the NRC accepts this LTSP and concurs with the State of Colorado's termination of Hecla's Colorado Radioactive Materials License (317-02), the site will be included under the DOE general license for long-term custody (10CFR40.28[b]).

Please call me at (970) 248-6004 if you have questions.

Sincerely,

Michael K Tucker

Michael K. Tucker
Site Manager

Enclosures

HMSS08

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Office of Legacy Management

Long-Term Surveillance Plan

for the

Durita (UMTRCA Title II) Disposal Site
Montrose County, Colorado

January 2005

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

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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) 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 Hecla Mining Company Durita uranium mill tailings disposal site in Montrose County, Colorado. The LM Program at the DOE-LM office in Grand Junction, Colorado, is responsible for the preparation, revision, and implementation of this LTSP, which specifies procedures for inspecting, monitoring, maintenance, reporting, and maintaining records pertaining to the site.

1.2 Legal and Regulatory Requirements

The Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978 (42 USC 7901) as amended, provides for the remediation (or reclamation) and regulation of uranium mill tailings at Title I and Title II sites. Title I 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 Hecla Durita site is a Title II site under UMTRCA. The State of Colorado is an Agreement State.

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

A general license is issued by 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 NRC.

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

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

In December 2003, DOE formally established 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, LM now administers the responsibilities of the Long-Term Surveillance and Maintenance Program.

2.0 Final Site Conditions

Reclamation at the Durita mill facility in Montrose County, Colorado, consisted of stabilizing three heap leach tanks, salvaging equipment that could be decontaminated, demolishing the balance of site structures and equipment, and disposing of it on site. Contaminated mill site soils also were disposed of on site.

2.1 Site History

The Durita facility was a heap leach operation, built in 1977 by Ranchers Exploration and Development Corporation. The facility operated from 1977 to 1979. All of the estimated 700,000 tons of feedstock "ore" for the mill came from the Naturita[1] mill site (Hecla 1991).

The tailings were trucked to the site and dumped through a grizzly into a crusher. The crushed tailings were stockpiled and eventually conveyed to one of the three heap leach tanks. When the tanks were full, the tailings surface was flooded with a dilute sulfuric acid solution. The percolating acidic solution leached uranium and vanadium from the tailings. This solution was collected by slotted pipes in the bottom of each leach tank, and then transferred by gravity flow to the extraction plant. Uranium and vanadium were recovered by ion exchange and solvent extraction. The waste liquid was stored in six onsite evaporation ponds (Hecla 1991).

After operations ceased, a 2- to 2½-foot thick soil cover was placed over the leach tanks. The evaporation ponds were left uncovered and allowed to continue evaporating the liquids (Hecla 1991).

Formal decommissioning and reclamation of the site began in 1992. Final reclamation construction activities were completed in 1999 (Hecla 2000).

2.2 General Description of the Disposal Site Vicinity

The Durita disposal site is in Montrose County, Colorado, approximately 100 road miles south of Grand Junction and 3 miles southwest of Naturita (Figures 2–1 and 2–2).

The site is about 2 road miles west from the San Miguel River Valley floor at an elevation of about 5600 feet. This location is within the canyon lands area of the Colorado Plateau. The area is typified by relatively smooth, sloping surfaces broken by canyons with rough and precipitous topographic relief (FBD 1981). Most of the surrounding property is administered by the Bureau of Land Management (BLM), and is not available for residential development (Hecla 2000).

The climate is a semi-arid continental type with mild summers and cold winters. Precipitation averages about 10 inches per year. Large rainstorms occur usually from May through October (FBD 1981). Vegetation in the immediate vicinity of the site consists of piñon-juniper woodlands and sagebrush flats. The vicinity is sparsely populated with the two nearest towns, Naturita and Nucla, having populations of 434 and 552, respectively, according to the 1990 census (Hecla 2000).

1 The Naturita Uranium Mill Site was an UMTRCA Title I site remediated by DOE

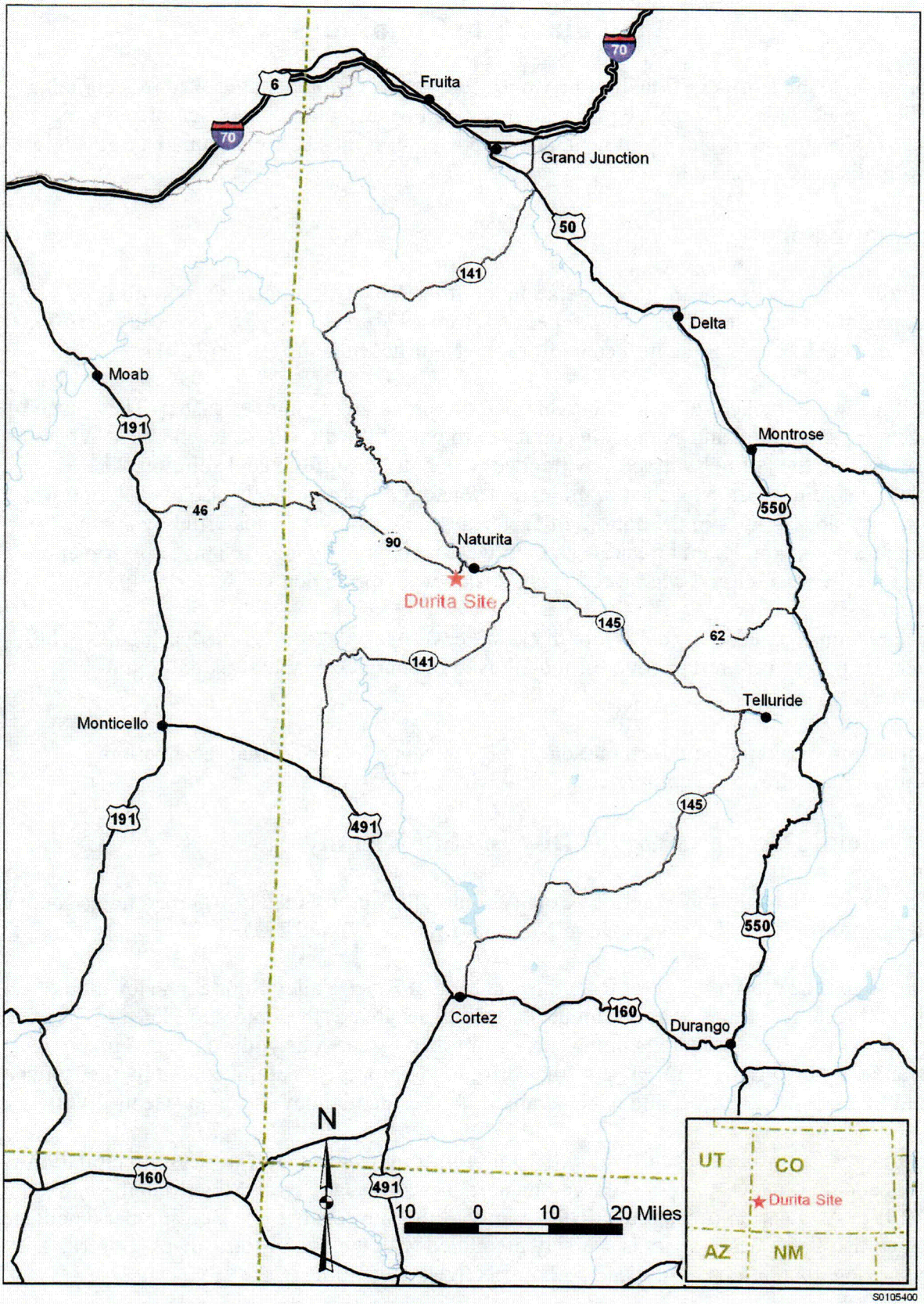

Figure 2–1. General Location Map of the Durita, Colorado, Disposal Site

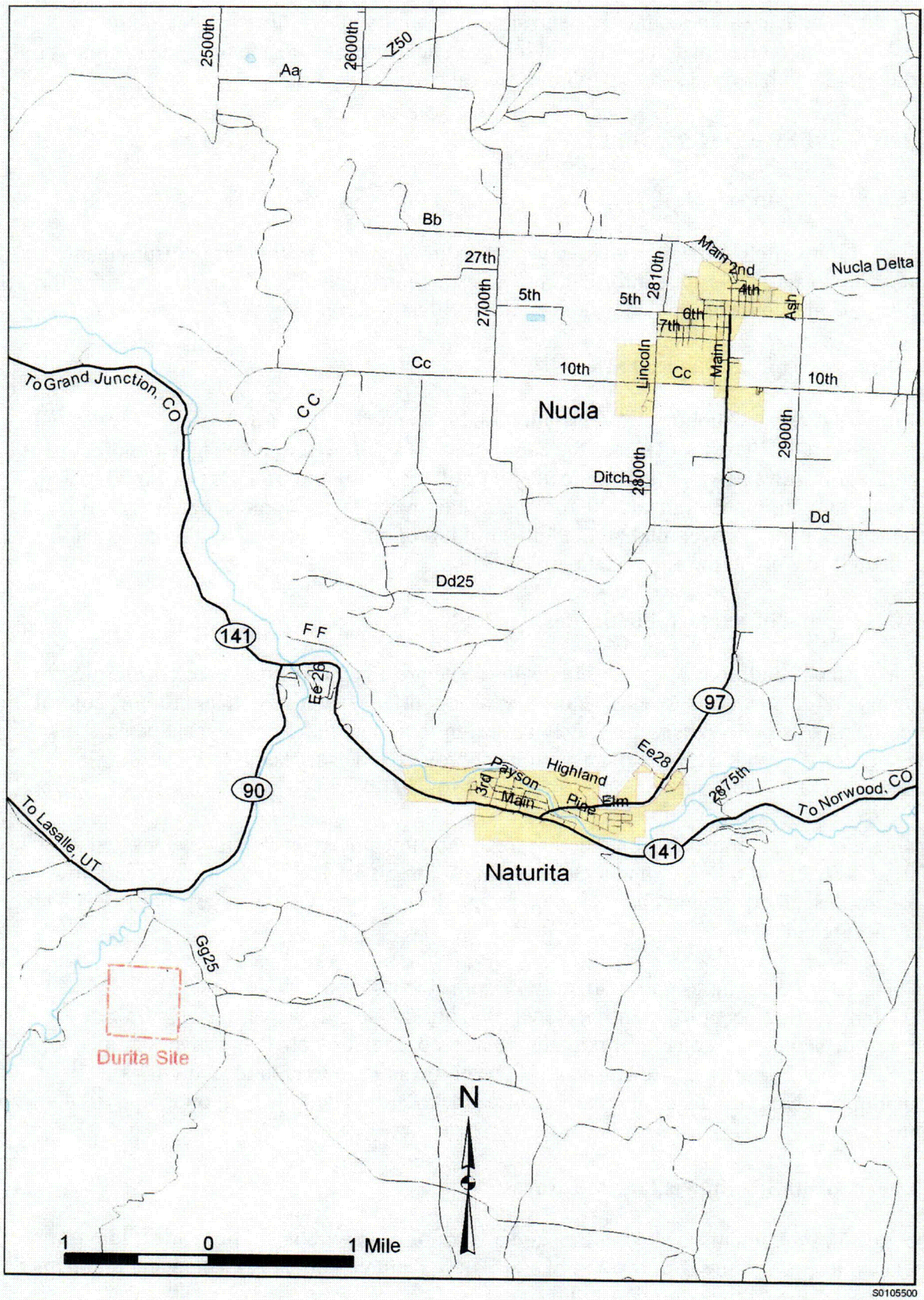

Figure 2–2. Vicinity Location Map, Durita, Colorado, Disposal Site

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The primary land uses in the immediate surrounding vicinity are wildlife habitat, domestic livestock grazing, recreational hunting, and hiking. The nearest residence is a ranch about ½ mile from the site. No other residences are within several miles of the site.

2.3 Disposal Site Description

2.3.1 Site Ownership

In the near future, the United States Government will own the 160-acre Durita disposal site property. Supporting real estate information is presented in Appendix A. The site includes three reclaimed heap leach tanks and a closure cell and is illustrated on Plate 1.

2.3.2 Directions to the Disposal Site

From Grand Junction, Colorado, travel south on U.S. Highway 50 approximately 11 miles to the junction with State Highway 141 near the community of Whitewater. Turn right and proceed west on State Highway 141 for approximately 94 miles, passing through the town of Gateway. At the junction with State Highway 90, turn right and proceed west approximately two miles to the intersection with a gravel road on the left. Turn left on the gravel road and proceed south approximately ½ mile to the site entrance.

2.3.3 Description of Surface Conditions

The final surface conditions at the Durita disposal site are a combination of rock armoring, contouring, and revegetation to achieve the necessary surface water run on and run off control and erosion protection to satisfy the longevity design requirements. The revegetated surfaces have been reseeded with a mix of plants that have proven to be successful in reclaiming disturbed areas at the site and will help provide for soil stability.

The contaminated materials are contained in three reclaimed heap leach tanks, identified as LT–201, LT–202, and LT–203, and a closure cell. A combination of contoured topography, drainage swales, and diversion channels convey incident surface water away from the leach tanks and the closure cell, and off the site.

Leach tank LT–203 occupies approximately 13 acres including the side slopes. Leach tanks LT–201 and LT–202 occupy a combined area of approximately 22 acres; the closure cell, including side slopes, occupies approximately 8 acres of the 160-acre disposal site property. There are no monitor wells at the Durita site. The entire site property is fenced with a combination of chain link fence and barbed wire stock fence. The final site topography is shown on Plate 1.

2.3.4 Permanent Site Surveillance Features

Four boundary monuments, a site marker, and a warning sign will be the permanent long-term surveillance features at the Durita disposal site. These features will be inspected and maintained as necessary as part of the controls for the site.

The unpolished granite site marker with an incised message identifying the location of buried contaminated materials on the Durita disposal site property is placed just inside the main entrance gate. The message on the granite site marker is shown on Figure 2–3.

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

Locations of the permanent site surveillance features are shown on Plate 1.

2.3.5 Site Geology

The Durita site is situated on gently north-sloping terrain at the southeast end of the Paradox Valley. The Mancos Formation directly underlies the site. Most of the site is covered with alluvial/colluvial sandy clay soil up to 20 feet thick containing variable amounts of rock fragments, primarily sandstone of cobble-to-boulder size. Near the east-central part of the site, a remnant of the Mancos Formation forms a hill approximately 100 feet high above the surrounding terrain. The Mancos is partially eroded in the site area, its present thickness ranges from about 20 feet at the southwest corner to more than 70 feet at the north edge of the site (excluding the hill) (Hecla 1991).

The Mancos overlies the Dakota Formation. The contact between the two formations is distinct in outcrops north and south of the site but less so under the site where it appears to be gradational in most places. Both formations are tilted toward the axis of a doubly-plunging syncline that trends west-northwest to east-southeast across the northern one-third of the site. The dips are one to five degrees on the south flank of the syncline underlying the site. In general this structural tilting is steeper than the slope of the surface terrain, causing the Mancos/Dakota contact to outcrop. Geologic field reconnaissance revealed no discernible faulting or other abrupt structural changes in the Mancos or Dakota Formations under the site (Hecla 1991).

Under the site the Mancos Formation is a calcareous to carbonaceous gray shale with thin lenses or beds of ferruginous sandstone. The Dakota also contains some carbonaceous shale and coal but is mostly friable to moderately cemented, tan to gray sandstone at shallow depths below the site (Hecla 1991).

No perennial streams exist on the site. Dry Creek, which passes near the northwest corner of the site has seasonal flows. Several intermittent drainages originate in, or cross through, the site. Gully formation and active headcutting of some drainages in the vicinity of the site indicate that degradation is the predominant geomorphic process (Hecla 1991).

The Durita site is located in seismic zone 1 and is therefore considered to be aseismic (Hecla 1991).

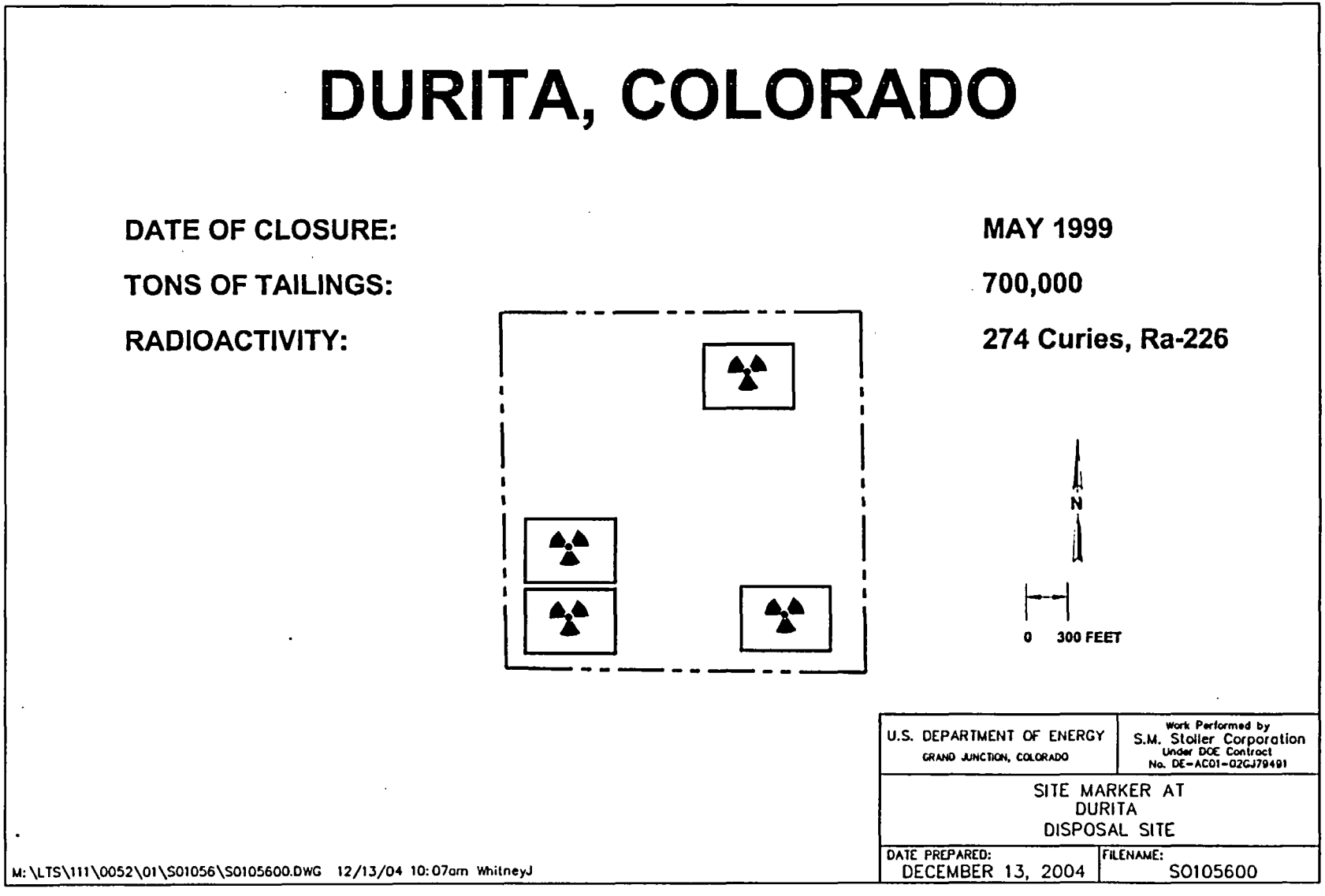

Figure 2–3. Site Marker at the Durita, Colorado, Disposal Site

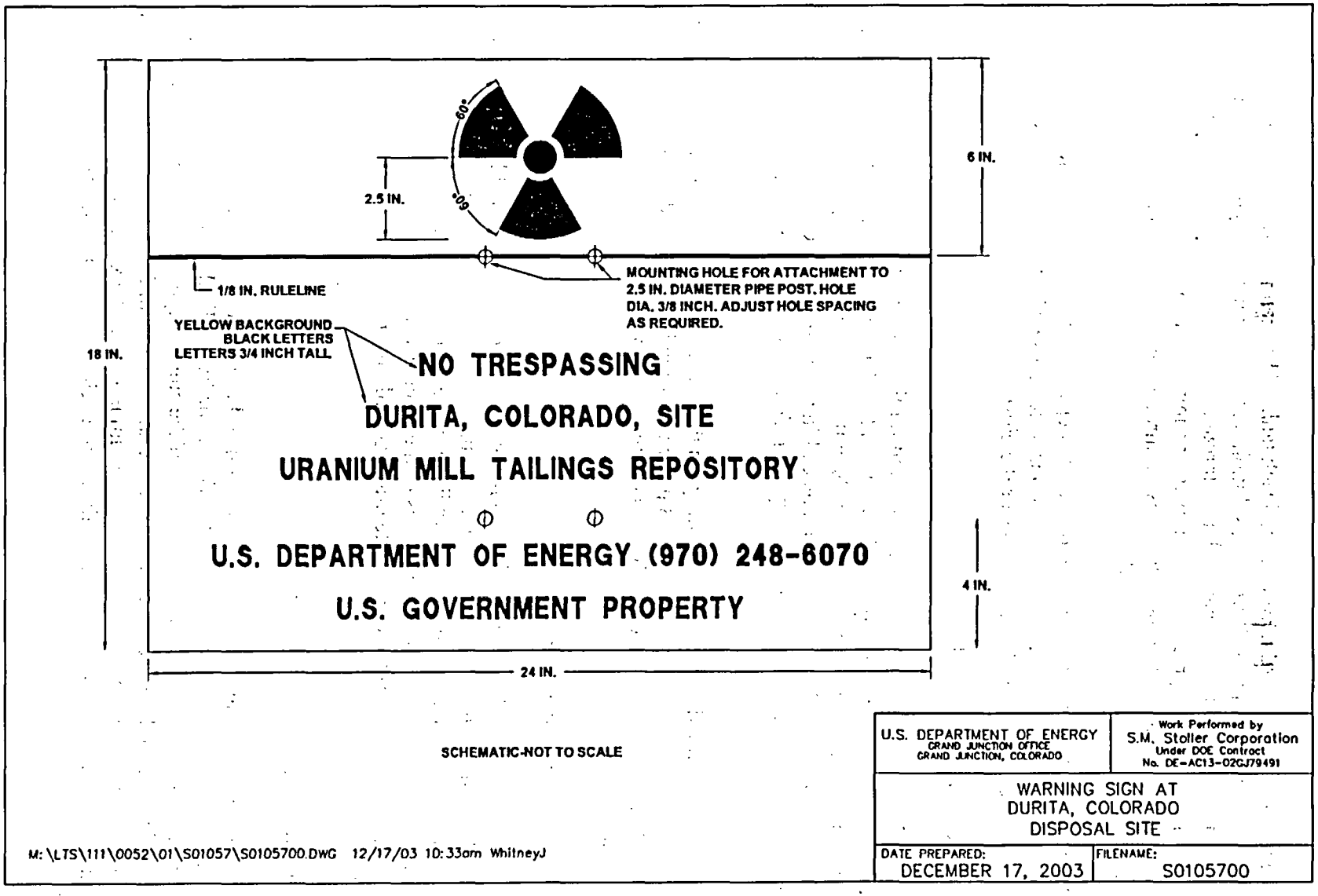

Figure 2–4. Warning Sign at Durita, Colorado, Disposal Site

2.4 Tailings Impoundment Design

Initially the tailings were placed in three heap leach tanks. The uranium was recovered by flooding the tanks with a dilute sulfuric acid solution that leached uranium and vanadium from the tailings and discharged the pregnant solution through slotted collection pipes at the bottom to the tanks. After the leaching process was complete, an initial soil cover 2- to 2.5-feet thick was placed over the leach tanks. After the solution went through the extraction process, the waste liquid was stored in six evaporation ponds.

Formal decommissioning and reclamation of the site began in 1992. All site equipment and buildings were decontaminated and released for unrestricted use. Contaminated soils were excavated and placed in either the leach tanks or the closure cell.

2.4.1 Encapsulation Design

A minimum 12-inch thick clay liner was constructed for the bottom of the closure cell. The waste materials in the six evaporation ponds were solidified and neutralized with Mancos shale and placed in the closure cell. The waste materials in the four raffinate ponds also were solidified, neutralized with Mancos shale, and placed in the closure cell. Covers were constructed for the leach tanks and the closure cell to satisfy the radon emission design specification of 20 $pCi/m^2/sec$ (Hecla 2000).

Cover grades were limited to 5:1 over the tailings in the leach tanks and the solidified wastes in the closure cell. Riprap erosion protection was placed over the leach tank side slopes and on the top and side slopes of the closure cell. The tops of the leach tanks were revegetated for erosion protection (Hecla 2000).

2.4.2 Surface Water Diversion System

Surface water channels and diversions were constructed to carry the occasional high-velocity flows through the site without damaging the leach tanks and closure cell. To the extent possible, these channels were located to re-establish gradients and alignments that existed prior to any site disturbance. Riprap was placed in critical areas of the channels and diversions for erosion protection. The site was regraded to promote drainage and disturbed areas were revegetated (Hecla 2000).

2.5 Ground Water Conditions

The results of the site ground water characterization and monitoring program indicate that there are two stratigraphic units under the site that appear to be hydraulically connected and constitute a single uppermost water-bearing unit. Over most of the site the uppermost water-bearing stratum is an interbedded sandstone-claystone unit that occurs from 20 to 55 feet below ground surface. This unit varies in thickness but at a minimum is 10 feet thick. The yields from this water-bearing unit are low with maximum values approaching one gallon per minute (Hecla 1991).

Water quality analyses indicate that naturally occurring total dissolved solids (TDS) levels are nearly 10 times higher than EPA's drinking water standard. Sulfate levels also naturally exceed drinking water standards. The pH ranges from 7.41 to 8.60, indicating that the water is slightly-to-moderately alkaline, with the highest pH levels exceeding drinking water standards. Sulfate, TDS, and pH levels were determined to be the result of the naturally occurring geochemical environment in the water-bearing unit. Concentrations of radiochemical parameters were below drinking water standards and showed no significant difference between up-gradient and down-gradient locations. Metals and other inorganic constituent concentrations were determined to be very low or below analytical detection levels. All organic constituents required for sampling were below detection limits (Hecla 1991).

In summary, the uppermost water-bearing unit under the site is not considered to be a potential water resource. The unit has a very limited lateral extent, poor yields, and contains water whose natural quality is below drinking water standards. There has been no detectable impact on water quality due to operations at the Durita site. Therefore, no ground water corrective actions were required or performed (Hecla 1991). All ground water monitoring wells associated with the site have been decommissioned and no ground water monitoring is required as part of the long-term custody requirements for the site.

End of current text

3.0 Long-Term Surveillance Program

3.1 General License for Long-Term Custody

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

When the NRC accepts this LTSP and concurs with the State of Colorado's termination of Hecla's Colorado Radioactive Materials License, 317-02, 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 Hecla 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 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 must 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.

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

3.3.2 Inspection Procedure

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

Table 3–1. Transects Used During First Inspection of the Durita Site

Transect	Description
Cover and side slopes of Closure Cell	Riprap covered repository impoundment cover.
Cover and side slopes of Heap Leach Tanks	Vegetation and cover condition on top of tanks and riprap covered side slopes.
Diversion/drainage channels	Contoured channels, riprap in critical areas, and sediment deposition.
Site Perimeter and Balance of Site	Site perimeter including 0.25 mile beyond site boundary, area between closure cell and leach tanks and site boundary, site entrance, boundary monuments, entrance sign, and site marker.

The annual inspection will be a visual walk-through. The primary purpose of the inspection will be to look for evidence of cover cracking, wind or water erosion, structural discontinuity of the containment features, 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 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. Photographs are documented on the Field Photograph Log.

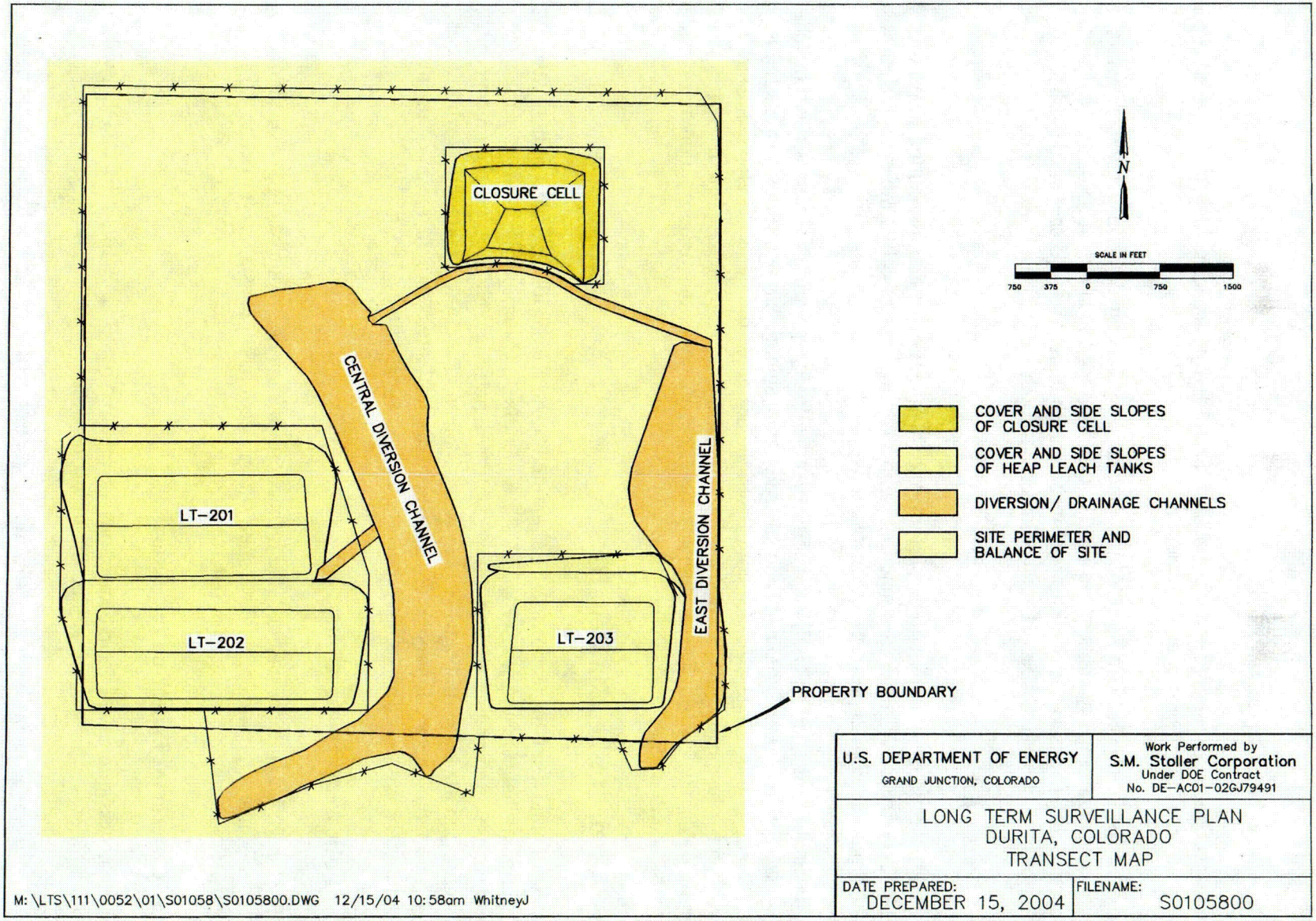

Figure 3–1. Map of Inspection Transects for the Durita, Colorado, Disposal Site

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3.3.3 Inspection Checklist

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

The checklist is subject to revision. At the conclusion of an annual site inspection, inspectors will make notes regarding revisions to the checklist, if necessary, 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 typically will be civil, geotechnical, or geological engineers. Scientists will include geologists, hydrologists, biologists, and environmental scientists representing various fields (e.g., ecology, soils, range management). If serious or unique problems develop at the site, more than two inspectors may be assigned to the inspection. Inspectors specialized in specific fields may be assigned to the inspection to evaluate serious or unusual problems and make recommendations.

3.4 Annual Inspection Reports

Results of annual site inspections will be reported to the NRC within 90 days of the last site inspection of that calendar year (10 CFR 40, Appendix A, Criterion 12). In the event the annual report cannot be submitted within 90 days, DOE will notify 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 Durita 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 local law enforcement and emergency response agencies to facilitate notification in the event of significant trespass, vandalism, or natural disaster. Due to the remote location of the Durita site, DOE recognizes that local agencies may not necessarily be aware of current conditions at the site. However, these agencies will be requested to notify DOE or provide information should they become aware of a significant event that might affect the security or integrity of the site.

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

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

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

Conditions that threaten the safety or the integrity of the disposal site may require a more immediate (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. Timing of the inspection may be governed by seasonal considerations. For example, a follow-up inspection to investigate a vegetation problem may be scheduled for a particular time of year when growing conditions are optimum. A routine follow-up inspection to perform maintenance or to evaluate an erosion problem might be scheduled to avoid snow cover or frozen ground.

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

- Notify NRC pursuant to 10 CFR 40, Appendix A, Criterion 12, or 10 CFR 40.60, whichever is determined to apply;
- Begin the DOE Environment, Safety, and Health Reporting process (DOE Order 231.1A);
- 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 the 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 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 closure cell and stabilized heap leach tanks have been designed and constructed to negate the need for routine maintenance.

The cover and side slopes of the closure cell were armored with riprap of sufficient size to prevent erosion that would otherwise be caused by precipitation and associated flood events. The covers of the leach tanks have minimal slope to promote positive drainage while minimizing runoff water velocities. The leach tank covers have been revegetated with indigenous plant species that are expected to endure for the long-term. Because of the vegetation and mild slopes, adverse wind or water erosion impacts that would require maintenance are not anticipated. The steeper side slopes of the leach tanks have been armored with riprap for erosion protection. The disposal site area is fenced to prevent damage from livestock grazing in the vicinity and to discourage intentional or unintentional trespassing. Areas where runoff water could achieve erosional velocities have been armored with riprap.

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

3.6.2 Emergency Measures

Emergency measures are the actions that DOE will take in response to "unusual damage or disruption" that threaten or compromise site safety, security, or integrity. 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 tailings impoundment following a potential disaster. Criteria, although required by 10 CFR 40.28 (b)(5), for triggering particular DOE responses for each progressively more serious level of intervention, are not easily defined because the nature and scale of all potential problems cannot be foreseen. The information in Table 3–2, however, serves as a guide for appropriate DOE responses. The table shows that the difference between routine maintenance and emergency response is primarily one of urgency and degree of threat or risk. The DOE's priority (urgency) in column 1 of Table 3–2 bears an inverse relationship with DOE's estimate of probability. The highest priority response is also believed to be the least likely to occur.

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

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

[a]Other changes or conditions will be evaluated and treated similarly on the basis of risk.

3.6.4 Reporting Maintenance and Emergency Measures

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

In accordance with 10 CFR 40.60, within 4 hours of discovery of any Priority 1 or 2 event listed in Table 3–2, 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

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

There is no ground water monitoring required for the Durita site.

3.7.2 Vegetation Monitoring

Large areas of the site have been revegetated to promote soil stability. The tops of the heap leach tanks and parts of the contoured diversion/drainage channels are the most critical revegetated areas. The region is subject to invasive weed species that may require periodic control by DOE. The condition of site vegetation will be evaluated during the annual inspections to determine if intervention is necessary to promote vegetation health. A qualified range scientist or plant ecologist will be consulted with respect to vegetative health at the Durita site.

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 Durita 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.

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.

FBD (Ford, Bacon & Davis Utah Inc.), 1981. *Engineering Assessment of Inactive Uranium Mill Tailings, Naturita Site, Naturita, Colorado,* July 1981.

Hecla (Hecla Mining Company), 1991. *Final Reclamation Plan, Durita Site,* Colorado Radioactive Materials License No. 317-02, October 1991.

Hecla, 2000. *Long-Term Monitoring and Maintenance Program,* March 2000.

State of Colorado, 1996. Letter to Joseph E. Virgona, Project Manager, U.S. Department of Energy from Roy Romer, Governor of Colorado, declining custody of the Durita and Maybell UMTRCA Title II sites located in the State of Colorado, April 2, 1996.

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.

End of current text

Appendix A

Real Estate Information

Legal Description

A tract of land being the South ½ of the Northeast ¼ and the North ½ of the Southeast ¼ Section 34, Township 46 North, Range 16 West, New Mexico Principle Meridian, Montrose County, Colorado, containing 160 acres more or less.

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

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

Appendix B

Initial Site Inspection Checklist

Inspection Checklist: Durita

Date of This Revision: _____
Last Annual Inspection: _____
Inspectors: _____ and _____

Next Annual Inspection (Planned): _____

No.	Item	Issue	Action
1	Access	Access is from a gravel road that crosses BLM property.	None.
2	Specific site surveillance features	See attached list.	Inspect. Identify maintenance requirements
3	Monitor wells	There are no monitor wells at this site.	None.
4	Vegetation	The covers of the heap leach tanks have been revegetated to mitigate wind and water erosion. Other areas of the site have also been revegetated.	Inspect leach tank covers and revegetated areas in general noting condition of vegetation. There should not be any grazing on the site property.
5	Riprap	Certain areas have been armored with riprap for erosion protection.	Inspect riprap, note evidence of rock displacement or rock degradation.

Checklist of Site Specific Surveillance Features: Durita

Feature	Comment
Access Road	Gravel road. Verify road is passable.
Entrance Gate	
Entrance Sign	
Perimeter Fence	Combination of chain link fence and barbed-wire stock fence
Boundary Monuments	Total: 4
Site Marker	

Appendix C

Custodianship Refusal Letter

UMB Barcode # 3-1.

STATE OF COLORADO

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

Roy Romer
Governor

April 2, 1996

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

Dear Mr Virgona:

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

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

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

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

Sincerely,

Roy Romer
Governor

ATTACHMENT 1

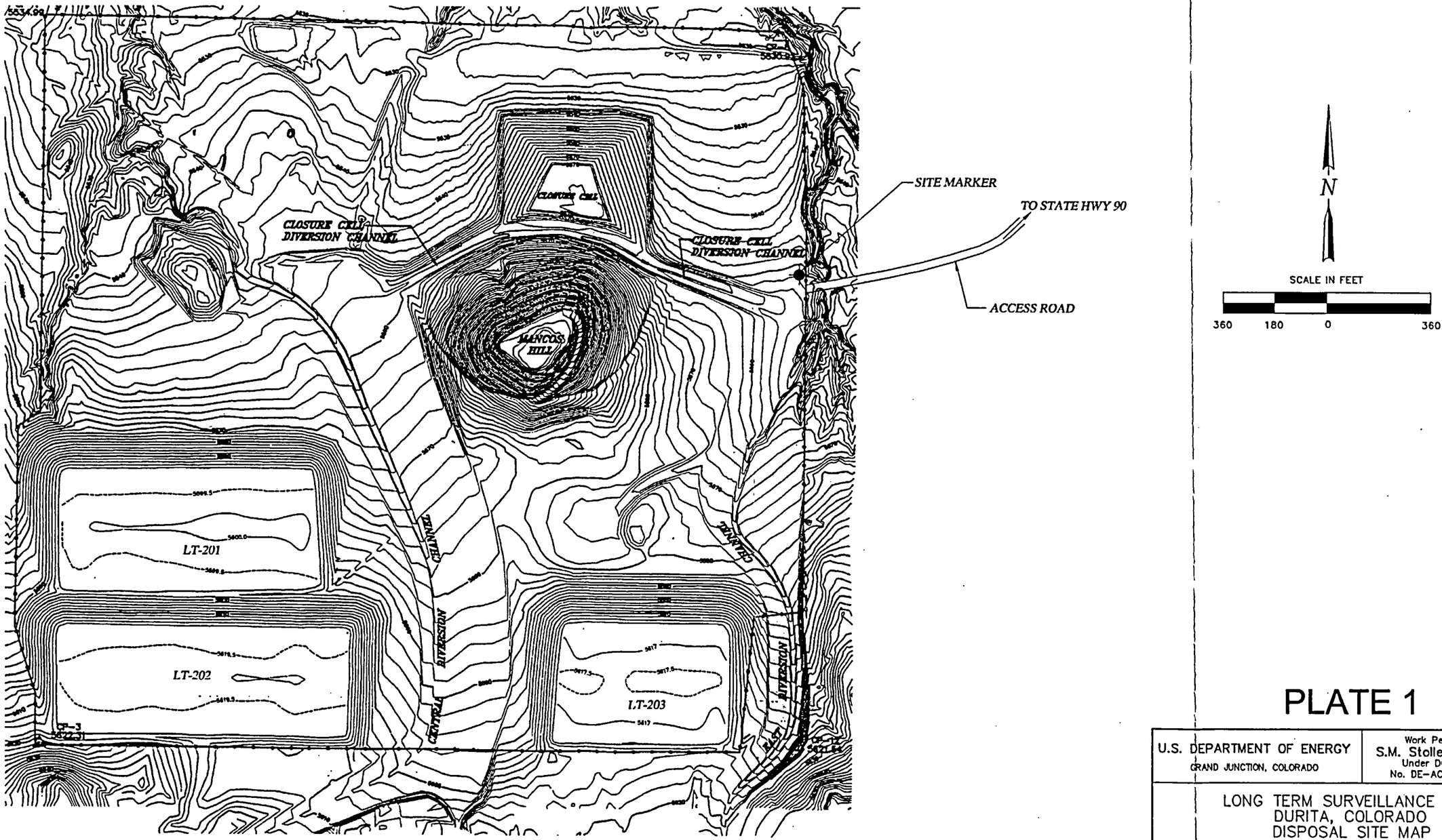

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PLATE 1

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AC01-02GJ79491
LONG TERM SURVEILLANCE PLAN DURITA, COLORADO DISPOSAL SITE MAP	
DATE PREPARED: DECEMBER 15, 2004	FILENAME: S0105900

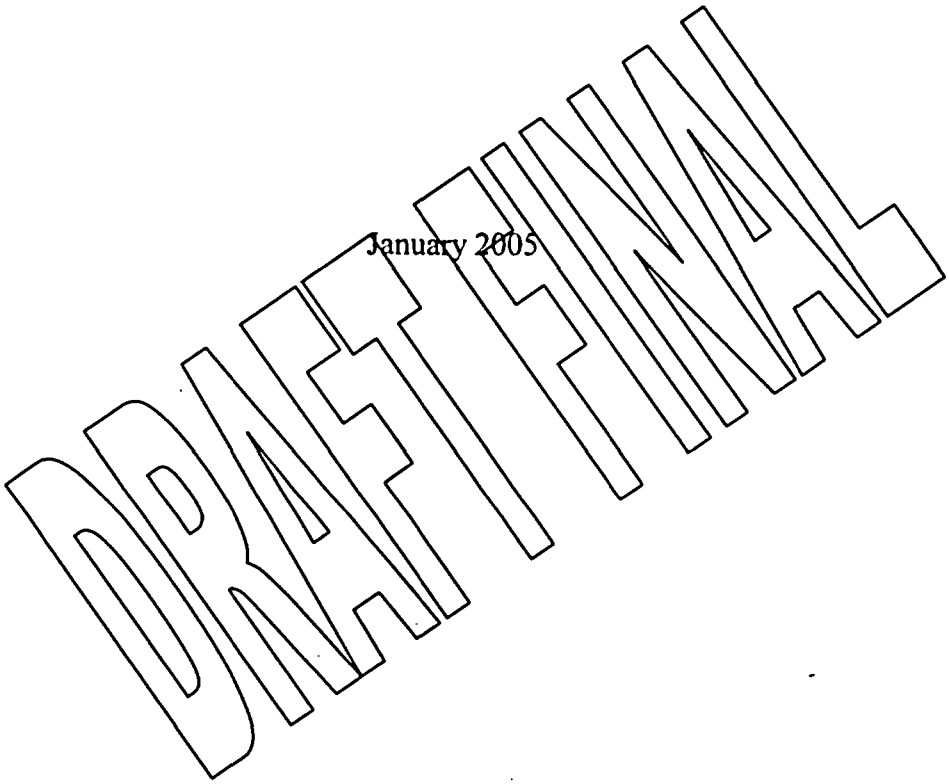
DOE-LM/GJ765-2004

Office of Legacy Management

Long-Term Surveillance Plan

for the

Durita (UMTRCA Title II) Disposal Site
Montrose County, Colorado



January 2005

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

S01514

Contents

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Figures

Appendices

Plate

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 Hecla Mining Company Durita uranium mill tailings disposal site in Montrose County, Colorado. The LM Program at the DOE-LM office in Grand Junction, Colorado, is responsible for the preparation, revision, and implementation of this LTSP, which specifies procedures for inspecting, monitoring, maintenance, reporting, and maintaining records pertaining to the site.

1.2 Legal and Regulatory Requirements

The Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978 (42 USC 7901) as amended, provides for the remediation (or reclamation) and regulation of uranium mill tailings at Title I and Title II sites. Title I 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 Hecla Durita site is a Title II site under UMTRCA. The State of Colorado is an Agreement State.

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

A general license is issued by 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 NRC.

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

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

In December 2003, DOE formally established 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, LM now administers the responsibilities of the Long-Term Surveillance and Maintenance Program.

2.0 Final Site Conditions

Reclamation at the Durita mill facility in Montrose County, Colorado, consisted of stabilizing three heap leach tanks, salvaging equipment that could be decontaminated, demolishing the balance of site structures and equipment, and disposing of it on site. Contaminated mill site soils also were disposed of on site.

2.1 Site History

The Durita facility was a heap leach operation, built in 1977 by Ranchers Exploration and Development Corporation. The facility operated from 1977 to 1979. All of the estimated 700,000 tons of feedstock "ore" for the mill came from the Naturita[1] mill site (Hecla 1991).

The tailings were trucked to the site and dumped through a grizzly into a crusher. The crushed tailings were stockpiled and eventually conveyed to one of the three heap leach tanks. When the tanks were full, the tailings surface was flooded with a dilute sulfuric acid solution. The percolating acidic solution leached uranium and vanadium from the tailings. This solution was collected by slotted pipes in the bottom of each leach tank, and then transferred by gravity flow to the extraction plant. Uranium and vanadium were recovered by ion exchange and solvent extraction. The waste liquid was stored in six onsite evaporation ponds (Hecla 1991).

After operations ceased, a 2- to 2½-foot thick soil cover was placed over the leach tanks. The evaporation ponds were left uncovered and allowed to continue evaporating the liquids (Hecla 1991).

Formal decommissioning and reclamation of the site began in 1992. Final reclamation construction activities were completed in 1999 (Hecla 2000).

2.2 General Description of the Disposal Site Vicinity

The Durita disposal site is in Montrose County, Colorado, approximately 100 road miles south of Grand Junction and 3 miles southwest of Naturita (Figures 2–1 and 2–2).

The site is about 2 road miles west from the San Miguel River Valley floor at an elevation of about 5600 feet. This location is within the canyon lands area of the Colorado Plateau. The area is typified by relatively smooth, sloping surfaces broken by canyons with rough and precipitous topographic relief (FBD 1981). Most of the surrounding property is administered by the Bureau of Land Management (BLM), and is not available for residential development (Hecla 2000).

The climate is a semi-arid continental type with mild summers and cold winters. Precipitation averages about 10 inches per year. Large rainstorms occur usually from May through October (FBD 1981). Vegetation in the immediate vicinity of the site consists of piñon-juniper woodlands and sagebrush flats. The vicinity is sparsely populated with the two nearest towns, Naturita and Nucla, having populations of 434 and 552, respectively, according to the 1990 census (Hecla 2000).

1 The Naturita Uranium Mill Site was an UMTRCA Title I site remediated by DOE

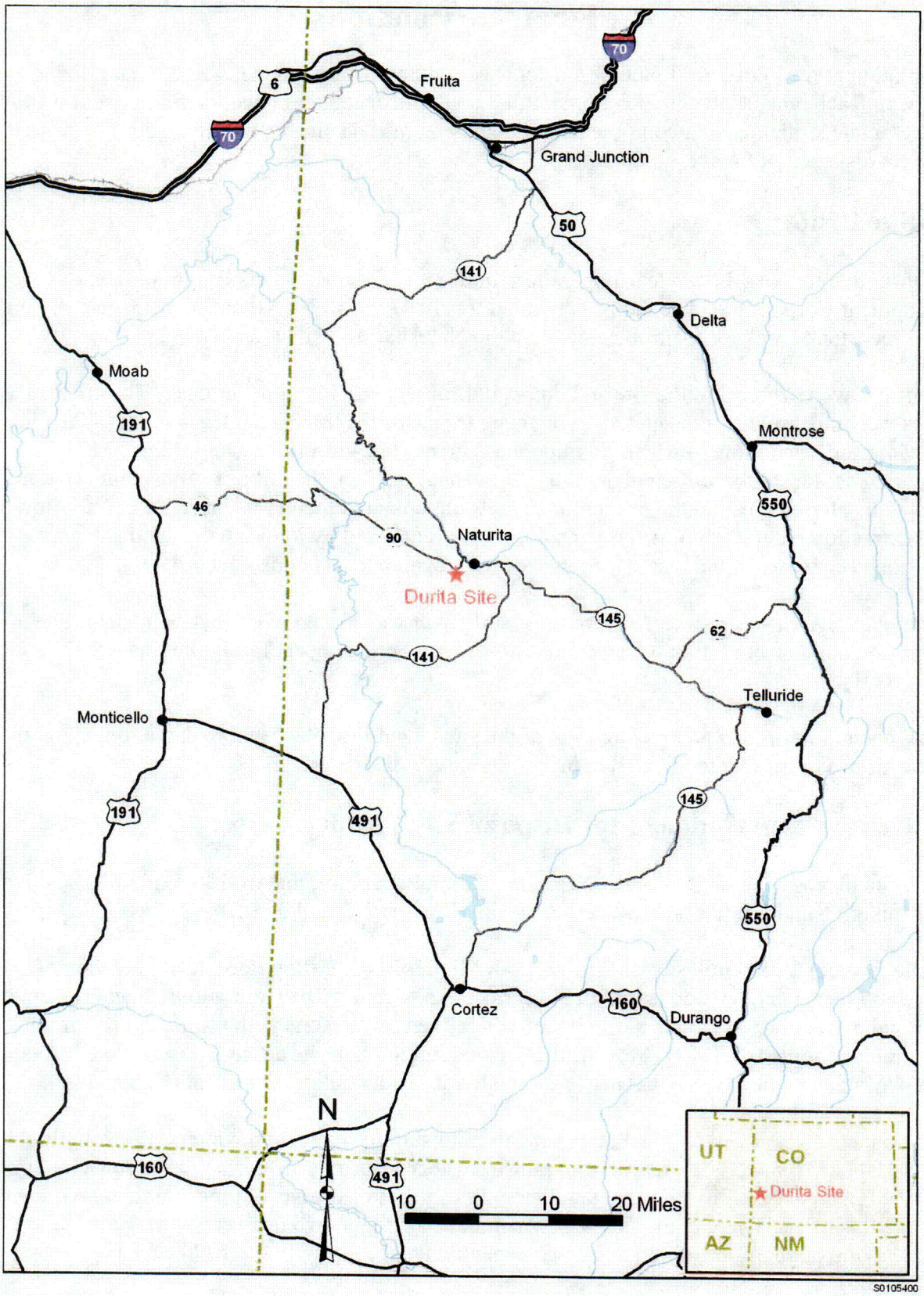


Figure 2–1. General Location Map of the Durita, Colorado, Disposal Site

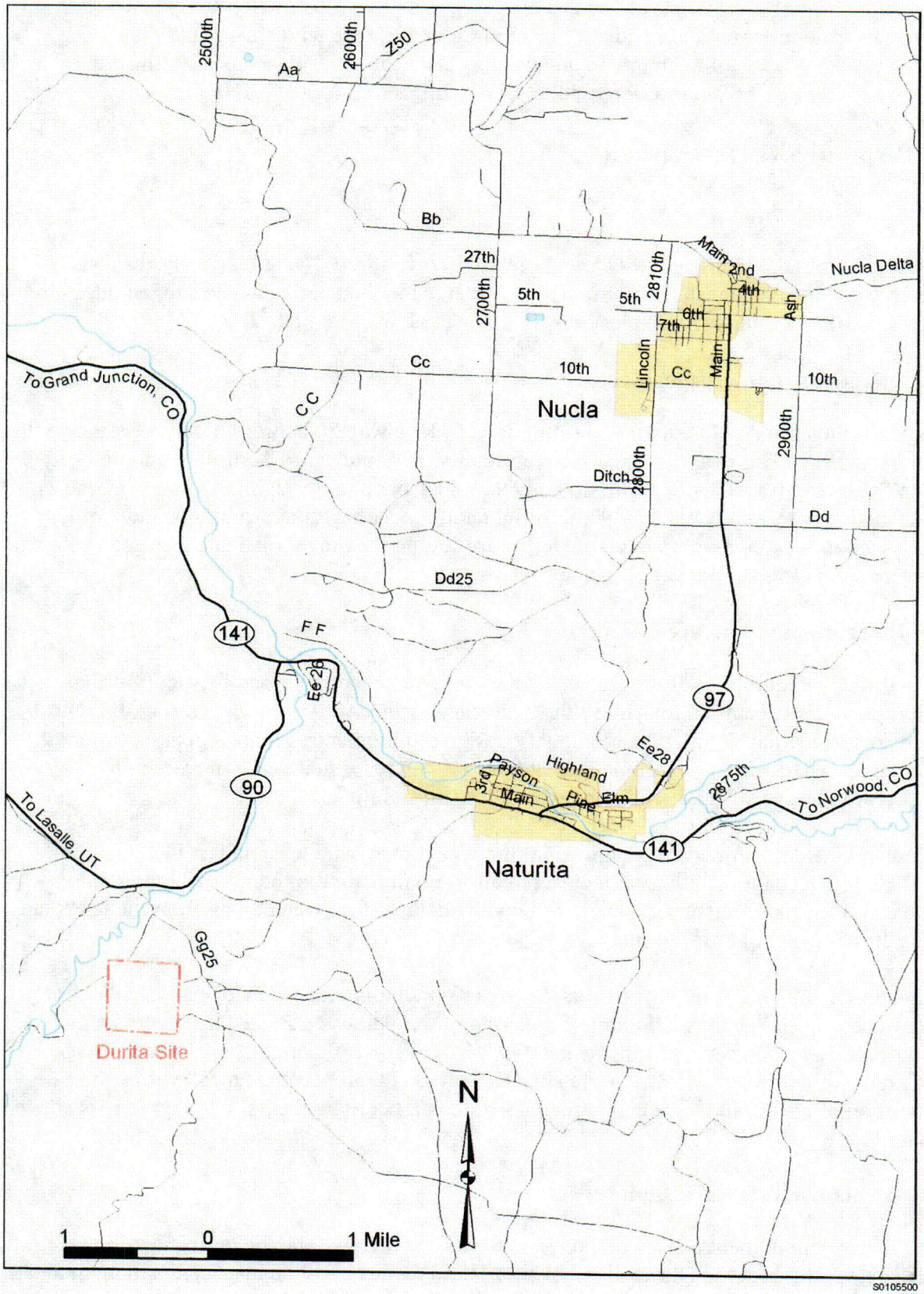


Figure 2–2. Vicinity Location Map, Durita, Colorado, Disposal Site

The primary land uses in the immediate surrounding vicinity are wildlife habitat, domestic livestock grazing, recreational hunting, and hiking. The nearest residence is a ranch about ½ mile from the site. No other residences are within several miles of the site.

2.3 Disposal Site Description

2.3.1 Site Ownership

In the near future, the United States Government will own the 160-acre Durita disposal site property. Supporting real estate information is presented in Appendix A. The site includes three reclaimed heap leach tanks and a closure cell and is illustrated on Plate 1.

2.3.2 Directions to the Disposal Site

From Grand Junction, Colorado, travel south on U.S. Highway 50 approximately 11 miles to the junction with State Highway 141 near the community of Whitewater. Turn right and proceed west on State Highway 141 for approximately 94 miles, passing through the town of Gateway. At the junction with State Highway 90, turn right and proceed west approximately two miles to the intersection with a gravel road on the left. Turn left on the gravel road and proceed south approximately ½ mile to the site entrance.

2.3.3 Description of Surface Conditions

The final surface conditions at the Durita disposal site are a combination of rock armoring, contouring, and revegetation to achieve the necessary surface water run on and run off control and erosion protection to satisfy the longevity design requirements. The revegetated surfaces have been reseeded with a mix of plants that have proven to be successful in reclaiming disturbed areas at the site and will help provide for soil stability.

The contaminated materials are contained in three reclaimed heap leach tanks, identified as LT–201, LT–202, and LT–203, and a closure cell. A combination of contoured topography, drainage swales, and diversion channels convey incident surface water away from the leach tanks and the closure cell, and off the site.

Leach tank LT–203 occupies approximately 13 acres including the side slopes. Leach tanks LT–201 and LT–202 occupy a combined area of approximately 22 acres; the closure cell, including side slopes, occupies approximately 8 acres of the 160-acre disposal site property. There are no monitor wells at the Durita site. The entire site property is fenced with a combination of chain link fence and barbed wire stock fence. The final site topography is shown on Plate 1.

2.3.4 Permanent Site Surveillance Features

Four boundary monuments, a site marker, and a warning sign will be the permanent long-term surveillance features at the Durita disposal site. These features will be inspected and maintained as necessary as part of the controls for the site.

The unpolished granite site marker with an incised message identifying the location of buried contaminated materials on the Durita disposal site property is placed just inside the main entrance gate. The message on the granite site marker is shown on Figure 2–3.

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

Locations of the permanent site surveillance features are shown on Plate 1.

2.3.5 Site Geology

The Durita site is situated on gently north-sloping terrain at the southeast end of the Paradox Valley. The Mancos Formation directly underlies the site. Most of the site is covered with alluvial/colluvial sandy clay soil up to 20 feet thick containing variable amounts of rock fragments, primarily sandstone of cobble-to-boulder size. Near the east-central part of the site, a remnant of the Mancos Formation forms a hill approximately 100 feet high above the surrounding terrain. The Mancos is partially eroded in the site area, its present thickness ranges from about 20 feet at the southwest corner to more than 70 feet at the north edge of the site (excluding the hill) (Hecla 1991).

The Mancos overlies the Dakota Formation. The contact between the two formations is distinct in outcrops north and south of the site but less so under the site where it appears to be gradational in most places. Both formations are tilted toward the axis of a doubly-plunging syncline that trends west-northwest to east-southeast across the northern one-third of the site. The dips are one to five degrees on the south flank of the syncline underlying the site. In general this structural tilting is steeper than the slope of the surface terrain, causing the Mancos/Dakota contact to outcrop. Geologic field reconnaissance revealed no discernible faulting or other abrupt structural changes in the Mancos or Dakota Formations under the site (Hecla 1991).

Under the site the Mancos Formation is a calcareous to carbonaceous gray shale with thin lenses or beds of ferruginous sandstone. The Dakota also contains some carbonaceous shale and coal but is mostly friable to moderately cemented, tan to gray sandstone at shallow depths below the site (Hecla 1991).

No perennial streams exist on the site. Dry Creek, which passes near the northwest corner of the site has seasonal flows. Several intermittent drainages originate in, or cross through, the site. Gully formation and active headcutting of some drainages in the vicinity of the site indicate that degradation is the predominant geomorphic process (Hecla 1991).

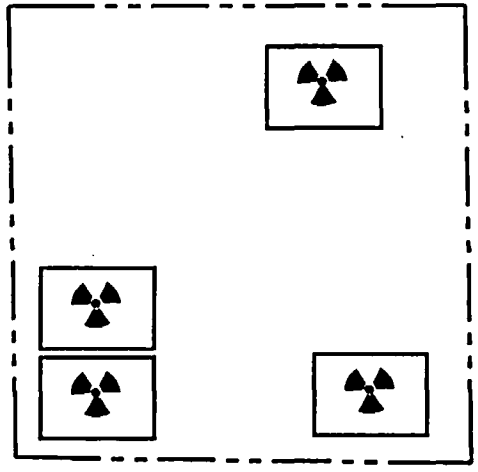
The Durita site is located in seismic zone 1 and is therefore considered to be aseismic (Hecla 1991).

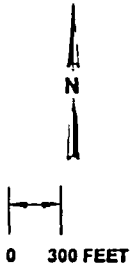
DURITA, COLORADO

DATE OF CLOSURE: MAY 1999

TONS OF TAILINGS: 700,000

RADIOACTIVITY: 274 Curies, Ra-226





U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AC01-02GJ79491
SITE MARKER AT DURITA DISPOSAL SITE	
DATE PREPARED: DECEMBER 13, 2004	FILENAME: S0105600

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Figure 2–3. Site Marker at the Durita, Colorado, Disposal Site

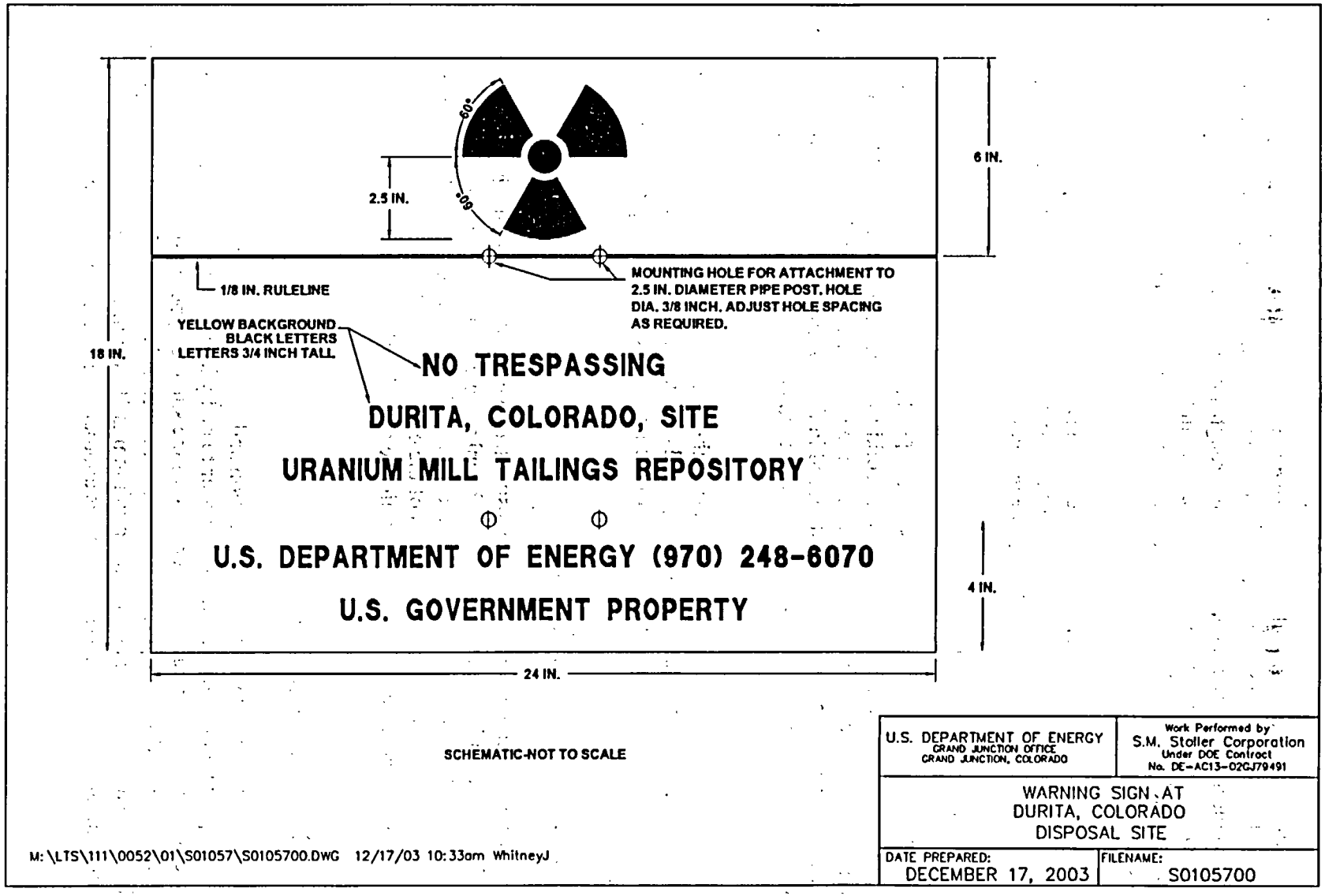

Figure 2–4. Warning Sign at Durita, Colorado, Disposal Site

2.4 Tailings Impoundment Design

Initially the tailings were placed in three heap leach tanks. The uranium was recovered by flooding the tanks with a dilute sulfuric acid solution that leached uranium and vanadium from the tailings and discharged the pregnant solution through slotted collection pipes at the bottom to the tanks. After the leaching process was complete, an initial soil cover 2- to 2.5-feet thick was placed over the leach tanks. After the solution went through the extraction process, the waste liquid was stored in six evaporation ponds.

Formal decommissioning and reclamation of the site began in 1992. All site equipment and buildings were decontaminated and released for unrestricted use. Contaminated soils were excavated and placed in either the leach tanks or the closure cell.

2.4.1 Encapsulation Design

A minimum 12-inch thick clay liner was constructed for the bottom of the closure cell. The waste materials in the six evaporation ponds were solidified and neutralized with Mancos shale and placed in the closure cell. The waste materials in the four raffinate ponds also were solidified, neutralized with Mancos shale, and placed in the closure cell. Covers were constructed for the leach tanks and the closure cell to satisfy the radon emission design specification of 20 $pCi/m^2/sec$ (Hecla 2000).

Cover grades were limited to 5:1 over the tailings in the leach tanks and the solidified wastes in the closure cell. Riprap erosion protection was placed over the leach tank side slopes and on the top and side slopes of the closure cell. The tops of the leach tanks were revegetated for erosion protection (Hecla 2000).

2.4.2 Surface Water Diversion System

Surface water channels and diversions were constructed to carry the occasional high-velocity flows through the site without damaging the leach tanks and closure cell. To the extent possible, these channels were located to re-establish gradients and alignments that existed prior to any site disturbance. Riprap was placed in critical areas of the channels and diversions for erosion protection. The site was regraded to promote drainage and disturbed areas were revegetated (Hecla 2000).

2.5 Ground Water Conditions

The results of the site ground water characterization and monitoring program indicate that there are two stratigraphic units under the site that appear to be hydraulically connected and constitute a single uppermost water-bearing unit. Over most of the site the uppermost water-bearing stratum is an interbedded sandstone-claystone unit that occurs from 20 to 55 feet below ground surface. This unit varies in thickness but at a minimum is 10 feet thick. The yields from this water-bearing unit are low with maximum values approaching one gallon per minute (Hecla 1991).

Water quality analyses indicate that naturally occurring total dissolved solids (TDS) levels are nearly 10 times higher than EPA's drinking water standard. Sulfate levels also naturally exceed drinking water standards. The pH ranges from 7.41 to 8.60, indicating that the water is slightly-to-moderately alkaline, with the highest pH levels exceeding drinking water standards. Sulfate, TDS, and pH levels were determined to be the result of the naturally occurring geochemical environment in the water-bearing unit. Concentrations of radiochemical parameters were below drinking water standards and showed no significant difference between up-gradient and down-gradient locations. Metals and other inorganic constituent concentrations were determined to be very low or below analytical detection levels. All organic constituents required for sampling were below detection limits (Hecla 1991).

In summary, the uppermost water-bearing unit under the site is not considered to be a potential water resource. The unit has a very limited lateral extent, poor yields, and contains water whose natural quality is below drinking water standards. There has been no detectable impact on water quality due to operations at the Durita site. Therefore, no ground water corrective actions were required or performed (Hecla 1991). All ground water monitoring wells associated with the site have been decommissioned and no ground water monitoring is required as part of the long-term custody requirements for the site.

End of current text

3.0 Long-Term Surveillance Program

3.1 General License for Long-Term Custody

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

When the NRC accepts this LTSP and concurs with the State of Colorado's termination of Hecla's Colorado Radioactive Materials License, 317-02, 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 Hecla 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 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 must 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.

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

3.3.2 Inspection Procedure

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

Table 3–1. Transects Used During First Inspection of the Durita Site

Transect	Description
Cover and side slopes of Closure Cell	Riprap covered repository impoundment cover.
Cover and side slopes of Heap Leach Tanks	Vegetation and cover condition on top of tanks and riprap covered side slopes.
Diversion/drainage channels	Contoured channels, riprap in critical areas, and sediment deposition.
Site Perimeter and Balance of Site	Site perimeter including 0.25 mile beyond site boundary, area between closure cell and leach tanks and site boundary, site entrance, boundary monuments, entrance sign, and site marker.

The annual inspection will be a visual walk-through. The primary purpose of the inspection will be to look for evidence of cover cracking, wind or water erosion, structural discontinuity of the containment features, 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 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. Photographs are documented on the Field Photograph Log.

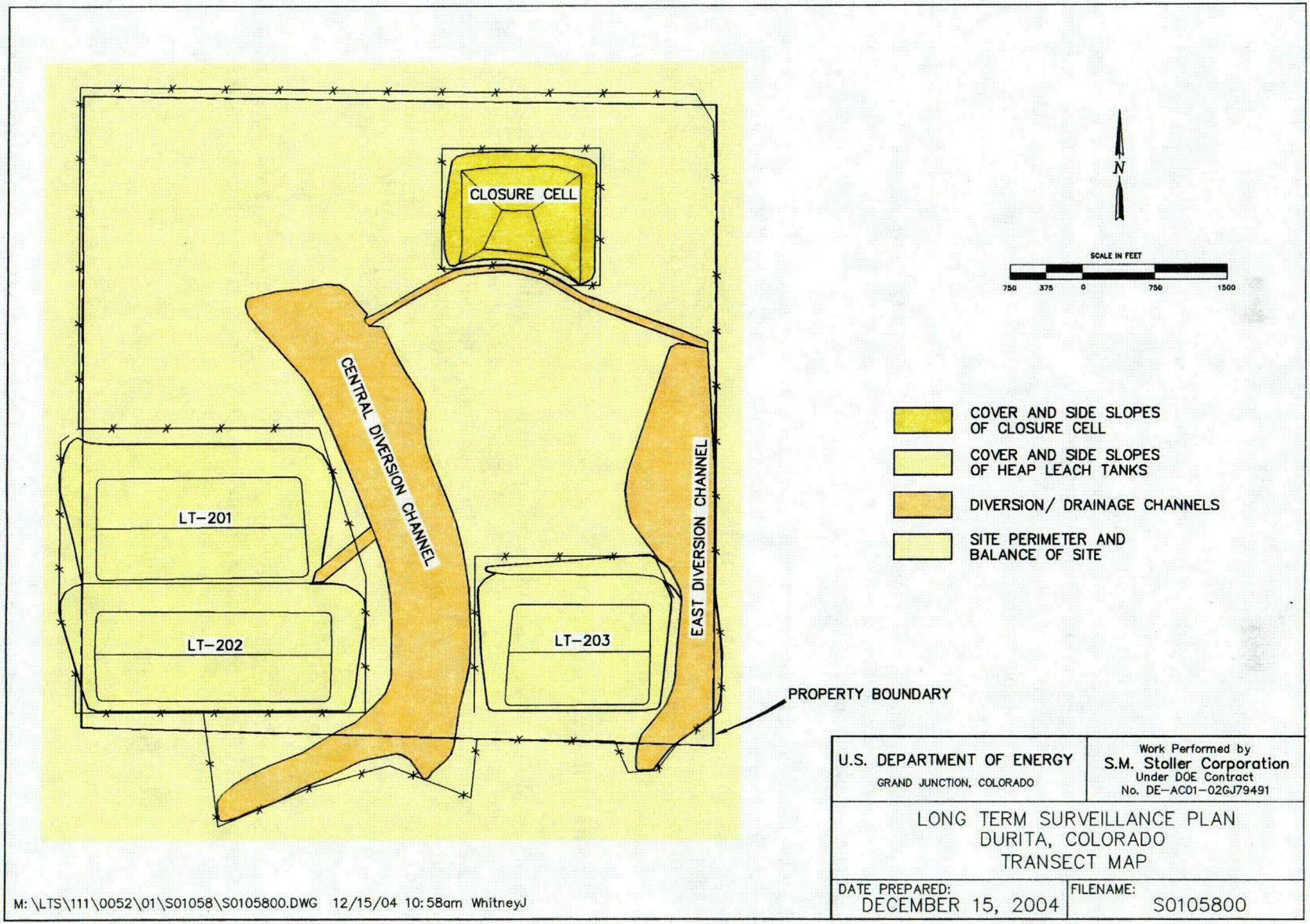

Figure 3–1. Map of Inspection Transects for the Durita, Colorado, Disposal Site

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3.3.3 Inspection Checklist

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

The checklist is subject to revision. At the conclusion of an annual site inspection, inspectors will make notes regarding revisions to the checklist, if necessary, 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 typically will be civil, geotechnical, or geological engineers. Scientists will include geologists, hydrologists, biologists, and environmental scientists representing various fields (e.g., ecology, soils, range management). If serious or unique problems develop at the site, more than two inspectors may be assigned to the inspection. Inspectors specialized in specific fields may be assigned to the inspection to evaluate serious or unusual problems and make recommendations.

3.4 Annual Inspection Reports

Results of annual site inspections will be reported to the NRC within 90 days of the last site inspection of that calendar year (10 CFR 40, Appendix A, Criterion 12). In the event the annual report cannot be submitted within 90 days, DOE will notify 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 Durita 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 local law enforcement and emergency response agencies to facilitate notification in the event of significant trespass, vandalism, or natural disaster. Due to the remote location of the Durita site, DOE recognizes that local agencies may not necessarily be aware of current conditions at the site. However, these agencies will be requested to notify DOE or provide information should they become aware of a significant event that might affect the security or integrity of the site.

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

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

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

Conditions that threaten the safety or the integrity of the disposal site may require a more immediate (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. Timing of the inspection may be governed by seasonal considerations. For example, a follow-up inspection to investigate a vegetation problem may be scheduled for a particular time of year when growing conditions are optimum. A routine follow-up inspection to perform maintenance or to evaluate an erosion problem might be scheduled to avoid snow cover or frozen ground.

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

- Notify NRC pursuant to 10 CFR 40, Appendix A, Criterion 12, or 10 CFR 40.60, whichever is determined to apply;
- Begin the DOE Environment, Safety, and Health Reporting process (DOE Order 231.1A);
- 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 the 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 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 closure cell and stabilized heap leach tanks have been designed and constructed to negate the need for routine maintenance.

The cover and side slopes of the closure cell were armored with riprap of sufficient size to prevent erosion that would otherwise be caused by precipitation and associated flood events. The covers of the leach tanks have minimal slope to promote positive drainage while minimizing runoff water velocities. The leach tank covers have been revegetated with indigenous plant species that are expected to endure for the long-term. Because of the vegetation and mild slopes, adverse wind or water erosion impacts that would require maintenance are not anticipated. The steeper side slopes of the leach tanks have been armored with riprap for erosion protection. The disposal site area is fenced to prevent damage from livestock grazing in the vicinity and to discourage intentional or unintentional trespassing. Areas where runoff water could achieve erosional velocities have been armored with riprap.

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

3.6.2 Emergency Measures

Emergency measures are the actions that DOE will take in response to "unusual damage or disruption" that threaten or compromise site safety, security, or integrity. 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 tailings impoundment following a potential disaster. Criteria, although required by 10 CFR 40.28 (b)(5), for triggering particular DOE responses for each progressively more serious level of intervention, are not easily defined because the nature and scale of all potential problems cannot be foreseen. The information in Table 3–2, however, serves as a guide for appropriate DOE responses. The table shows that the difference between routine maintenance and emergency response is primarily one of urgency and degree of threat or risk. The DOE's priority (urgency) in column 1 of Table 3–2 bears an inverse relationship with DOE's estimate of probability. The highest priority response is also believed to be the least likely to occur.

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

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

[a]Other changes or conditions will be evaluated and treated similarly on the basis of risk.

3.6.4 Reporting Maintenance and Emergency Measures

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

In accordance with 10 CFR 40.60, within 4 hours of discovery of any Priority 1 or 2 event listed in Table 3–2, 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

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

There is no ground water monitoring required for the Durita site.

3.7.2 Vegetation Monitoring

Large areas of the site have been revegetated to promote soil stability. The tops of the heap leach tanks and parts of the contoured diversion/drainage channels are the most critical revegetated areas. The region is subject to invasive weed species that may require periodic control by DOE. The condition of site vegetation will be evaluated during the annual inspections to determine if intervention is necessary to promote vegetation health. A qualified range scientist or plant ecologist will be consulted with respect to vegetative health at the Durita site.

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 Durita 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.

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.

FBD (Ford, Bacon & Davis Utah Inc.), 1981. *Engineering Assessment of Inactive Uranium Mill Tailings, Naturita Site, Naturita, Colorado,* July 1981.

Hecla (Hecla Mining Company), 1991. *Final Reclamation Plan, Durita Site,* Colorado Radioactive Materials License No. 317-02, October 1991.

Hecla, 2000. *Long-Term Monitoring and Maintenance Program,* March 2000.

State of Colorado, 1996. Letter to Joseph E. Virgona, Project Manager, U.S. Department of Energy from Roy Romer, Governor of Colorado, declining custody of the Durita and Maybell UMTRCA Title II sites located in the State of Colorado, April 2, 1996.

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.

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Appendix A

Real Estate Information

Legal Description

A tract of land being the South ½ of the Northeast ¼ and the North ½ of the Southeast ¼ Section 34, Township 46 North, Range 16 West, New Mexico Principle Meridian, Montrose County, Colorado, containing 160 acres more or less.

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

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

Appendix B

Initial Site Inspection Checklist

Inspection Checklist: Durita

Date of This Revision: _____
Last Annual Inspection: _____
Inspectors: _____ and _____

Next Annual Inspection (Planned): _____

No.	Item	Issue	Action
1	Access	Access is from a gravel road that crosses BLM property.	None.
2	Specific site surveillance features	See attached list.	Inspect. Identify maintenance requirements
3	Monitor wells	There are no monitor wells at this site.	None.
4	Vegetation	The covers of the heap leach tanks have been revegetated to mitigate wind and water erosion. Other areas of the site have also been revegetated.	Inspect leach tank covers and revegetated areas in general noting condition of vegetation. There should not be any grazing on the site property.
5	Riprap	Certain areas have been armored with riprap for erosion protection.	Inspect riprap, note evidence of rock displacement or rock degradation.

Checklist of Site Specific Surveillance Features: Durita

Feature	Comment
Access Road	Gravel road. Verify road is passable.
Entrance Gate	
Entrance Sign	
Perimeter Fence	Combination of chain link fence and barbed-wire stock fence
Boundary Monuments	Total: 4
Site Marker	

Appendix C

Custodianship Refusal Letter

UMB Binder # 3-1.

STATE OF COLORADO

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

Roy Romer
Governor

April 2, 1996

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

Dear Mr Virgona

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

Four sites within Colorado fall under Title II. These include the Durita Site, the Maybell Title II Site, the Uravan Site and the Canon City Site It is anticipated that reclamation at two of these sites, Durita and Maybell, will be completed in the period 1996 to 1993. Reclamation at the remaining two sites will be completed some time after 2005. At this time, none of our site operators have requested license termination The timing of custodianship of any site will of course depend on the license holder's request for license termination.

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

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

Sincerely,

Roy Romer
Governor

ATTACHMENT 1

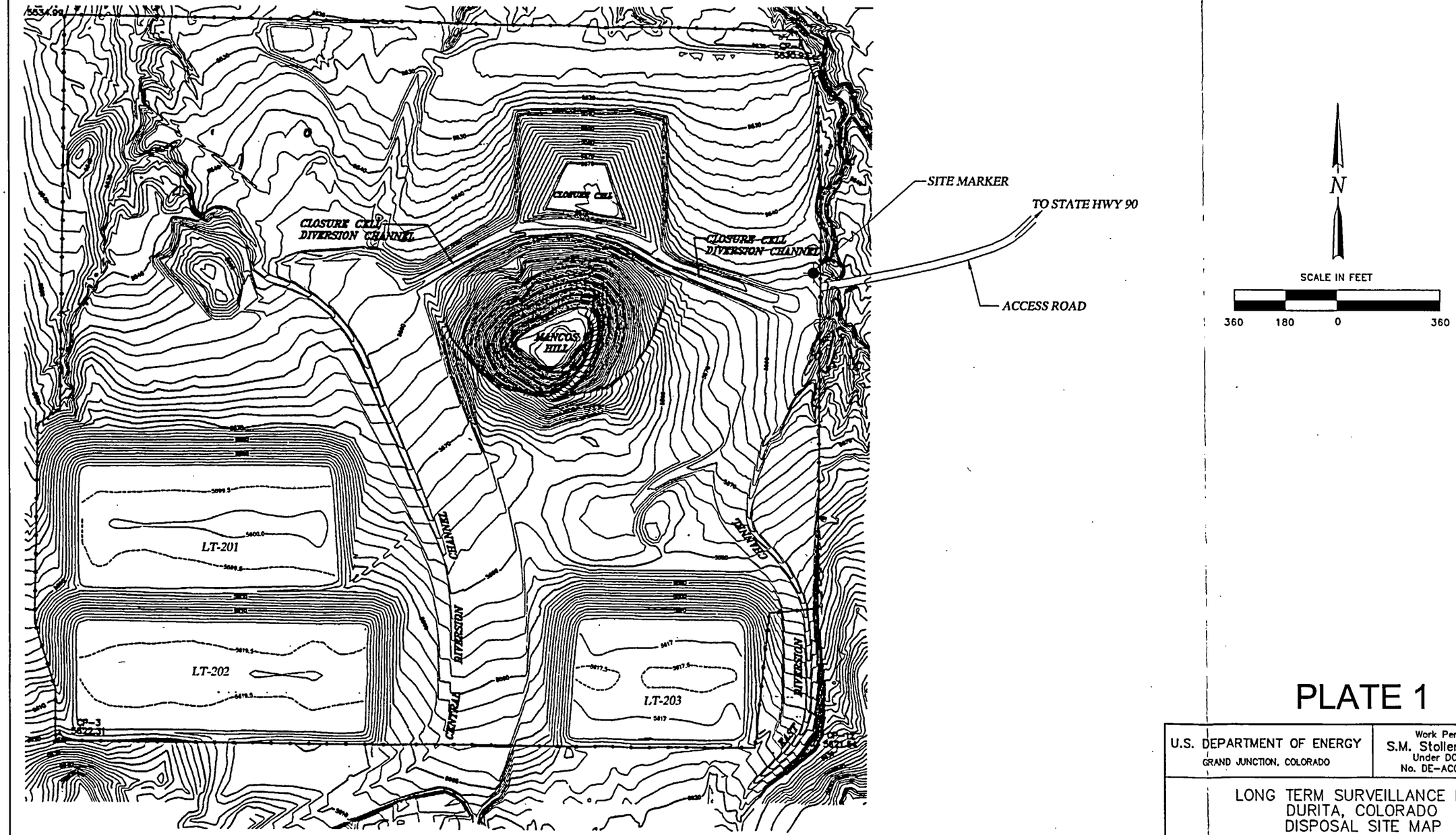

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PLATE 1

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AC01-02GJ79491
LONG TERM SURVEILLANCE PLAN DURITA, COLORADO DISPOSAL SITE MAP	
DATE PREPARED: DECEMBER 15, 2004	FILENAME: S0105900

DOE-LM/GJ765-2004

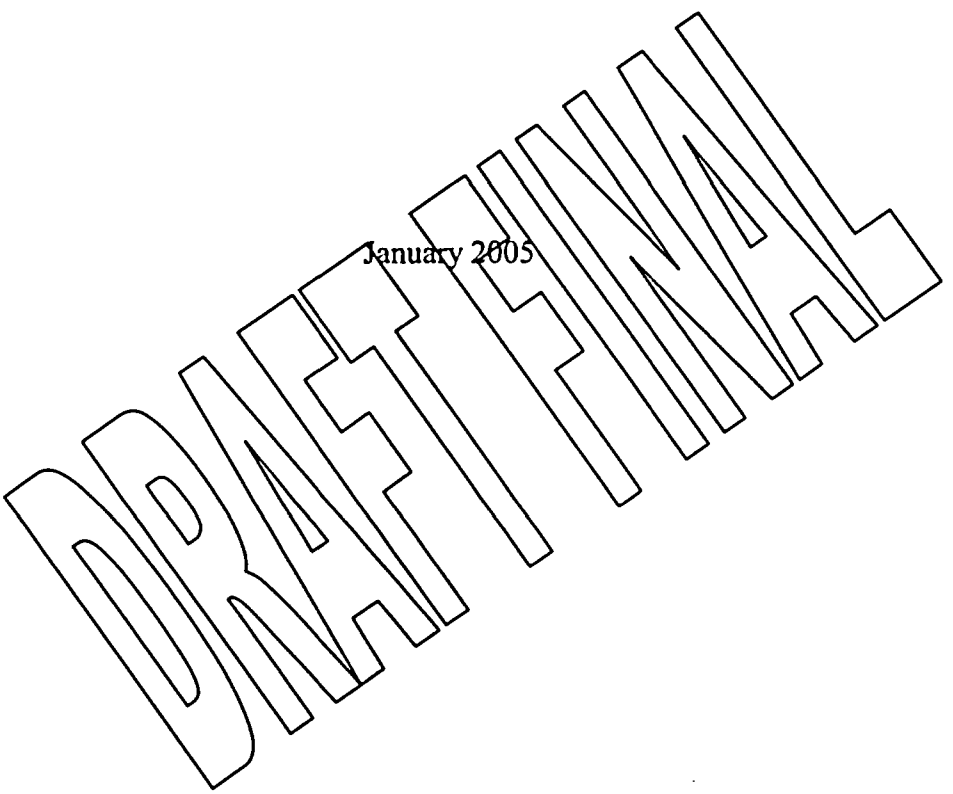
Office of Legacy Management

Long-Term Surveillance Plan

for the

Durita (UMTRCA Title II) Disposal Site
Montrose County, Colorado

January 2005



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

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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) 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 Hecla Mining Company Durita uranium mill tailings disposal site in Montrose County, Colorado. The LM Program at the DOE-LM office in Grand Junction, Colorado, is responsible for the preparation, revision, and implementation of this LTSP, which specifies procedures for inspecting, monitoring, maintenance, reporting, and maintaining records pertaining to the site.

1.2 Legal and Regulatory Requirements

The Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978 (42 USC 7901) as amended, provides for the remediation (or reclamation) and regulation of uranium mill tailings at Title I and Title II sites. Title I 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 Hecla Durita site is a Title II site under UMTRCA. The State of Colorado is an Agreement State.

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

A general license is issued by 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 NRC.

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

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

In December 2003, DOE formally established 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, LM now administers the responsibilities of the Long-Term Surveillance and Maintenance Program.

2.0 Final Site Conditions

Reclamation at the Durita mill facility in Montrose County, Colorado, consisted of stabilizing three heap leach tanks, salvaging equipment that could be decontaminated, demolishing the balance of site structures and equipment, and disposing of it on site. Contaminated mill site soils also were disposed of on site.

2.1 Site History

The Durita facility was a heap leach operation, built in 1977 by Ranchers Exploration and Development Corporation. The facility operated from 1977 to 1979. All of the estimated 700,000 tons of feedstock "ore" for the mill came from the Naturita[1] mill site (Hecla 1991).

The tailings were trucked to the site and dumped through a grizzly into a crusher. The crushed tailings were stockpiled and eventually conveyed to one of the three heap leach tanks. When the tanks were full, the tailings surface was flooded with a dilute sulfuric acid solution. The percolating acidic solution leached uranium and vanadium from the tailings. This solution was collected by slotted pipes in the bottom of each leach tank, and then transferred by gravity flow to the extraction plant. Uranium and vanadium were recovered by ion exchange and solvent extraction. The waste liquid was stored in six onsite evaporation ponds (Hecla 1991).

After operations ceased, a 2- to 2½-foot thick soil cover was placed over the leach tanks. The evaporation ponds were left uncovered and allowed to continue evaporating the liquids (Hecla 1991).

Formal decommissioning and reclamation of the site began in 1992. Final reclamation construction activities were completed in 1999 (Hecla 2000).

2.2 General Description of the Disposal Site Vicinity

The Durita disposal site is in Montrose County, Colorado, approximately 100 road miles south of Grand Junction and 3 miles southwest of Naturita (Figures 2–1 and 2–2).

The site is about 2 road miles west from the San Miguel River Valley floor at an elevation of about 5600 feet. This location is within the canyon lands area of the Colorado Plateau. The area is typified by relatively smooth, sloping surfaces broken by canyons with rough and precipitous topographic relief (FBD 1981). Most of the surrounding property is administered by the Bureau of Land Management (BLM), and is not available for residential development (Hecla 2000).

The climate is a semi-arid continental type with mild summers and cold winters. Precipitation averages about 10 inches per year. Large rainstorms occur usually from May through October (FBD 1981). Vegetation in the immediate vicinity of the site consists of piñon-juniper woodlands and sagebrush flats. The vicinity is sparsely populated with the two nearest towns, Naturita and Nucla, having populations of 434 and 552, respectively, according to the 1990 census (Hecla 2000).

1 The Naturita Uranium Mill Site was an UMTRCA Title I site remediated by DOE

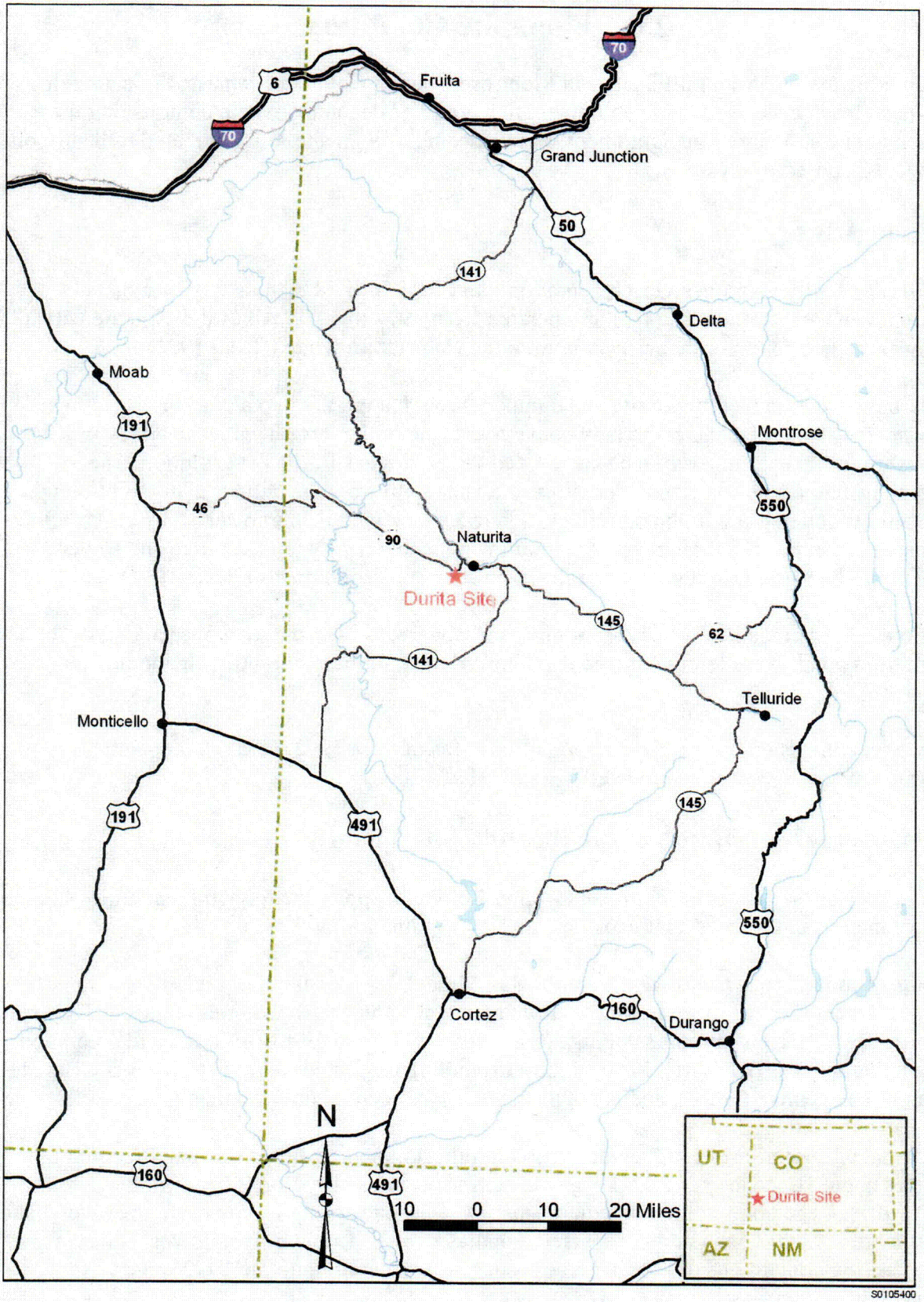

Figure 2–1. General Location Map of the Durita, Colorado, Disposal Site

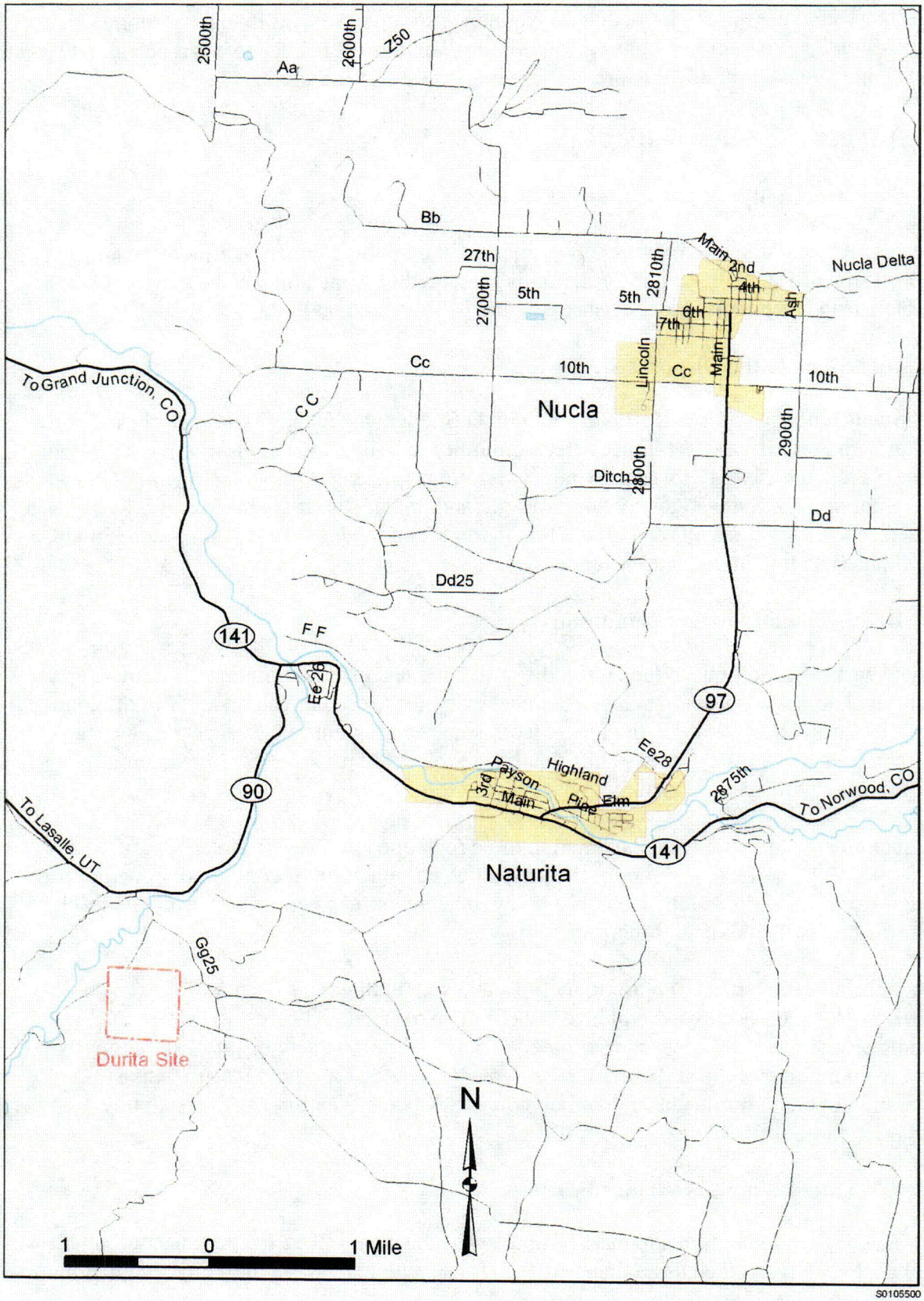

Figure 2–2. Vicinity Location Map, Durita, Colorado, Disposal Site

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The primary land uses in the immediate surrounding vicinity are wildlife habitat, domestic livestock grazing, recreational hunting, and hiking. The nearest residence is a ranch about ½ mile from the site. No other residences are within several miles of the site.

2.3 Disposal Site Description

2.3.1 Site Ownership

In the near future, the United States Government will own the 160-acre Durita disposal site property. Supporting real estate information is presented in Appendix A. The site includes three reclaimed heap leach tanks and a closure cell and is illustrated on Plate 1.

2.3.2 Directions to the Disposal Site

From Grand Junction, Colorado, travel south on U.S. Highway 50 approximately 11 miles to the junction with State Highway 141 near the community of Whitewater. Turn right and proceed west on State Highway 141 for approximately 94 miles, passing through the town of Gateway. At the junction with State Highway 90, turn right and proceed west approximately two miles to the intersection with a gravel road on the left. Turn left on the gravel road and proceed south approximately ½ mile to the site entrance.

2.3.3 Description of Surface Conditions

The final surface conditions at the Durita disposal site are a combination of rock armoring, contouring, and revegetation to achieve the necessary surface water run on and run off control and erosion protection to satisfy the longevity design requirements. The revegetated surfaces have been reseeded with a mix of plants that have proven to be successful in reclaiming disturbed areas at the site and will help provide for soil stability.

The contaminated materials are contained in three reclaimed heap leach tanks, identified as LT–201, LT–202, and LT–203, and a closure cell. A combination of contoured topography, drainage swales, and diversion channels convey incident surface water away from the leach tanks and the closure cell, and off the site.

Leach tank LT–203 occupies approximately 13 acres including the side slopes. Leach tanks LT–201 and LT–202 occupy a combined area of approximately 22 acres; the closure cell, including side slopes, occupies approximately 8 acres of the 160-acre disposal site property. There are no monitor wells at the Durita site. The entire site property is fenced with a combination of chain link fence and barbed wire stock fence. The final site topography is shown on Plate 1.

2.3.4 Permanent Site Surveillance Features

Four boundary monuments, a site marker, and a warning sign will be the permanent long-term surveillance features at the Durita disposal site. These features will be inspected and maintained as necessary as part of the controls for the site.

The unpolished granite site marker with an incised message identifying the location of buried contaminated materials on the Durita disposal site property is placed just inside the main entrance gate. The message on the granite site marker is shown on Figure 2–3.

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

Locations of the permanent site surveillance features are shown on Plate 1.

2.3.5 Site Geology

The Durita site is situated on gently north-sloping terrain at the southeast end of the Paradox Valley. The Mancos Formation directly underlies the site. Most of the site is covered with alluvial/colluvial sandy clay soil up to 20 feet thick containing variable amounts of rock fragments, primarily sandstone of cobble-to-boulder size. Near the east-central part of the site, a remnant of the Mancos Formation forms a hill approximately 100 feet high above the surrounding terrain. The Mancos is partially eroded in the site area, its present thickness ranges from about 20 feet at the southwest corner to more than 70 feet at the north edge of the site (excluding the hill) (Hecla 1991).

The Mancos overlies the Dakota Formation. The contact between the two formations is distinct in outcrops north and south of the site but less so under the site where it appears to be gradational in most places. Both formations are tilted toward the axis of a doubly-plunging syncline that trends west-northwest to east-southeast across the northern one-third of the site. The dips are one to five degrees on the south flank of the syncline underlying the site. In general this structural tilting is steeper than the slope of the surface terrain, causing the Mancos/Dakota contact to outcrop. Geologic field reconnaissance revealed no discernible faulting or other abrupt structural changes in the Mancos or Dakota Formations under the site (Hecla 1991).

Under the site the Mancos Formation is a calcareous to carbonaceous gray shale with thin lenses or beds of ferruginous sandstone. The Dakota also contains some carbonaceous shale and coal but is mostly friable to moderately cemented, tan to gray sandstone at shallow depths below the site (Hecla 1991).

No perennial streams exist on the site. Dry Creek, which passes near the northwest corner of the site has seasonal flows. Several intermittent drainages originate in, or cross through, the site. Gully formation and active headcutting of some drainages in the vicinity of the site indicate that degradation is the predominant geomorphic process (Hecla 1991).

The Durita site is located in seismic zone 1 and is therefore considered to be aseismic (Hecla 1991).

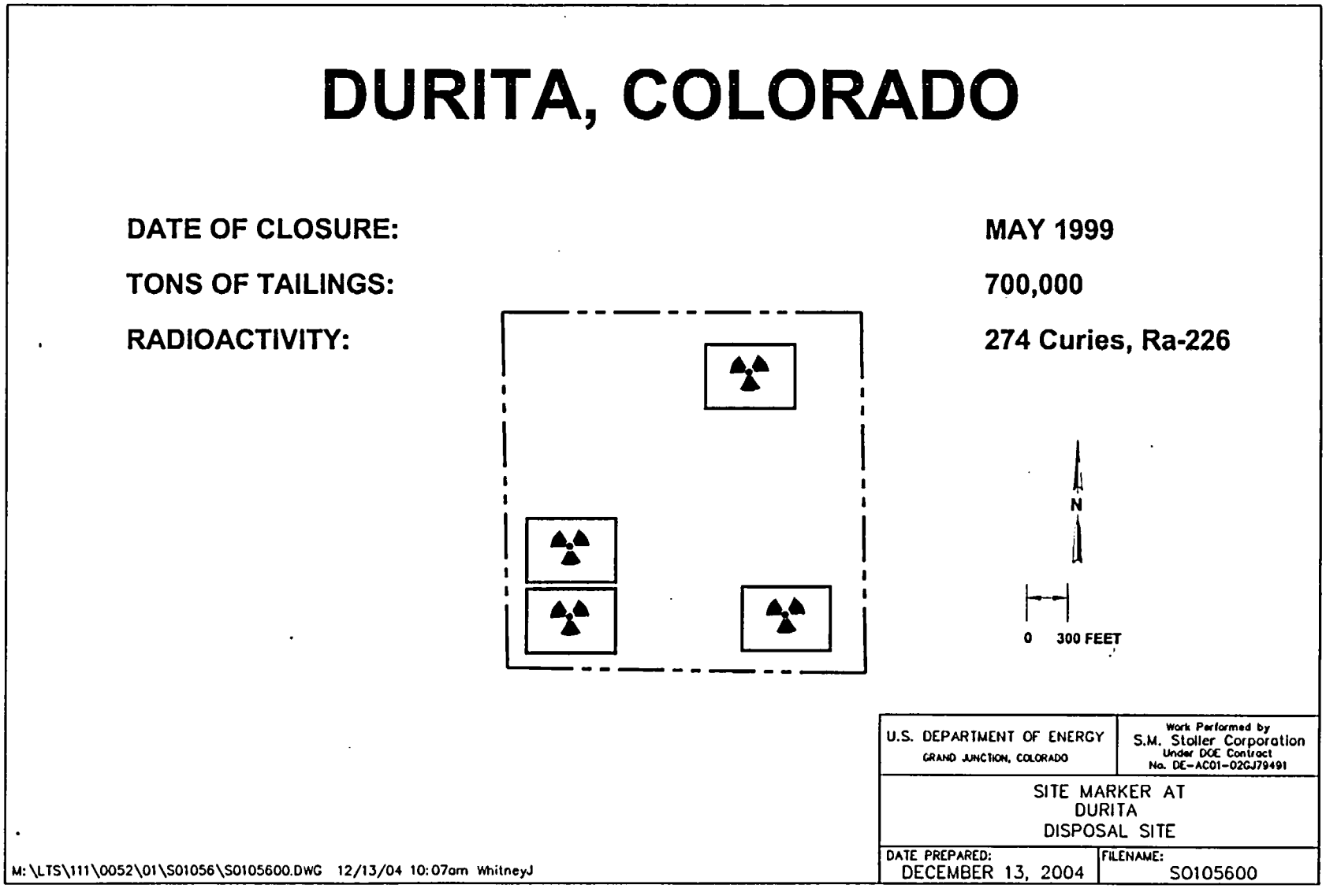

Figure 2–3. Site Marker at the Durita, Colorado, Disposal Site

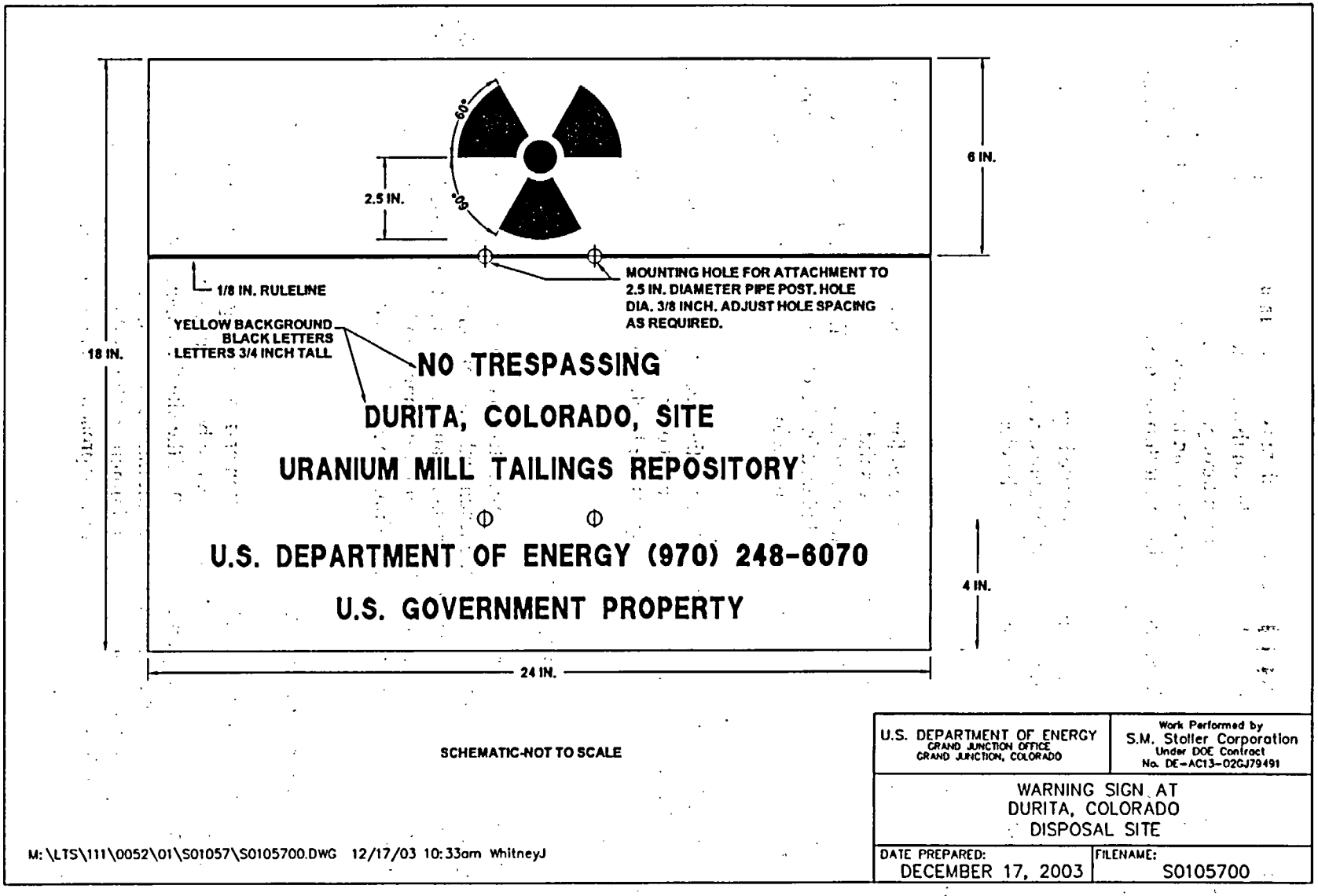

Figure 2–4. Warning Sign at Durita, Colorado, Disposal Site

2.4 Tailings Impoundment Design

Initially the tailings were placed in three heap leach tanks. The uranium was recovered by flooding the tanks with a dilute sulfuric acid solution that leached uranium and vanadium from the tailings and discharged the pregnant solution through slotted collection pipes at the bottom to the tanks. After the leaching process was complete, an initial soil cover 2- to 2.5-feet thick was placed over the leach tanks. After the solution went through the extraction process, the waste liquid was stored in six evaporation ponds.

Formal decommissioning and reclamation of the site began in 1992. All site equipment and buildings were decontaminated and released for unrestricted use. Contaminated soils were excavated and placed in either the leach tanks or the closure cell.

2.4.1 Encapsulation Design

A minimum 12-inch thick clay liner was constructed for the bottom of the closure cell. The waste materials in the six evaporation ponds were solidified and neutralized with Mancos shale and placed in the closure cell. The waste materials in the four raffinate ponds also were solidified, neutralized with Mancos shale, and placed in the closure cell. Covers were constructed for the leach tanks and the closure cell to satisfy the radon emission design specification of 20 $pCi/m^2/sec$ (Hecla 2000).

Cover grades were limited to 5:1 over the tailings in the leach tanks and the solidified wastes in the closure cell. Riprap erosion protection was placed over the leach tank side slopes and on the top and side slopes of the closure cell. The tops of the leach tanks were revegetated for erosion protection (Hecla 2000).

2.4.2 Surface Water Diversion System

Surface water channels and diversions were constructed to carry the occasional high-velocity flows through the site without damaging the leach tanks and closure cell. To the extent possible, these channels were located to re-establish gradients and alignments that existed prior to any site disturbance. Riprap was placed in critical areas of the channels and diversions for erosion protection. The site was regraded to promote drainage and disturbed areas were revegetated (Hecla 2000).

2.5 Ground Water Conditions

The results of the site ground water characterization and monitoring program indicate that there are two stratigraphic units under the site that appear to be hydraulically connected and constitute a single uppermost water-bearing unit. Over most of the site the uppermost water-bearing stratum is an interbedded sandstone-claystone unit that occurs from 20 to 55 feet below ground surface. This unit varies in thickness but at a minimum is 10 feet thick. The yields from this water-bearing unit are low with maximum values approaching one gallon per minute (Hecla 1991).

Water quality analyses indicate that naturally occurring total dissolved solids (TDS) levels are nearly 10 times higher than EPA's drinking water standard. Sulfate levels also naturally exceed drinking water standards. The pH ranges from 7.41 to 8.60, indicating that the water is slightly-to-moderately alkaline, with the highest pH levels exceeding drinking water standards. Sulfate, TDS, and pH levels were determined to be the result of the naturally occurring geochemical environment in the water-bearing unit. Concentrations of radiochemical parameters were below drinking water standards and showed no significant difference between up-gradient and down-gradient locations. Metals and other inorganic constituent concentrations were determined to be very low or below analytical detection levels. All organic constituents required for sampling were below detection limits (Hecla 1991).

In summary, the uppermost water-bearing unit under the site is not considered to be a potential water resource. The unit has a very limited lateral extent, poor yields, and contains water whose natural quality is below drinking water standards. There has been no detectable impact on water quality due to operations at the Durita site. Therefore, no ground water corrective actions were required or performed (Hecla 1991). All ground water monitoring wells associated with the site have been decommissioned and no ground water monitoring is required as part of the long-term custody requirements for the site.

End of current text

3.0 Long-Term Surveillance Program

3.1 General License for Long-Term Custody

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

When the NRC accepts this LTSP and concurs with the State of Colorado's termination of Hecla's Colorado Radioactive Materials License, 317-02, 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 Hecla 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 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 must 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.

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

3.3.2 Inspection Procedure

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

Table 3–1. Transects Used During First Inspection of the Durita Site

Transect	Description
Cover and side slopes of Closure Cell	Riprap covered repository impoundment cover.
Cover and side slopes of Heap Leach Tanks	Vegetation and cover condition on top of tanks and riprap covered side slopes.
Diversion/drainage channels	Contoured channels, riprap in critical areas, and sediment deposition.
Site Perimeter and Balance of Site	Site perimeter including 0.25 mile beyond site boundary, area between closure cell and leach tanks and site boundary, site entrance, boundary monuments, entrance sign, and site marker.

The annual inspection will be a visual walk-through. The primary purpose of the inspection will be to look for evidence of cover cracking, wind or water erosion, structural discontinuity of the containment features, 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 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. Photographs are documented on the Field Photograph Log.

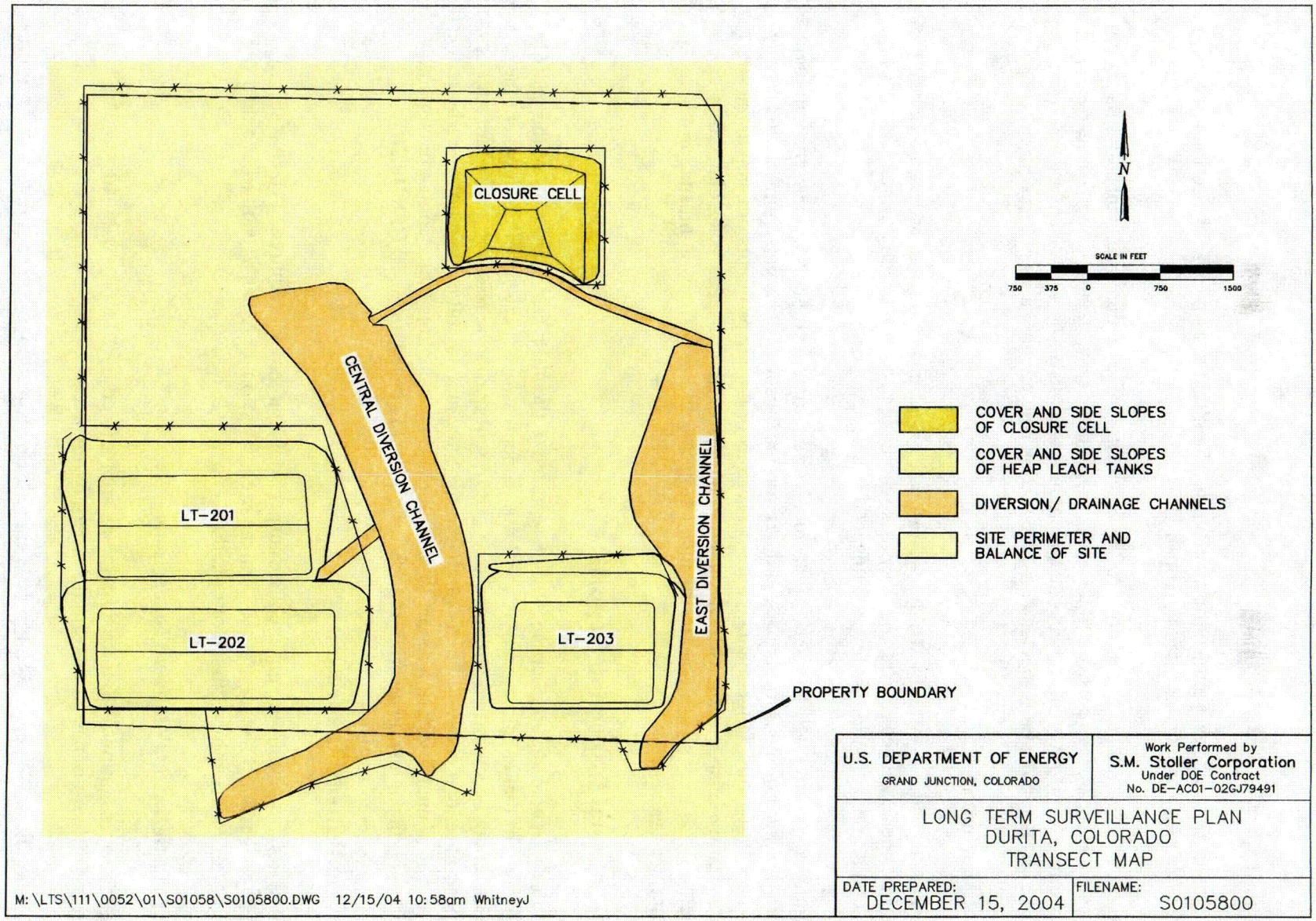

Figure 3–1. Map of Inspection Transects for the Durita, Colorado, Disposal Site

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3.3.3 Inspection Checklist

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

The checklist is subject to revision. At the conclusion of an annual site inspection, inspectors will make notes regarding revisions to the checklist, if necessary, 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 typically will be civil, geotechnical, or geological engineers. Scientists will include geologists, hydrologists, biologists, and environmental scientists representing various fields (e.g., ecology, soils, range management). If serious or unique problems develop at the site, more than two inspectors may be assigned to the inspection. Inspectors specialized in specific fields may be assigned to the inspection to evaluate serious or unusual problems and make recommendations.

3.4 Annual Inspection Reports

Results of annual site inspections will be reported to the NRC within 90 days of the last site inspection of that calendar year (10 CFR 40, Appendix A, Criterion 12). In the event the annual report cannot be submitted within 90 days, DOE will notify 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 Durita 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 local law enforcement and emergency response agencies to facilitate notification in the event of significant trespass, vandalism, or natural disaster. Due to the remote location of the Durita site, DOE recognizes that local agencies may not necessarily be aware of current conditions at the site. However, these agencies will be requested to notify DOE or provide information should they become aware of a significant event that might affect the security or integrity of the site.

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

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

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

Conditions that threaten the safety or the integrity of the disposal site may require a more immediate (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. Timing of the inspection may be governed by seasonal considerations. For example, a follow-up inspection to investigate a vegetation problem may be scheduled for a particular time of year when growing conditions are optimum. A routine follow-up inspection to perform maintenance or to evaluate an erosion problem might be scheduled to avoid snow cover or frozen ground.

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

- Notify NRC pursuant to 10 CFR 40, Appendix A, Criterion 12, or 10 CFR 40.60, whichever is determined to apply;
- Begin the DOE Environment, Safety, and Health Reporting process (DOE Order 231.1A);
- 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 the 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 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 closure cell and stabilized heap leach tanks have been designed and constructed to negate the need for routine maintenance.

The cover and side slopes of the closure cell were armored with riprap of sufficient size to prevent erosion that would otherwise be caused by precipitation and associated flood events. The covers of the leach tanks have minimal slope to promote positive drainage while minimizing runoff water velocities. The leach tank covers have been revegetated with indigenous plant species that are expected to endure for the long-term. Because of the vegetation and mild slopes, adverse wind or water erosion impacts that would require maintenance are not anticipated. The steeper side slopes of the leach tanks have been armored with riprap for erosion protection. The disposal site area is fenced to prevent damage from livestock grazing in the vicinity and to discourage intentional or unintentional trespassing. Areas where runoff water could achieve erosional velocities have been armored with riprap.

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

3.6.2 Emergency Measures

Emergency measures are the actions that DOE will take in response to "unusual damage or disruption" that threaten or compromise site safety, security, or integrity. 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 tailings impoundment following a potential disaster. Criteria, although required by 10 CFR 40.28 (b)(5), for triggering particular DOE responses for each progressively more serious level of intervention, are not easily defined because the nature and scale of all potential problems cannot be foreseen. The information in Table 3–2, however, serves as a guide for appropriate DOE responses. The table shows that the difference between routine maintenance and emergency response is primarily one of urgency and degree of threat or risk. The DOE's priority (urgency) in column 1 of Table 3–2 bears an inverse relationship with DOE's estimate of probability. The highest priority response is also believed to be the least likely to occur.

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

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

[a]Other changes or conditions will be evaluated and treated similarly on the basis of risk.

3.6.4 Reporting Maintenance and Emergency Measures

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

In accordance with 10 CFR 40.60, within 4 hours of discovery of any Priority 1 or 2 event listed in Table 3–2, 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

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

There is no ground water monitoring required for the Durita site.

3.7.2 Vegetation Monitoring

Large areas of the site have been revegetated to promote soil stability. The tops of the heap leach tanks and parts of the contoured diversion/drainage channels are the most critical revegetated areas. The region is subject to invasive weed species that may require periodic control by DOE. The condition of site vegetation will be evaluated during the annual inspections to determine if intervention is necessary to promote vegetation health. A qualified range scientist or plant ecologist will be consulted with respect to vegetative health at the Durita site.

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 Durita 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.

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.

FBD (Ford, Bacon & Davis Utah Inc.), 1981. *Engineering Assessment of Inactive Uranium Mill Tailings, Naturita Site, Naturita, Colorado,* July 1981.

Hecla (Hecla Mining Company), 1991. *Final Reclamation Plan, Durita Site,* Colorado Radioactive Materials License No. 317-02, October 1991.

Hecla, 2000. *Long-Term Monitoring and Maintenance Program,* March 2000.

State of Colorado, 1996. Letter to Joseph E. Virgona, Project Manager, U.S. Department of Energy from Roy Romer, Governor of Colorado, declining custody of the Durita and Maybell UMTRCA Title II sites located in the State of Colorado, April 2, 1996.

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.

End of current text

Appendix A

Real Estate Information

Legal Description

A tract of land being the South ½ of the Northeast ¼ and the North ½ of the Southeast ¼ Section 34, Township 46 North, Range 16 West, New Mexico Principle Meridian, Montrose County, Colorado, containing 160 acres more or less.

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

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

Appendix B

Initial Site Inspection Checklist

Inspection Checklist: Durita

Date of This Revision: _____
Last Annual Inspection: _____
Inspectors: _____ and _____

Next Annual Inspection (Planned): _____

No.	Item	Issue	Action
1	Access	Access is from a gravel road that crosses BLM property.	None.
2	Specific site surveillance features	See attached list.	Inspect. Identify maintenance requirements
3	Monitor wells	There are no monitor wells at this site.	None.
4	Vegetation	The covers of the heap leach tanks have been revegetated to mitigate wind and water erosion. Other areas of the site have also been revegetated.	Inspect leach tank covers and revegetated areas in general noting condition of vegetation. There should not be any grazing on the site property.
5	Riprap	Certain areas have been armored with riprap for erosion protection.	Inspect riprap, note evidence of rock displacement or rock degradation.

Checklist of Site Specific Surveillance Features: Durita

Feature	Comment
Access Road	Gravel road. Verify road is passable.
Entrance Gate	
Entrance Sign	
Perimeter Fence	Combination of chain link fence and barbed-wire stock fence
Boundary Monuments	Total: 4
Site Marker	

Appendix C

Custodianship Refusal Letter

UMB

STATE OF COLORADO

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

RECEIVED
APR - 5 1996

Roy Romer
Governor

April 2, 1996

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

Dear Mr Virgona

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

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

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

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

Sincerely,

Roy Romer
Governor

ATTACHMENT 1

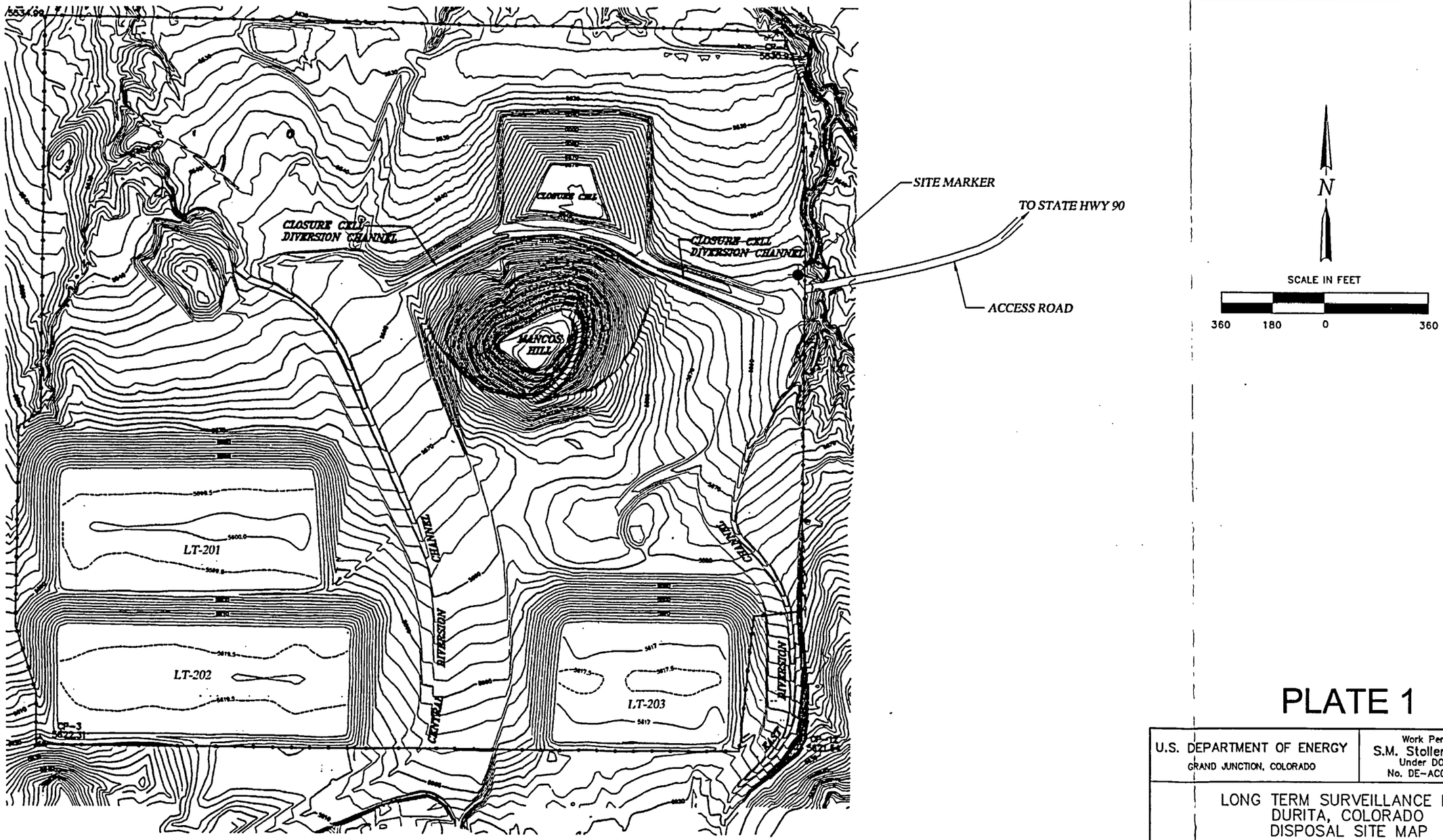

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PLATE 1

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AC01-02GJ79491
LONG TERM SURVEILLANCE PLAN DURITA, COLORADO DISPOSAL SITE MAP	
DATE PREPARED: DECEMBER 15, 2004	FILENAME: S0105900

DOE-LM/GJ765-2004

Office of Legacy Management

Long-Term Surveillance Plan

for the

Durita (UMTRCA Title II) Disposal Site
Montrose County, Colorado

January 2005

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

S01514

Contents

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Appendices

Plate

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 Hecla Mining Company Durita uranium mill tailings disposal site in Montrose County, Colorado. The LM Program at the DOE-LM office in Grand Junction, Colorado, is responsible for the preparation, revision, and implementation of this LTSP, which specifies procedures for inspecting, monitoring, maintenance, reporting, and maintaining records pertaining to the site.

1.2 Legal and Regulatory Requirements

The Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978 (42 USC 7901) as amended, provides for the remediation (or reclamation) and regulation of uranium mill tailings at Title I and Title II sites. Title I 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 Hecla Durita site is a Title II site under UMTRCA. The State of Colorado is an Agreement State.

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

A general license is issued by 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 NRC.

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

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

In December 2003, DOE formally established 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, LM now administers the responsibilities of the Long-Term Surveillance and Maintenance Program.

2.0 Final Site Conditions

Reclamation at the Durita mill facility in Montrose County, Colorado, consisted of stabilizing three heap leach tanks, salvaging equipment that could be decontaminated, demolishing the balance of site structures and equipment, and disposing of it on site. Contaminated mill site soils also were disposed of on site.

2.1 Site History

The Durita facility was a heap leach operation, built in 1977 by Ranchers Exploration and Development Corporation. The facility operated from 1977 to 1979. All of the estimated 700,000 tons of feedstock "ore" for the mill came from the Naturita[1] mill site (Hecla 1991).

The tailings were trucked to the site and dumped through a grizzly into a crusher. The crushed tailings were stockpiled and eventually conveyed to one of the three heap leach tanks. When the tanks were full, the tailings surface was flooded with a dilute sulfuric acid solution. The percolating acidic solution leached uranium and vanadium from the tailings. This solution was collected by slotted pipes in the bottom of each leach tank, and then transferred by gravity flow to the extraction plant. Uranium and vanadium were recovered by ion exchange and solvent extraction. The waste liquid was stored in six onsite evaporation ponds (Hecla 1991).

After operations ceased, a 2- to 2½-foot thick soil cover was placed over the leach tanks. The evaporation ponds were left uncovered and allowed to continue evaporating the liquids (Hecla 1991).

Formal decommissioning and reclamation of the site began in 1992. Final reclamation construction activities were completed in 1999 (Hecla 2000).

2.2 General Description of the Disposal Site Vicinity

The Durita disposal site is in Montrose County, Colorado, approximately 100 road miles south of Grand Junction and 3 miles southwest of Naturita (Figures 2–1 and 2–2).

The site is about 2 road miles west from the San Miguel River Valley floor at an elevation of about 5600 feet. This location is within the canyon lands area of the Colorado Plateau. The area is typified by relatively smooth, sloping surfaces broken by canyons with rough and precipitous topographic relief (FBD 1981). Most of the surrounding property is administered by the Bureau of Land Management (BLM), and is not available for residential development (Hecla 2000).

The climate is a semi-arid continental type with mild summers and cold winters. Precipitation averages about 10 inches per year. Large rainstorms occur usually from May through October (FBD 1981). Vegetation in the immediate vicinity of the site consists of piñon-juniper woodlands and sagebrush flats. The vicinity is sparsely populated with the two nearest towns, Naturita and Nucla, having populations of 434 and 552, respectively, according to the 1990 census (Hecla 2000).

1 The Naturita Uranium Mill Site was an UMTRCA Title I site remediated by DOE

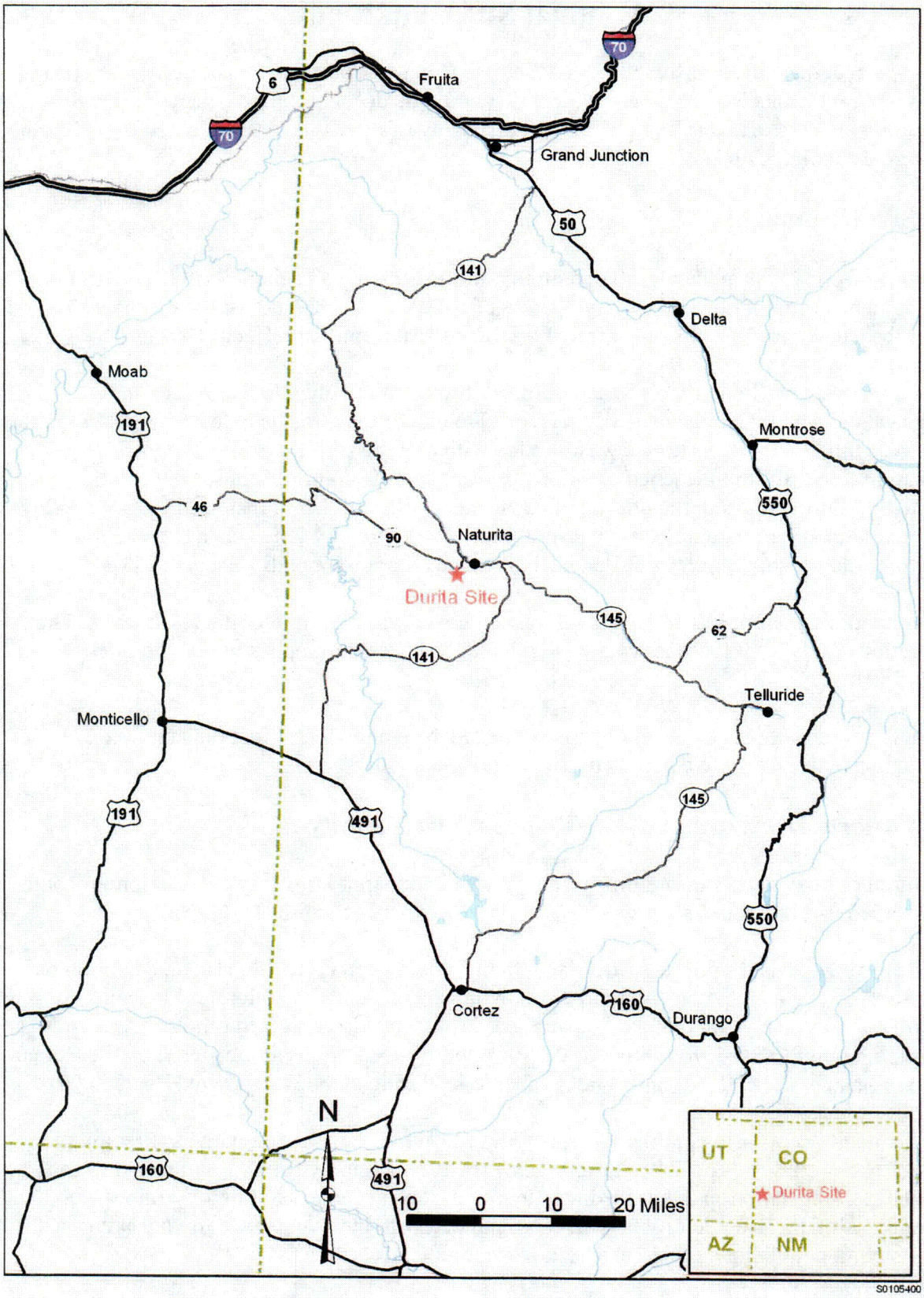

Figure 2–1. General Location Map of the Durita, Colorado, Disposal Site

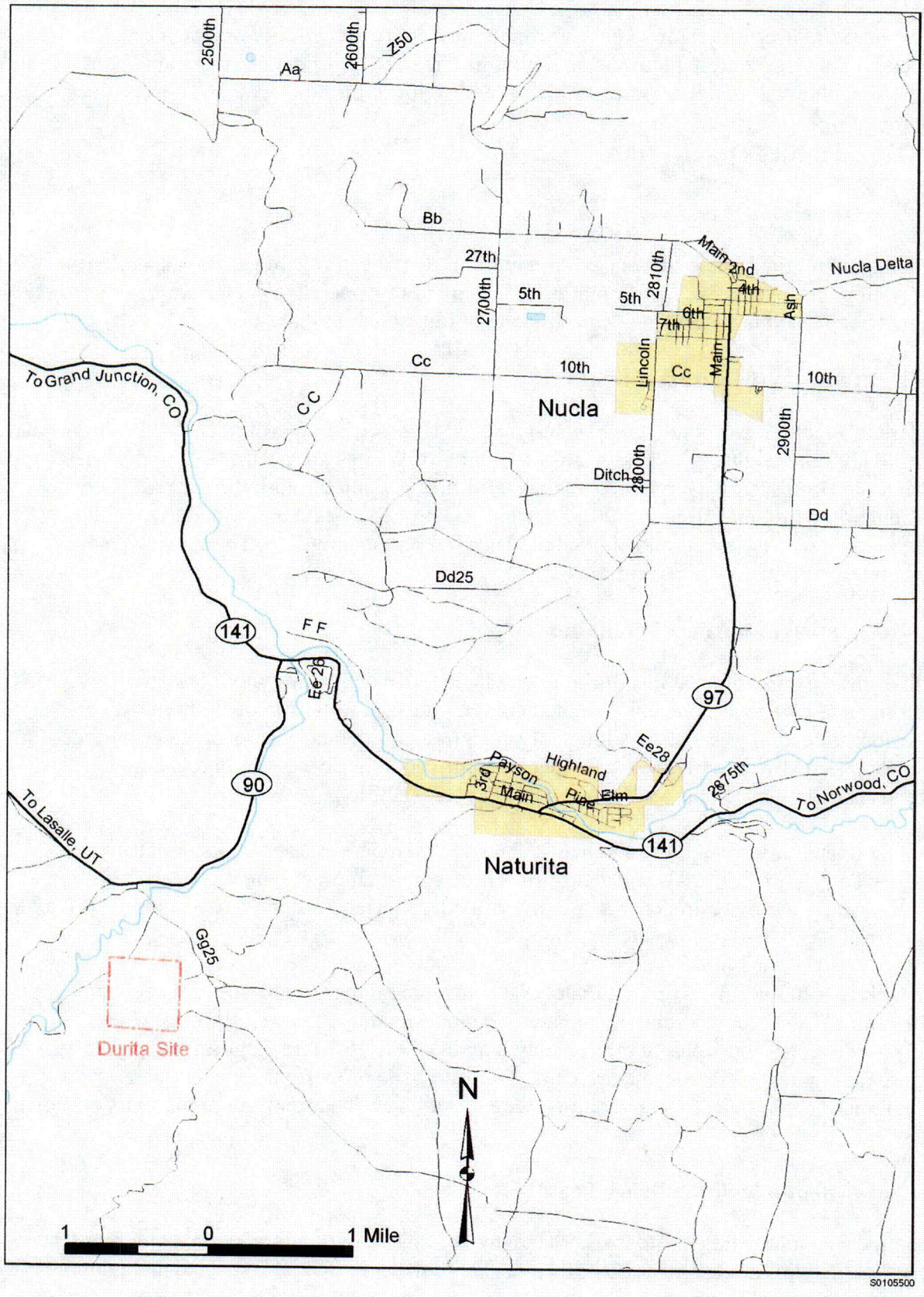

Figure 2–2. Vicinity Location Map, Durita, Colorado, Disposal Site

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The primary land uses in the immediate surrounding vicinity are wildlife habitat, domestic livestock grazing, recreational hunting, and hiking. The nearest residence is a ranch about ½ mile from the site. No other residences are within several miles of the site.

2.3 Disposal Site Description

2.3.1 Site Ownership

In the near future, the United States Government will own the 160-acre Durita disposal site property. Supporting real estate information is presented in Appendix A. The site includes three reclaimed heap leach tanks and a closure cell and is illustrated on Plate 1.

2.3.2 Directions to the Disposal Site

From Grand Junction, Colorado, travel south on U.S. Highway 50 approximately 11 miles to the junction with State Highway 141 near the community of Whitewater. Turn right and proceed west on State Highway 141 for approximately 94 miles, passing through the town of Gateway. At the junction with State Highway 90, turn right and proceed west approximately two miles to the intersection with a gravel road on the left. Turn left on the gravel road and proceed south approximately ½ mile to the site entrance.

2.3.3 Description of Surface Conditions

The final surface conditions at the Durita disposal site are a combination of rock armoring, contouring, and revegetation to achieve the necessary surface water run on and run off control and erosion protection to satisfy the longevity design requirements. The revegetated surfaces have been reseeded with a mix of plants that have proven to be successful in reclaiming disturbed areas at the site and will help provide for soil stability.

The contaminated materials are contained in three reclaimed heap leach tanks, identified as LT–201, LT–202, and LT–203, and a closure cell. A combination of contoured topography, drainage swales, and diversion channels convey incident surface water away from the leach tanks and the closure cell, and off the site.

Leach tank LT–203 occupies approximately 13 acres including the side slopes. Leach tanks LT–201 and LT–202 occupy a combined area of approximately 22 acres; the closure cell, including side slopes, occupies approximately 8 acres of the 160-acre disposal site property. There are no monitor wells at the Durita site. The entire site property is fenced with a combination of chain link fence and barbed wire stock fence. The final site topography is shown on Plate 1.

2.3.4 Permanent Site Surveillance Features

Four boundary monuments, a site marker, and a warning sign will be the permanent long-term surveillance features at the Durita disposal site. These features will be inspected and maintained as necessary as part of the controls for the site.

The unpolished granite site marker with an incised message identifying the location of buried contaminated materials on the Durita disposal site property is placed just inside the main entrance gate. The message on the granite site marker is shown on Figure 2–3.

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

Locations of the permanent site surveillance features are shown on Plate 1.

2.3.5 Site Geology

The Durita site is situated on gently north-sloping terrain at the southeast end of the Paradox Valley. The Mancos Formation directly underlies the site. Most of the site is covered with alluvial/colluvial sandy clay soil up to 20 feet thick containing variable amounts of rock fragments, primarily sandstone of cobble-to-boulder size. Near the east-central part of the site, a remnant of the Mancos Formation forms a hill approximately 100 feet high above the surrounding terrain. The Mancos is partially eroded in the site area, its present thickness ranges from about 20 feet at the southwest corner to more than 70 feet at the north edge of the site (excluding the hill) (Hecla 1991).

The Mancos overlies the Dakota Formation. The contact between the two formations is distinct in outcrops north and south of the site but less so under the site where it appears to be gradational in most places. Both formations are tilted toward the axis of a doubly-plunging syncline that trends west-northwest to east-southeast across the northern one-third of the site. The dips are one to five degrees on the south flank of the syncline underlying the site. In general this structural tilting is steeper than the slope of the surface terrain, causing the Mancos/Dakota contact to outcrop. Geologic field reconnaissance revealed no discernible faulting or other abrupt structural changes in the Mancos or Dakota Formations under the site (Hecla 1991).

Under the site the Mancos Formation is a calcareous to carbonaceous gray shale with thin lenses or beds of ferruginous sandstone. The Dakota also contains some carbonaceous shale and coal but is mostly friable to moderately cemented, tan to gray sandstone at shallow depths below the site (Hecla 1991).

No perennial streams exist on the site. Dry Creek, which passes near the northwest corner of the site has seasonal flows. Several intermittent drainages originate in, or cross through, the site. Gully formation and active headcutting of some drainages in the vicinity of the site indicate that degradation is the predominant geomorphic process (Hecla 1991).

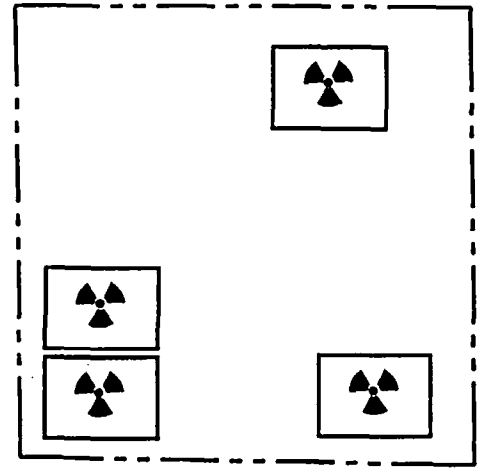
The Durita site is located in seismic zone 1 and is therefore considered to be aseismic (Hecla 1991).

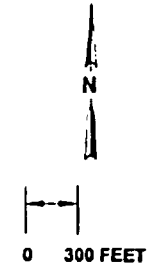
DURITA, COLORADO

DATE OF CLOSURE: MAY 1999

TONS OF TAILINGS: 700,000

RADIOACTIVITY: 274 Curies, Ra-226





U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AC01-02GJ79491
SITE MARKER AT DURITA DISPOSAL SITE	
DATE PREPARED: DECEMBER 13, 2004	FILENAME: S0105600

M:\LTS\111\0052\01\S01056\S0105600.DWG 12/13/04 10:07am WhitneyJ

Figure 2–3. Site Marker at the Durita, Colorado, Disposal Site

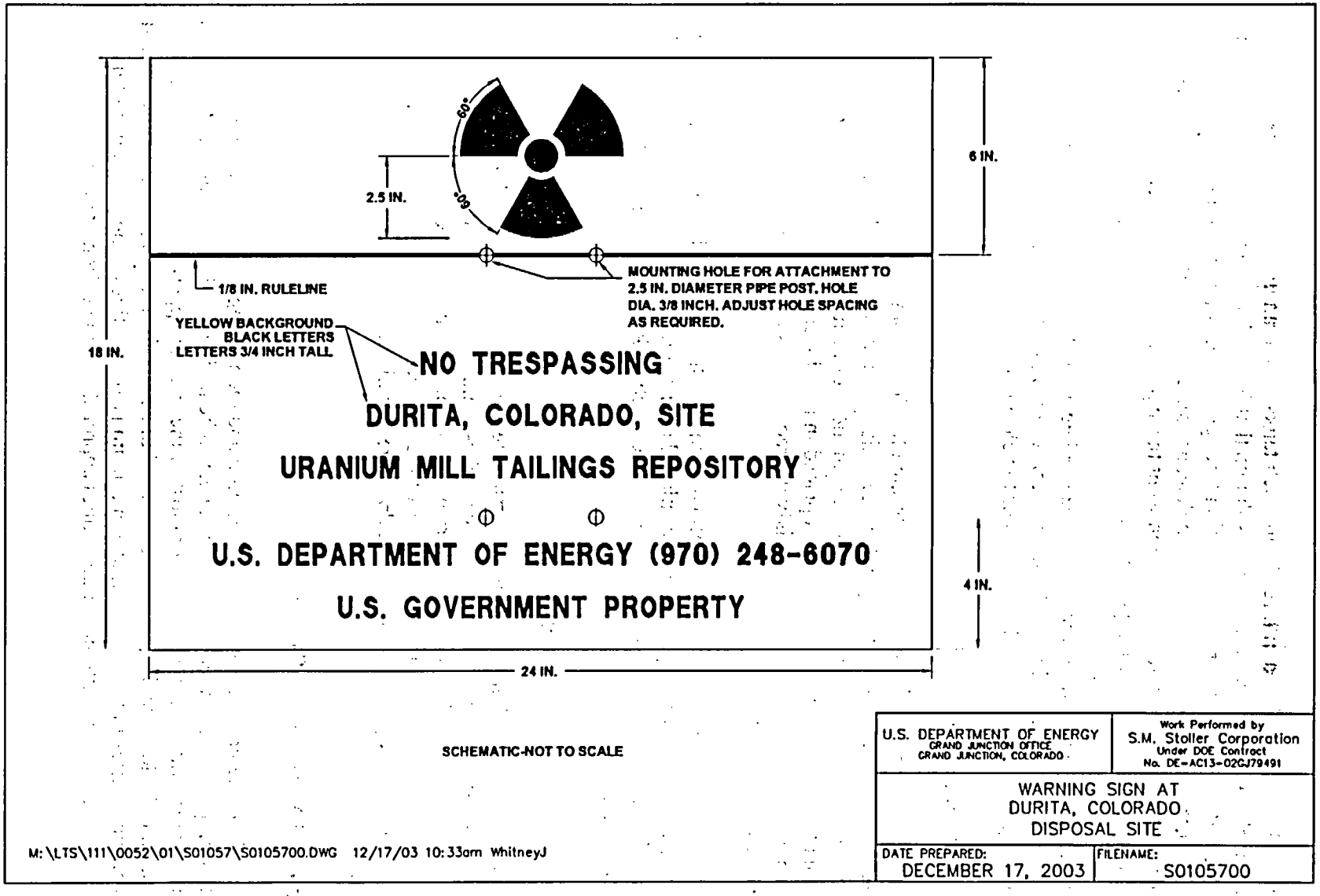


Figure 2–4. Warning Sign at Durita, Colorado, Disposal Site

2.4 Tailings Impoundment Design

Initially the tailings were placed in three heap leach tanks. The uranium was recovered by flooding the tanks with a dilute sulfuric acid solution that leached uranium and vanadium from the tailings and discharged the pregnant solution through slotted collection pipes at the bottom to the tanks. After the leaching process was complete, an initial soil cover 2- to 2.5-feet thick was placed over the leach tanks. After the solution went through the extraction process, the waste liquid was stored in six evaporation ponds.

Formal decommissioning and reclamation of the site began in 1992. All site equipment and buildings were decontaminated and released for unrestricted use. Contaminated soils were excavated and placed in either the leach tanks or the closure cell.

2.4.1 Encapsulation Design

A minimum 12-inch thick clay liner was constructed for the bottom of the closure cell. The waste materials in the six evaporation ponds were solidified and neutralized with Mancos shale and placed in the closure cell. The waste materials in the four raffinate ponds also were solidified, neutralized with Mancos shale, and placed in the closure cell. Covers were constructed for the leach tanks and the closure cell to satisfy the radon emission design specification of 20 $pCi/m^2/sec$ (Hecla 2000).

Cover grades were limited to 5:1 over the tailings in the leach tanks and the solidified wastes in the closure cell. Riprap erosion protection was placed over the leach tank side slopes and on the top and side slopes of the closure cell. The tops of the leach tanks were revegetated for erosion protection (Hecla 2000).

2.4.2 Surface Water Diversion System

Surface water channels and diversions were constructed to carry the occasional high-velocity flows through the site without damaging the leach tanks and closure cell. To the extent possible, these channels were located to re-establish gradients and alignments that existed prior to any site disturbance. Riprap was placed in critical areas of the channels and diversions for erosion protection. The site was regraded to promote drainage and disturbed areas were revegetated (Hecla 2000).

2.5 Ground Water Conditions

The results of the site ground water characterization and monitoring program indicate that there are two stratigraphic units under the site that appear to be hydraulically connected and constitute a single uppermost water-bearing unit. Over most of the site the uppermost water-bearing stratum is an interbedded sandstone-claystone unit that occurs from 20 to 55 feet below ground surface. This unit varies in thickness but at a minimum is 10 feet thick. The yields from this water-bearing unit are low with maximum values approaching one gallon per minute (Hecla 1991).

Water quality analyses indicate that naturally occurring total dissolved solids (TDS) levels are nearly 10 times higher than EPA's drinking water standard. Sulfate levels also naturally exceed drinking water standards. The pH ranges from 7.41 to 8.60, indicating that the water is slightly-to-moderately alkaline, with the highest pH levels exceeding drinking water standards. Sulfate, TDS, and pH levels were determined to be the result of the naturally occurring geochemical environment in the water-bearing unit. Concentrations of radiochemical parameters were below drinking water standards and showed no significant difference between up-gradient and down-gradient locations. Metals and other inorganic constituent concentrations were determined to be very low or below analytical detection levels. All organic constituents required for sampling were below detection limits (Hecla 1991).

In summary, the uppermost water-bearing unit under the site is not considered to be a potential water resource. The unit has a very limited lateral extent, poor yields, and contains water whose natural quality is below drinking water standards. There has been no detectable impact on water quality due to operations at the Durita site. Therefore, no ground water corrective actions were required or performed (Hecla 1991). All ground water monitoring wells associated with the site have been decommissioned and no ground water monitoring is required as part of the long-term custody requirements for the site.

End of current text

3.0 Long-Term Surveillance Program

3.1 General License for Long-Term Custody

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

When the NRC accepts this LTSP and concurs with the State of Colorado's termination of Hecla's Colorado Radioactive Materials License, 317-02, 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 Hecla 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 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 must 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.

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

3.3.2 Inspection Procedure

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

Table 3–1. Transects Used During First Inspection of the Durita Site

Transect	Description
Cover and side slopes of Closure Cell	Riprap covered repository impoundment cover.
Cover and side slopes of Heap Leach Tanks	Vegetation and cover condition on top of tanks and riprap covered side slopes.
Diversion/drainage channels	Contoured channels, riprap in critical areas, and sediment deposition.
Site Perimeter and Balance of Site	Site perimeter including 0.25 mile beyond site boundary, area between closure cell and leach tanks and site boundary, site entrance, boundary monuments, entrance sign, and site marker.

The annual inspection will be a visual walk-through. The primary purpose of the inspection will be to look for evidence of cover cracking, wind or water erosion, structural discontinuity of the containment features, 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 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. Photographs are documented on the Field Photograph Log.

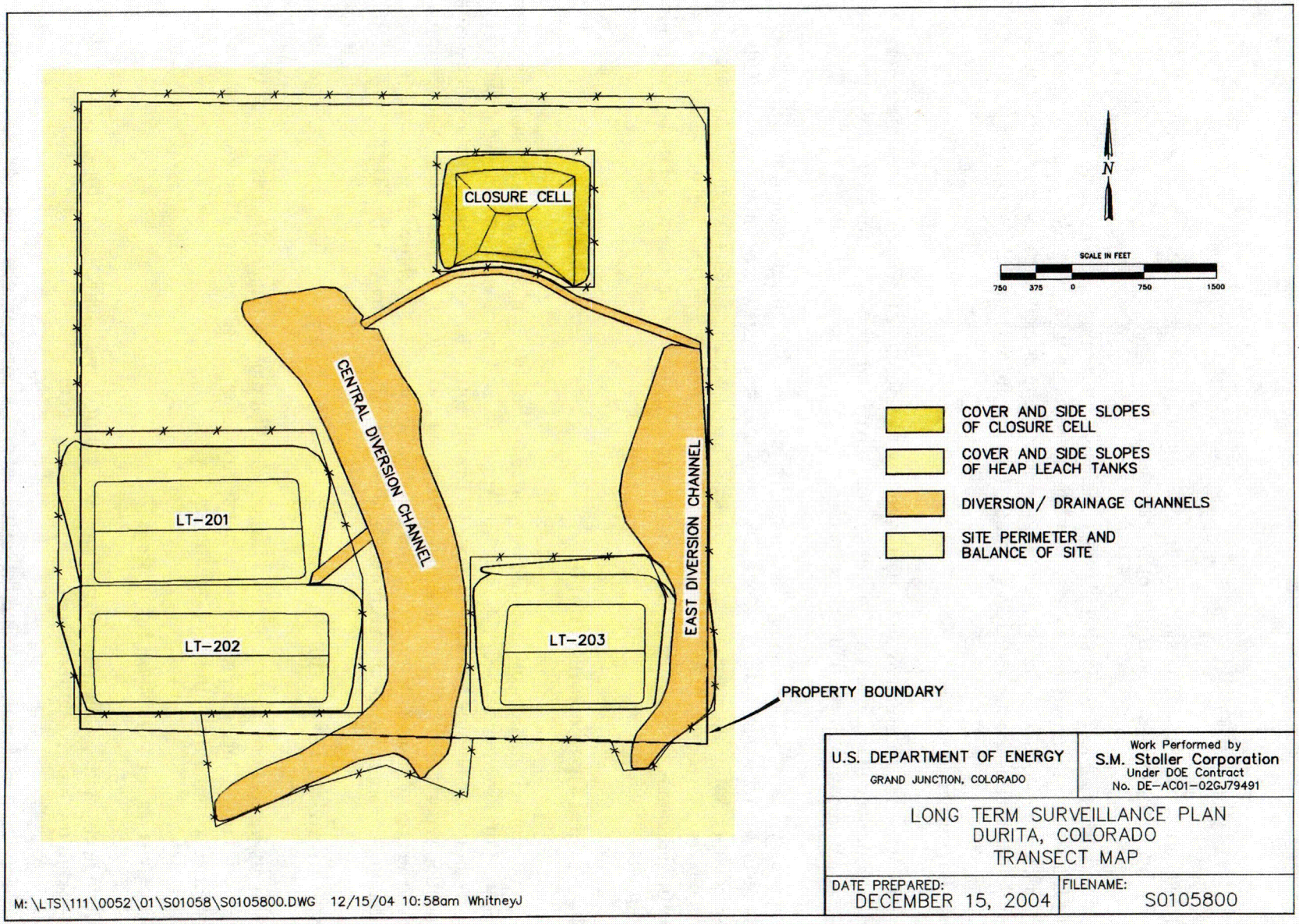


Figure 3–1. Map of Inspection Transects for the Durita, Colorado, Disposal Site

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3.3.3 Inspection Checklist

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

The checklist is subject to revision. At the conclusion of an annual site inspection, inspectors will make notes regarding revisions to the checklist, if necessary, 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 typically will be civil, geotechnical, or geological engineers. Scientists will include geologists, hydrologists, biologists, and environmental scientists representing various fields (e.g., ecology, soils, range management). If serious or unique problems develop at the site, more than two inspectors may be assigned to the inspection. Inspectors specialized in specific fields may be assigned to the inspection to evaluate serious or unusual problems and make recommendations.

3.4 Annual Inspection Reports

Results of annual site inspections will be reported to the NRC within 90 days of the last site inspection of that calendar year (10 CFR 40, Appendix A, Criterion 12). In the event the annual report cannot be submitted within 90 days, DOE will notify 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 Durita 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 local law enforcement and emergency response agencies to facilitate notification in the event of significant trespass, vandalism, or natural disaster. Due to the remote location of the Durita site, DOE recognizes that local agencies may not necessarily be aware of current conditions at the site. However, these agencies will be requested to notify DOE or provide information should they become aware of a significant event that might affect the security or integrity of the site.

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

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

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

Conditions that threaten the safety or the integrity of the disposal site may require a more immediate (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. Timing of the inspection may be governed by seasonal considerations. For example, a follow-up inspection to investigate a vegetation problem may be scheduled for a particular time of year when growing conditions are optimum. A routine follow-up inspection to perform maintenance or to evaluate an erosion problem might be scheduled to avoid snow cover or frozen ground.

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

- Notify NRC pursuant to 10 CFR 40, Appendix A, Criterion 12, or 10 CFR 40.60, whichever is determined to apply;
- Begin the DOE Environment, Safety, and Health Reporting process (DOE Order 231.1A);
- 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 the 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 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 closure cell and stabilized heap leach tanks have been designed and constructed to negate the need for routine maintenance.

The cover and side slopes of the closure cell were armored with riprap of sufficient size to prevent erosion that would otherwise be caused by precipitation and associated flood events. The covers of the leach tanks have minimal slope to promote positive drainage while minimizing runoff water velocities. The leach tank covers have been revegetated with indigenous plant species that are expected to endure for the long-term. Because of the vegetation and mild slopes, adverse wind or water erosion impacts that would require maintenance are not anticipated. The steeper side slopes of the leach tanks have been armored with riprap for erosion protection. The disposal site area is fenced to prevent damage from livestock grazing in the vicinity and to discourage intentional or unintentional trespassing. Areas where runoff water could achieve erosional velocities have been armored with riprap.

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

3.6.2 Emergency Measures

Emergency measures are the actions that DOE will take in response to "unusual damage or disruption" that threaten or compromise site safety, security, or integrity. 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 tailings impoundment following a potential disaster. Criteria, although required by 10 CFR 40.28 (b)(5), for triggering particular DOE responses for each progressively more serious level of intervention, are not easily defined because the nature and scale of all potential problems cannot be foreseen. The information in Table 3–2, however, serves as a guide for appropriate DOE responses. The table shows that the difference between routine maintenance and emergency response is primarily one of urgency and degree of threat or risk. The DOE's priority (urgency) in column 1 of Table 3–2 bears an inverse relationship with DOE's estimate of probability. The highest priority response is also believed to be the least likely to occur.

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

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

[a]Other changes or conditions will be evaluated and treated similarly on the basis of risk.

3.6.4 Reporting Maintenance and Emergency Measures

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

In accordance with 10 CFR 40.60, within 4 hours of discovery of any Priority 1 or 2 event listed in Table 3–2, 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

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

There is no ground water monitoring required for the Durita site.

3.7.2 Vegetation Monitoring

Large areas of the site have been revegetated to promote soil stability. The tops of the heap leach tanks and parts of the contoured diversion/drainage channels are the most critical revegetated areas. The region is subject to invasive weed species that may require periodic control by DOE. The condition of site vegetation will be evaluated during the annual inspections to determine if intervention is necessary to promote vegetation health. A qualified range scientist or plant ecologist will be consulted with respect to vegetative health at the Durita site.

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 Durita 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.

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.

FBD (Ford, Bacon & Davis Utah Inc.), 1981. *Engineering Assessment of Inactive Uranium Mill Tailings, Naturita Site, Naturita, Colorado,* July 1981.

Hecla (Hecla Mining Company), 1991. *Final Reclamation Plan, Durita Site,* Colorado Radioactive Materials License No. 317-02, October 1991.

Hecla, 2000. *Long-Term Monitoring and Maintenance Program,* March 2000.

State of Colorado, 1996. Letter to Joseph E. Virgona, Project Manager, U.S. Department of Energy from Roy Romer, Governor of Colorado, declining custody of the Durita and Maybell UMTRCA Title II sites located in the State of Colorado, April 2, 1996.

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.

End of current text

Appendix A

Real Estate Information

Legal Description

A tract of land being the South ½ of the Northeast ¼ and the North ½ of the Southeast ¼ Section 34, Township 46 North, Range 16 West, New Mexico Principle Meridian, Montrose County, Colorado, containing 160 acres more or less.

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

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

Appendix B

Initial Site Inspection Checklist

Inspection Checklist: Durita

Date of This Revision: _____
Last Annual Inspection: _____
Inspectors: _____ and _____

Next Annual Inspection (Planned): _____.

No.	Item	Issue	Action
1	Access	Access is from a gravel road that crosses BLM property.	None.
2	Specific site surveillance features	See attached list.	Inspect. Identify maintenance requirements
3	Monitor wells	There are no monitor wells at this site.	None.
4	Vegetation	The covers of the heap leach tanks have been revegetated to mitigate wind and water erosion. Other areas of the site have also been revegetated.	Inspect leach tank covers and revegetated areas in general noting condition of vegetation. There should not be any grazing on the site property.
5	Riprap	Certain areas have been armored with riprap for erosion protection.	Inspect riprap, note evidence of rock displacement or rock degradation.

Checklist of Site Specific Surveillance Features: Durita

Feature	Comment
Access Road	Gravel road. Verify road is passable.
Entrance Gate	
Entrance Sign	
Perimeter Fence	Combination of chain link fence and barbed-wire stock fence
Boundary Monuments	Total: 4
Site Marker	

Appendix C

Custodianship Refusal Letter

UMB Barcode # 3-7

RECEIVED

STATE OF COLORADO

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

APR - 5 1996

Roy Romer
Governor

April 2, 1996

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

Dear Mr Virgona

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

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

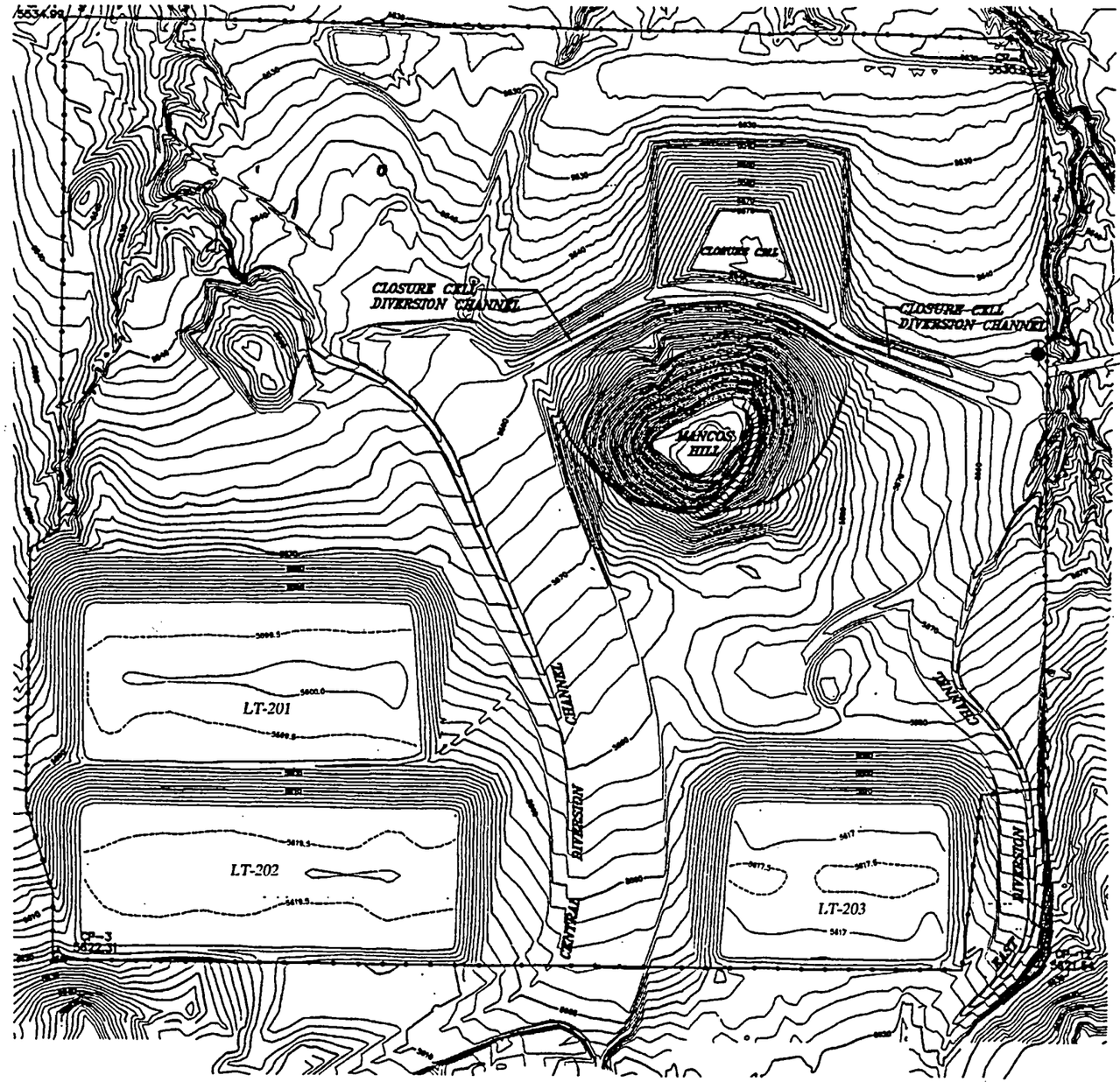
Colorado declines its option to be custodian of the Durita and Maybell Sites However, since the Uravan and Canon City sites will not be eligible for closure until after 2000, it is premature to discuss the state's position on these sites

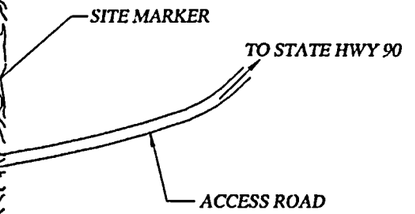
The Radiation Control Division at the Colorado Department of Public Health and Environment has committed to work with the U.S Nuclear Regulatory Commission, the U.S Department of Energy and our licensees to assure a smooth transition of custodianship at the Durita and Maybell Sites We will keep DOE informed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

Sincerely,

Roy Romer
Governor

ATTACHMENT 1





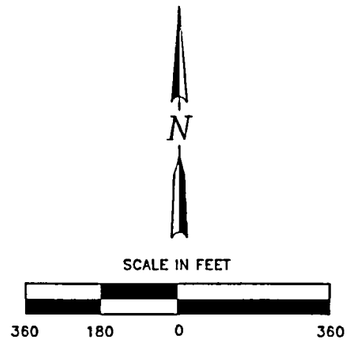


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PLATE 1

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AC01-02GJ79491
LONG TERM SURVEILLANCE PLAN DURITA, COLORADO DISPOSAL SITE MAP	
DATE PREPARED: DECEMBER 15, 2004	FILENAME: S0105900