DOE–LM/1530–2007

Long-Term Surveillance Plan for the Mexican Hat, Utah (UMTRCA Title I), Disposal Site San Juan County, Utah

October 2007

U.S. Department of Energy

Office of Legacy Management

Work Performed Under DOE Contract No. DE–AC01–02GJ79491
for the U.S. Department of Energy Office of Legacy Management.
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Department of Energy
Office of Legacy Management

OCT 2 2 2007

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

Subject: Long-Term Surveillance Plan (Revision 3) for the Mexican Hat, Utah, Disposal Site

Dear Mr. McConnell:

Enclosed for your files are four copies of the final revised *Long-Term Surveillance Plan for the Mexican Hat, Utah, (UMTRCA Title I) Disposal Site* (Revision 3), as required by the U. S. Nuclear Regulatory Agency (NRC) per 10 CFR 40.27. The long-term surveillance plan (LTSP) was revised to reflect the changes in the best management practice (BMP) ground water and seep monitoring program as concurred with by the Navajo AML Reclamation/UMTRA Department by a letter dated July 25, 2006. The Navajo Nation concurrence to changes in the BMP monitoring program at the site followed a review of an evaluation of the program presented in the *Resolution of Seep and Ground Water Monitoring at the Mexican Hat, Utah, UMTRCA Title I Disposal Site* (March 2006). The revision also included updating the LTSP to the current format the U.S. Department of Energy is using for Title I and Title II site LTSPs.

The agreed upon changes to the BMP ground water and seep monitoring program included:

1.) No additional monitoring of ground water quality and decommissioning of all remaining wells at the site (completed April 28, 2007).

2.) Discontinuing water quality monitoring of the seeps and continuing visual observation and photographic documentation of seep flows during the annual site inspections (implemented April 26, 2006). *Note*: This change in seep monitoring is under the following agreed-upon condition: if observed seep flows were to significantly increase, as compared to historical levels, a re-evaluation of the need to resume water quality monitoring of the seeps would be performed.

Please be reminded that ground water and seep monitoring is not required by the NRC at the Mexican Hat Disposal site under the current protection strategy (refer to; *Final Technical Evaluation Report for the Mexican Hat Uranium Mill Tailings Site*, NRC, 1996). The continued BMP seep flow monitoring at the site is performed due to continued concern by the Navajo Nation over potential risks that may be associated with site-related contamination.

Please call me at (970) 248-6073 if you have any questions.

Sincerely,

Richard P. Bush
Site Manager

Enclosures

cc w/enclosures:
P. Michalak, NRC (3 copies)
File: HAT 505.15 (D. Roberts)

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DOE-LM/1530-2007
Revision 3

Office of Legacy Management

Long-Term Surveillance Plan

for the

Mexican Hat (UMTRCA Title I) Disposal Site
San Juan County, Utah

October 2007

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

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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 40.27 (10 CFR 40.27) as the long-term custodian of the Mexican Hat uranium mill tailings disposal site in San Juan County, Utah. The site has been renamed the Mexican Hat Disposal Site by DOE and will be referred to as such throughout this document. The LM Program at the DOE-LM office in Grand Junction, Colorado, is responsible for the preparation, revision, and implementation of this LTSP (Revision 3), which specifies procedures for inspecting the site, monitoring, maintenance, annual and other reporting requirements, and maintaining records pertaining to the site.

1.2 Legal and Regulatory Requirements

The Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978 (42 USC §7901, as amended), provides regulations for the remediation (or reclamation) and long-term care of uranium mill tailings under either Title I or Title II of the act. Title I addresses former uranium mill sites that were unlicensed as of January 1, 1978, and essentially abandoned. Title II addresses uranium-milling sites under specific license as of January 1, 1978. In both cases, the licensing agency is the U.S. Nuclear Regulatory Commission (NRC), or in the case of certain Title II disposal sites, an Agreement State. The Mexican Hat Disposal Site is regulated under Title I of UMTRCA. The State of Utah is an agreement state, however, the Mexican Hat Disposal Site is located on Navajo Nation land, which precludes state jurisdiction.

Federal regulations at 10 CFR 40.27 provide for the licensing, custody, and long-term care of uranium and thorium mill tailings sites closed (reclaimed) under Title I of UMTRCA.

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

The general license becomes effective once the NRC or an Agreement State approves the site reclamation and terminates the operating license, and NRC accepts a site-specific LTSP (this document).

Requirements of the LTSP and general requirements for the long-term custody of the Mexican Hat Disposal Site are addressed in various sections of the LTSP (Table 1–1).

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

Table 1–1. Requirements of the LTSP and for the Long-Term Custodian of the Mexican Hat Disposal 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	Sections 3.5 and 3.6

1.3 Role of the Department of Energy

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

Previously in 1988, DOE had designated the Grand Junction facility as the program office for managing long-term surveillance and maintenance of DOE disposal sites that contain regulated low-level radioactive materials that no longer had a DOE mission after cleanup, as well as other sites (including UMTRCA Title I and Title II sites) as assigned, and to establish a common office for the security, surveillance, monitoring, and maintenance of those sites.

According to the objectives of DOE Order 450.1, *Environmental Protection Program* (DOE 2005), DOE sites must implement sound stewardship practices protective of the air, water, land and other natural and cultural resources potentially affected by their operations. DOE Order 450.1 required DOE sites to have an environmental management system (EMS) in place by December 31, 2005, to implement these practices. The DOE-LM EMS, which was formally implemented in October 2005, incorporates federal mandates specified in Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* (EO 2007).

The LM EMS is a systematic process for reducing the environmental impacts resulting from DOE-LM and contractor work activities, products, and services and directs work to occur in a manner that protects workers, the public, and the environment. The process adheres to "Plan-Do-Check-Act" principles, mandates environmental compliance, and integrates green initiatives into all phases of work, including scoping, planning, construction, subcontracts, and operations. The EMS provides specific procedures that anticipate and mitigate negative impacts to the environment by promoting use of recycled materials; recycling to the extent practicable; conserving fuel, energy, and natural resources; and minimizing the generation of greenhouse gases, use of toxic chemicals, and generation of hazardous wastes.

2.0 Final Site Conditions

Reclamation of the former Mexican Hat uranium-processing site in San Juan County, Utah, consisted of demolishing site structures and relocating the contaminated structural materials and contaminated mill site tailings and soils to a disposal cell (repository) constructed at the former site of the lower tailings pile. Radioactive materials from 11 vicinity properties and tailings and associated waste hauled from the Monument Valley Processing Site, were also placed in the cell.

2.1 Site History

The mill at the Mexican Hat Processing Site was constructed and operated from 1957 to 1963 by Texas-Zinc Minerals Corporation. Atlas Corporation purchased the mill in 1963, and operated it until it was closed in 1965. The mill was built on land leased from the Navajo Nation; control of the site reverted to the Navajo Nation after the Atlas Corporation lease expired in 1970 (FBDU 1981). The former Mexican Hat Processing Site covered 235 acres.

Much of the uranium ore processed at the Mexican Hat site came from the White Canyon area of Utah and contained a considerable amount of copper sulfide and other sulfide minerals. The ore was ground and treated by froth flotation. The flotation concentrates and tailings were acid-leached separately to recover both copper and uranium products. During its operation, the mill processed 2.2 million tons of ore and produced 5,700 tons of uranium concentrate. In addition to the milling operation, a sulfuric acid manufacturing plant operated at the site until 1970 (FBDU 1981). At the time of the remedial action, the concrete pad for the mill building and several associated buildings and structures (e.g., scale house, office building, and tanks) remained.

The Monument Valley Processing Site is in Apache County, Arizona, and is within the Navajo Nation Reservation approximately 17 road miles south of the Mexican Hat Disposal Site. At the time of remedial action, the designated 98-acre Monument Valley site contained two tailings piles covering approximately 28 acres, concrete building foundations, and debris (DOE 1989). The total volume of residual radioactive material (RRM) at the Monument Valley site, including the tailings, soils beneath and around the tailings, and other contaminated materials, was estimated to be 983,300 cubic yards (DOE 1989). The Monument Valley Processing Site RRM was transported to the Mexican Hat Disposal Site and placed on top of the pre-existing RRM in the disposal cell that was under construction.

The remedial action at the Mexican Hat Disposal Site was completed in 1995. Approximately 3.6 million cubic yards of RRM were stabilized in a disposal cell at the location of the lower Mexican Hat tailings pile. The former mill office building and sewage lagoons were left intact. At the completion of surface remedial action, the roughly pentagonal-shaped fenced-in disposal cell covers approximately 68 acres. The entire Mexican Hat Disposal Site property encompasses approximately 119 acres.

2.2 General Description of the Disposal Site Vicinity

The Mexican Hat Disposal Site is in San Juan County, Utah, in Sections 13 and 24, Township 42 South, Range 18 East, and Sections 18 and 19, Township 42 South, Range 19 East, Salt Lake Principal Meridian. The disposal site encompasses approximately 119 acres within the Navajo

Nation Reservation approximately 2 road miles southwest of the town of Mexican Hat, Utah (Figure 2–1 and Figure 2–2). The small Navajo community of Halchita is approximately 0.5 road miles southwest of the site. The closest city with commercial airline service is Farmington, New Mexico, approximately 134 road miles to the southeast.

The Mexican Hat Disposal Site is within the Colorado Plateau physiographic province that covers approximately 114,000 square miles in Utah, Arizona, Colorado, and New Mexico. Major topographic features in the area are the deeply entrenched San Juan River to the north and prominent Raplee Ridge to the northeast. The elevation of the site is approximately 4,300 feet above the National Geodetic Vertical Datum of 1929.

The Mexican Hat Disposal Site is approximately 1 mile south of the San Juan River on a relatively flat mesa at an elevation of approximately 4,300 feet above mean sea level. Surface drainage from the site and surrounding area is to the San Juan River. Bounding the relatively flat mesa to the north and east are the ephemeral drainages North Arroyo and Gypsum Creek. These drainages are relatively narrow and deeply incised. The terrain west of the site is similar to that to the north and east (DOE 1995; 1993). A ridge that extends approximately 100 feet above the site bounds the site on the south.

The climate in the area is arid with widely ranging daily and annual temperatures. Winters are cold (nighttime temperatures below freezing prevail from November through March), and summers are hot with high temperatures from 90 to 100 degrees Fahrenheit. Prevailing winds are from the southwest. Average annual precipitation is 6 inches. Precipitation is fairly evenly distributed throughout the year. Snowfall is usually light. Mexican Hat received an annual average of 3.3 inches of snow from 1951 through 1980. The area is sparsely vegetated by desert shrubs and grasses, and the land around the site is used for limited residential purposes and livestock grazing (DOE 1987).

2.3 Disposal Site Description

2.3.1 Site Ownership

The Mexican Hat Disposal Site is located on the Navajo Nation Reservation in southeast Utah. The approximately 119-acre disposal site is held in trust by the United States of America for the Bureau of Indian Affairs; the Navajo Nation retains title to the land. Real estate information, including a legal description of the land, is included in Appendix A.

DOE and the Navajo Nation executed a Custodial Access Agreement that conveys to the federal government title to the residual radioactive materials stabilized at the repository site and ensures that DOE has perpetual access to the site (Appendix B). UMTRCA authorized DOE to enter into Cooperative Agreement (CA) (DE-FC04-85AL26731) with the Navajo Nation and NRC required it prior to bringing the site under the general license. The purpose of the CA was to perform remedial actions at the former processing sites. The site was accepted under the NRC general license (10 CFR 40.27) in 1997. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site.

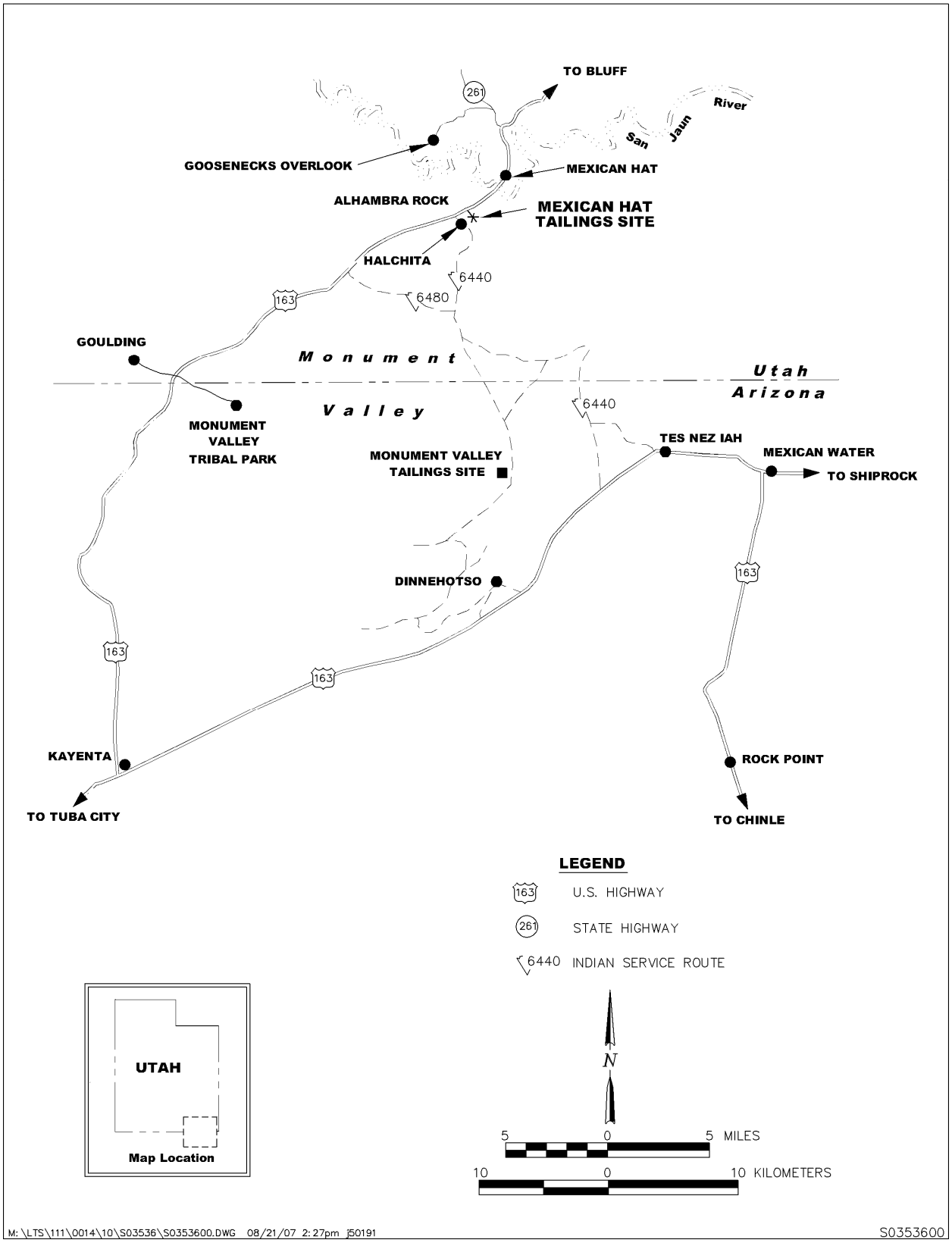

Figure 2–1. General Location Map of the Mexican Hat, Utah, Disposal Site

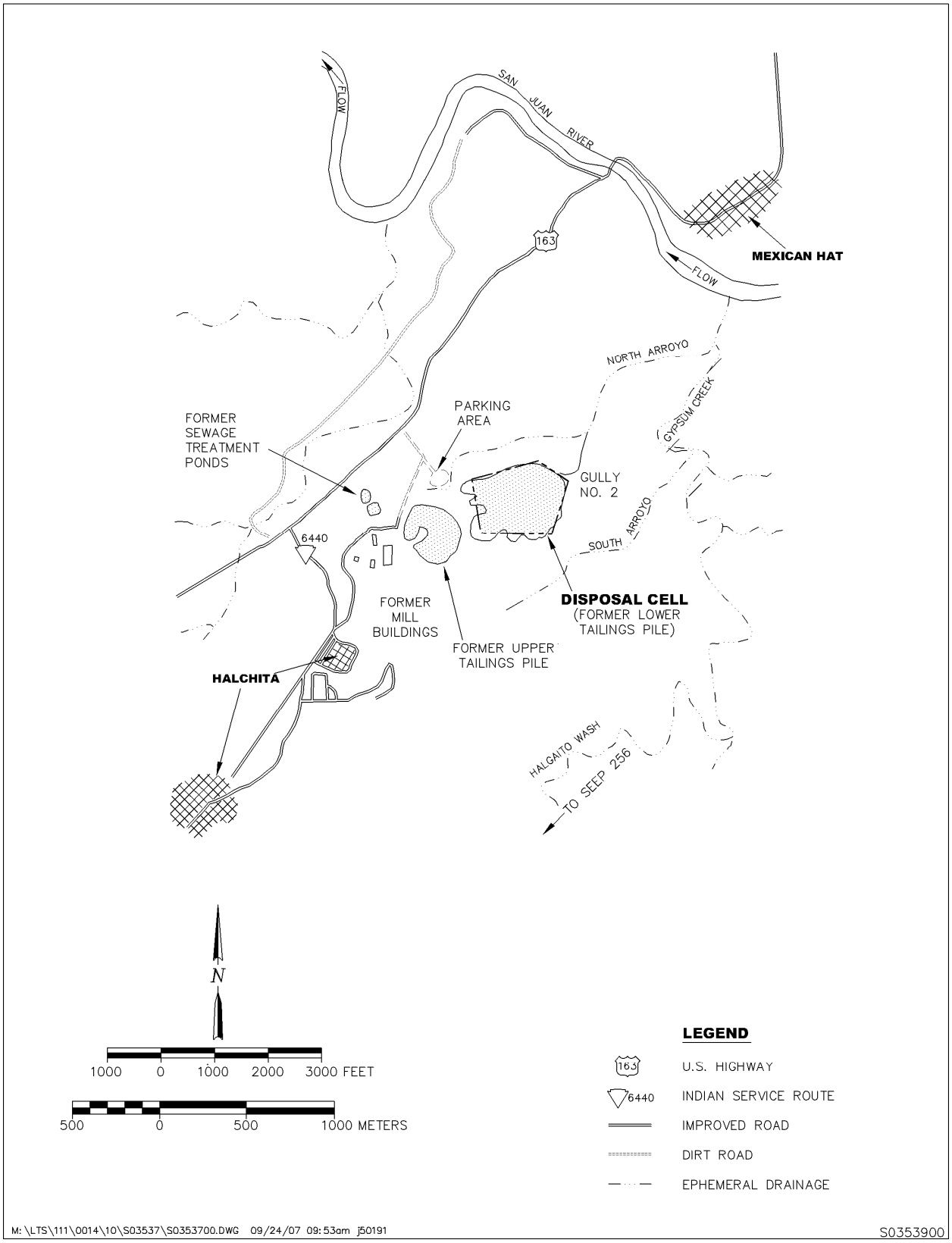

Figure 2–2. Mexican Hat, Utah, Disposal Site Vicinity Map

2.3.2 Directions to the Disposal Site

From the north end of the U.S. Highway 163 bridge over the San Juan River, travel approximately 1.2 miles southwest. Turn left (southeast) onto a gravel road, which will immediately pass under power transmission lines. Take the left fork at the "Y" intersection at the top of the hill, and stay to the left to descend to the level parking area at the northwest corner of the disposal site. The distance from U.S. Highway 163 to the parking lot is approximately 0.2 mile. The entrance gate is near the northwest corner of the disposal cell. Figure 2–2 is a detailed map showing the site access route.

2.3.3 Description of Surface Conditions

The aboveground disposal cell covers approximately 68 acres of the approximately 119-acre disposal site property. The disposal cell abuts a steep ridge to the south and rises to a height of approximately 50 feet above the surrounding terrain to the north, east, and west.

The final surface conditions at the Mexican Hat Disposal Site are a combination of rock armoring and contouring to achieve the necessary surface water drainage control and erosion protection to satisfy the longevity design requirements (a more detailed discussion of the disposal cell design and surface water control is provided in Section 2.4). The final surface conditions at the Mexican Hat Disposal Site are shown on Figure 2−3.

2.3.4 Permanent Site Surveillance Features

The disposal cell at the Mexican Hat Disposal Site is completely enclosed with a barbed wire fence. Access to the disposal site (site entrance) is provided by a locked, double-leaf, swing gate at the northwest corner of the disposal site. An entrance sign is located at the gate.

The permanent long-term surveillance features at the Mexican Hat Disposal Site are boundary and survey monuments, site markers, an entrance sign, and perimeter warning signs. The positions of the permanent site surveillance features are shown on Figure 2−3.

Twelve boundary monuments mark the final site boundary. Two unpolished granite site markers with an incised message are located at the disposal site entrance, and at the crest of the disposal cell. The message on the granite site marker is shown on Figure 2–4. There are 43 perimeter warning sign locations along the property boundary and each location has a pair of signs: an upper property ownership sign, which displays the DOE 24-hour telephone number, and a lower radioactive materials disposal site warning sign (Figure 2–5).

These features will be inspected and maintained as necessary as part of the passive institutional controls for the site.

2.3.5 Site Geology

The Halgaito Shale, the lowermost unit of the Permian Cutler Group, is exposed at the ground surface of the site (Figure 2–6). This shale consists primarily of interbedded silty sandstone, siltstone, and shale. Calcareous, well cemented beds alternate with less-cemented beds, and there are some thin lenticular beds of limestone and conglomerate (siltstone and limestone pebbles in a silty matrix). The unit is 80 to 215 feet thick in the site vicinity. Two sets of nearly

vertical fractures trending east-west and northeast-southwest and fractures along bedding planes that dip toward the east are present in the upper portion of the Halgaito Shale at the site. The presence and size of the fractures decreases significantly with depth (DOE 1995; 1993).

The Honaker Trail Formation is the uppermost unit of the Hermosa Group and lies beneath the Halgaito Shale (Figure 2–6). The Honaker Trail Formation consists of interbedded siltstone, limestone, shale, and sandstone. Chert and limestone nodules are found throughout the siltstone beds, and the limestone units are predominantly fine to very fine grained. The formation is more than 300 feet thick (DOE 1995; 1993).

2.3.6 Hydrology

The Halgaito Shale is divided into upper and lower units. The upper unit was unsaturated before the uranium processing activities at the Mexican Hat site. Nearly all of the ground water presently contained in the upper unit of the Halgaito Shale is a result of the former uranium processing operations (the discharge of process water and water used to place the tailings) and, to a lesser degree, transient drainage from the disposal cell. Minor amount of naturally occurring ephemeral ground water is also present, scattered intermittently throughout the upper unit of the shale, particularly near the surface. The ground water in the upper unit of the Halgaito Shale is contained primarily in fractures and is perched on underlying zones having a lower hydraulic conductivity.

The lower unit of the Halgaito Formation is classified as the uppermost aquifer beneath the site and is isolated from ground water in the upper unit of the Halgaito Formation by thin lenticular to continuous limestone beds that act as a confining layer (aquitard) limiting vertical water movement. An upward hydraulic gradient occurs in the uppermost aquifer that prevents perched ground water in the upper unit of the Halgaito Shale from entering the uppermost aquifer.

Both the upper and lower units of the Halgaito Shale exhibit very little primary hydraulic conductivity due to the fine-grained nature of the sediments and intergranular cements. The hydraulic conductivity of the Halgaito Shale decreases with depth because of the decrease in the number and size of the fractures, with the lower unit of the shale providing a very effective confining layer that significantly limits the vertical exchange of ground water between the Halgaito Shale and the underlying Honaker Trail Formation (DOE 1995; 1993).

Natural recharge to the Halgaito Shale is limited by low annual precipitation (6 inches per year) and high evaporation. Discharge is through the fractures and on low-permeability beds as the ground water travels toward seeps in the North Arroyo, South Arroyo, and Gypsum Creek. The ground water in the Halgaito Shale that is affected by the former uranium-processing site operations is limited in areal extent and yield, and therefore, has no current use as a water resource (DOE 1995; 1993).

Ground water perched within the Halgaito Shale in the vicinity of the Mexican Hat Disposal Site intermittently discharges to the surface as seeps, along joints, fractures, and bedding planes in the formation. Several of these seeps have been identified in North Arroyo (directly north of the disposal cell), South Arroyo (directly southeast of the disposal cell) and Gypsum Creek (east of the disposal cell) (Figure 2−7).

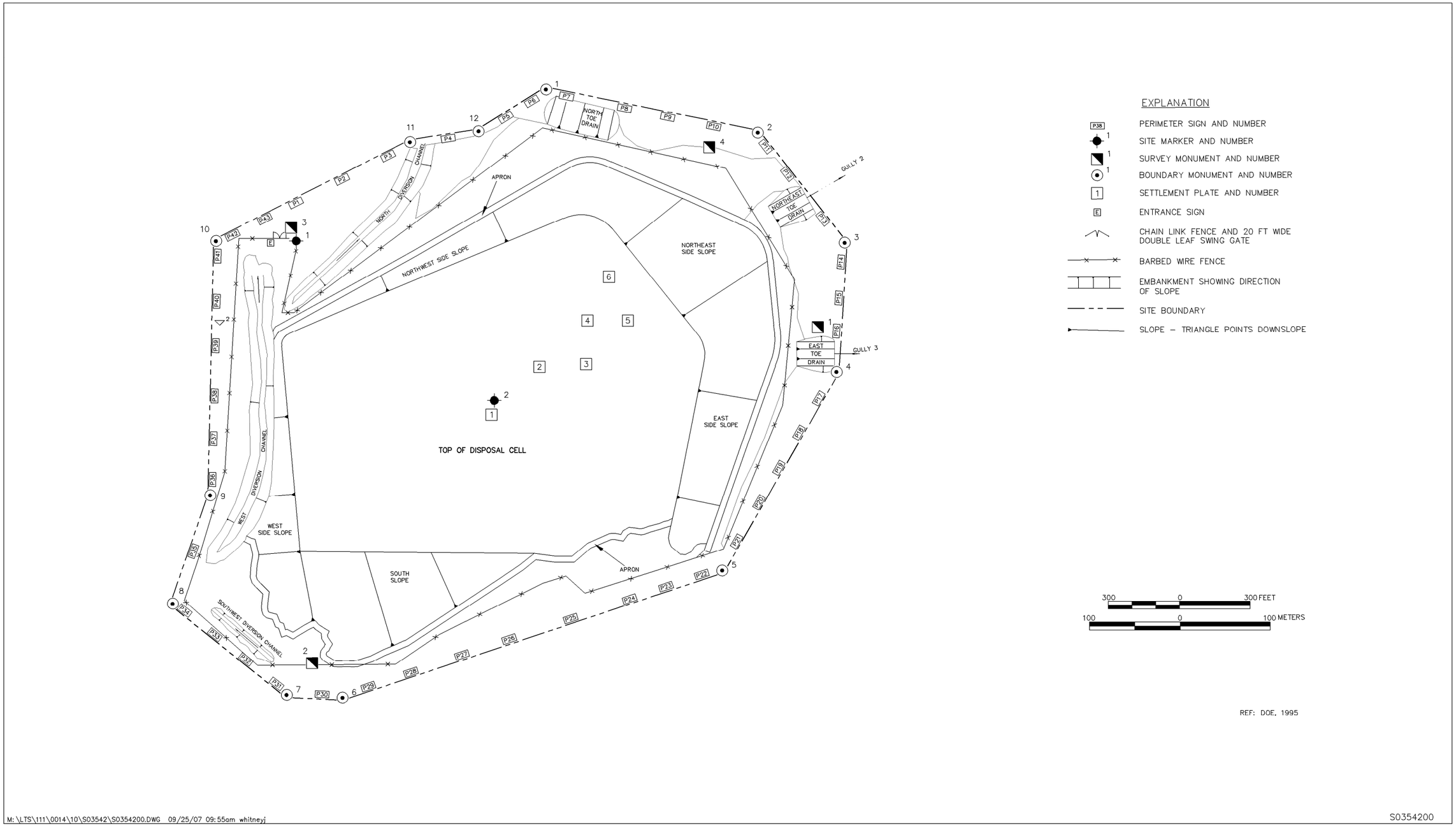

Figure 2–3. Disposal Site Map, Mexican Hat, Utah, Disposal Site

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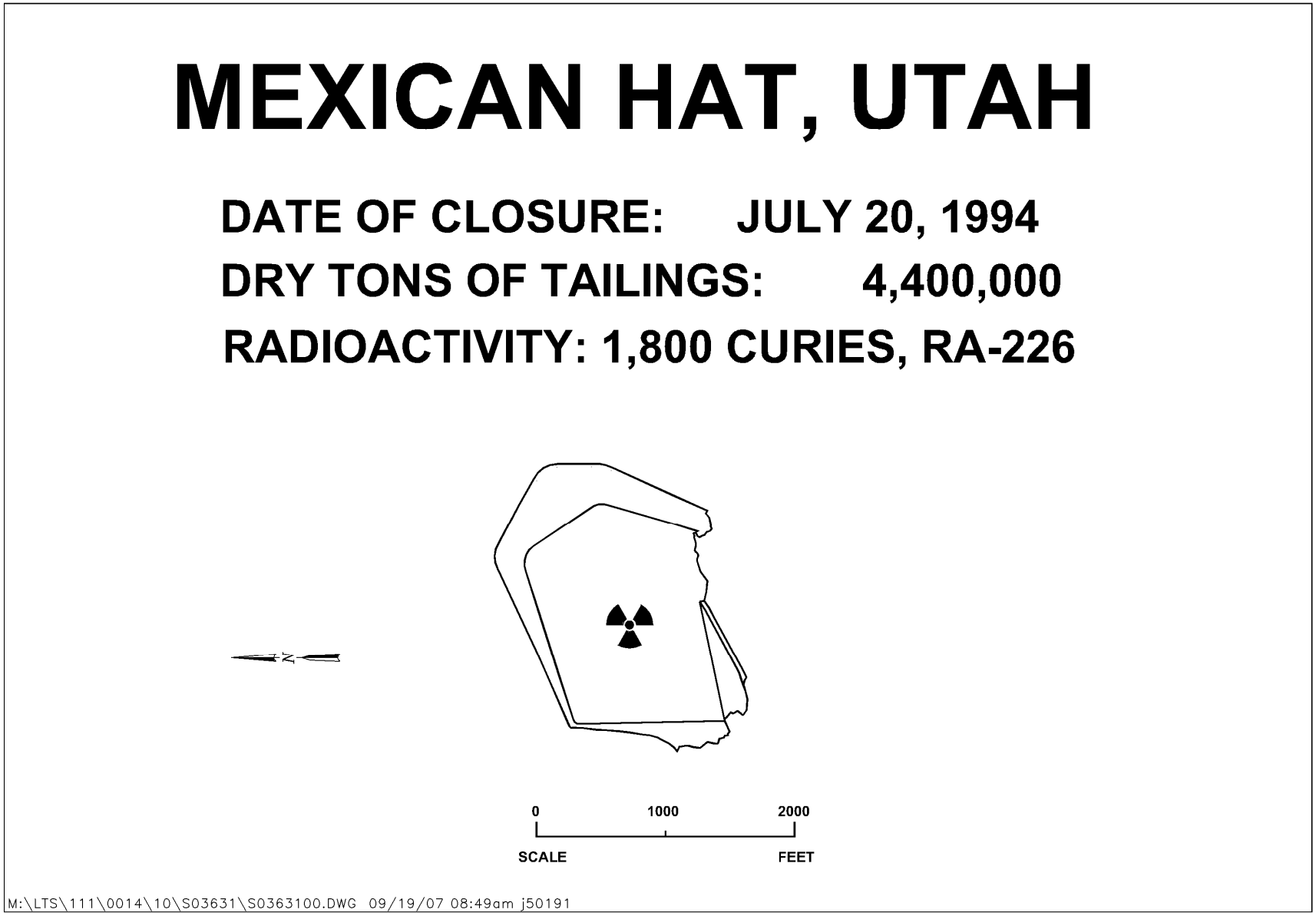

Figure 2–4. Site Marker at the Mexican Hat, Utah, Disposal Site

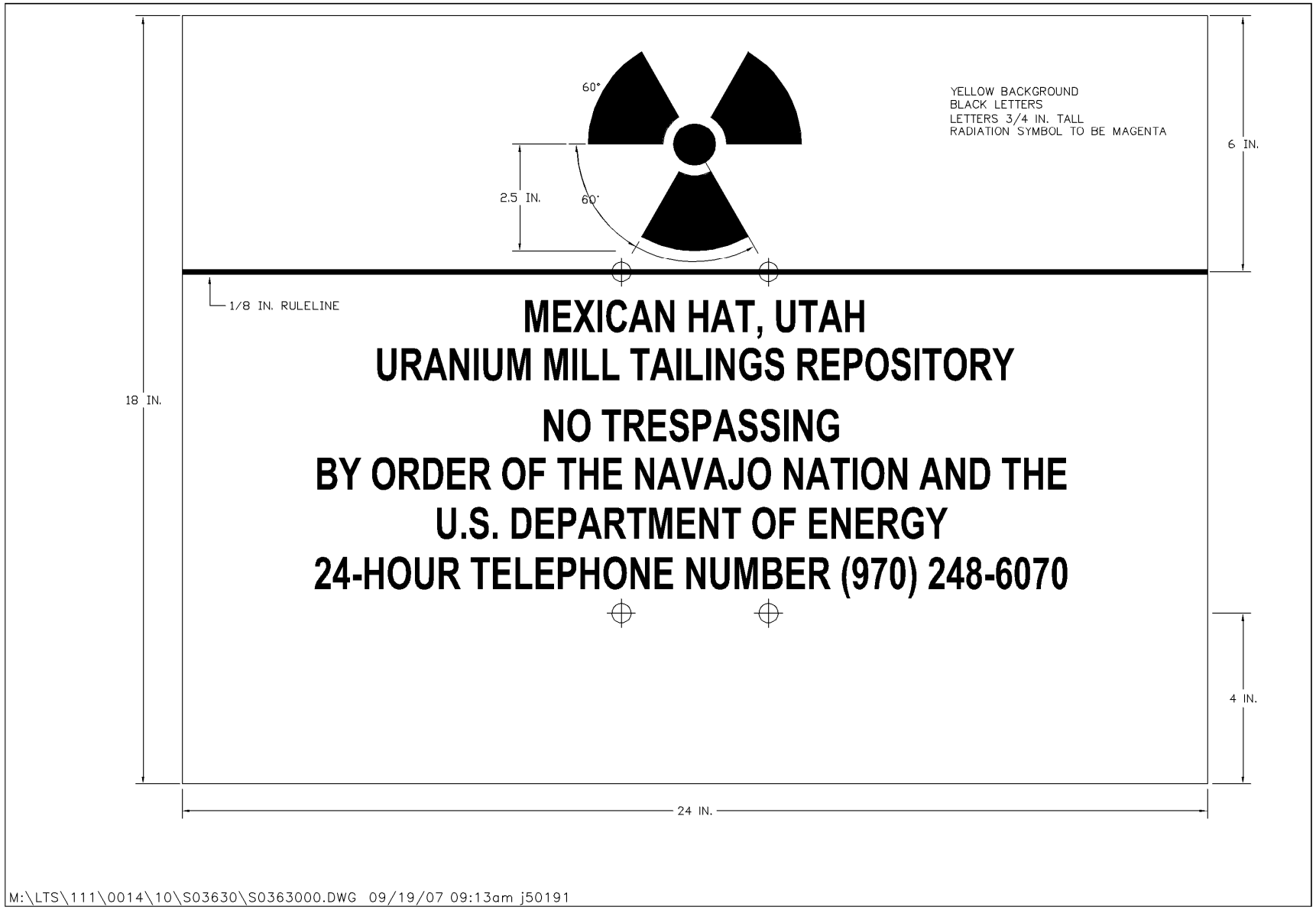

Figure 2–5. Warning Sign at the Mexican Hat, Utah, Disposal Site

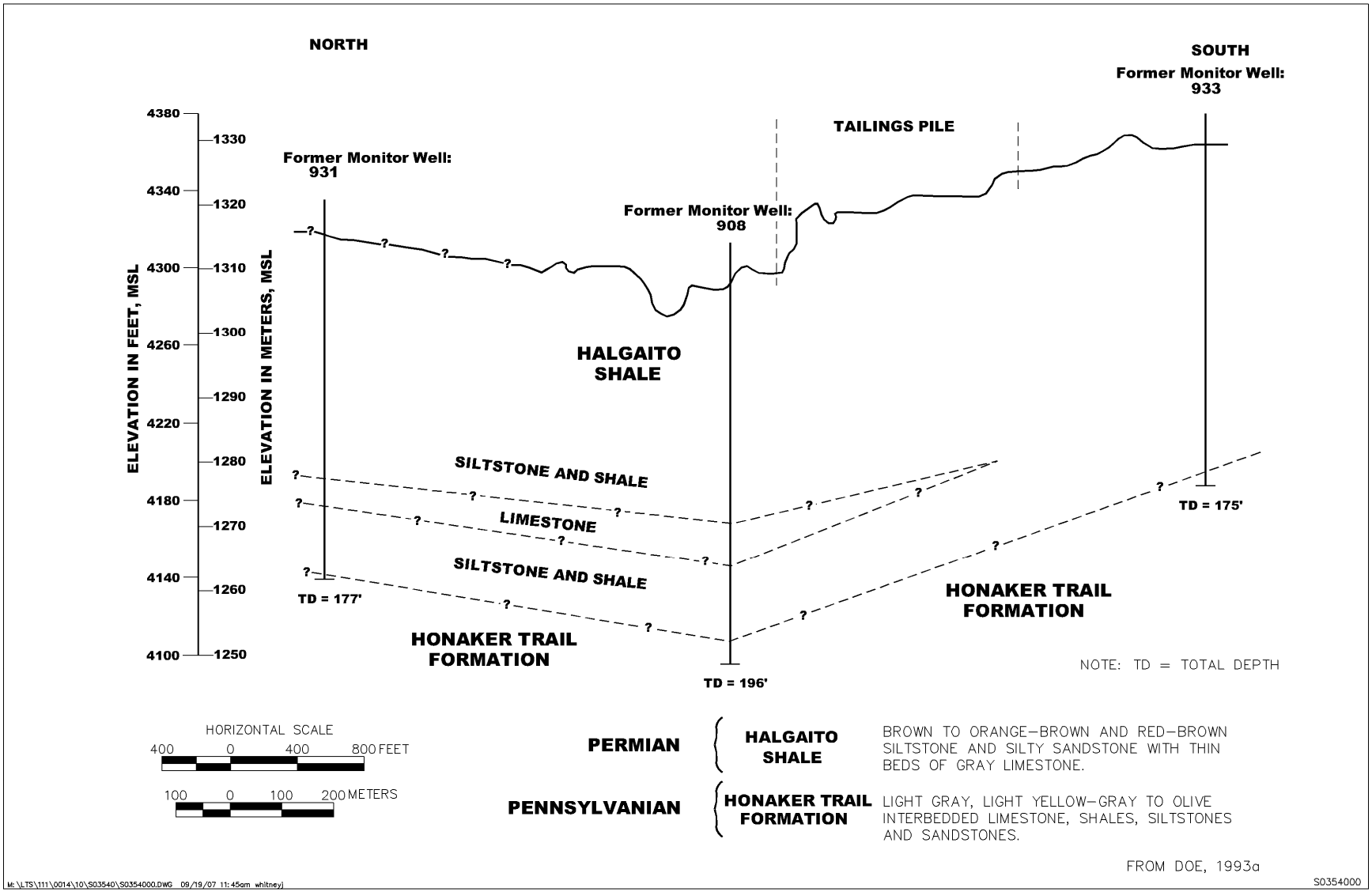

Figure 2–6. Typical Geologic Cross Section Mexican Hat, Utah, Disposal Site

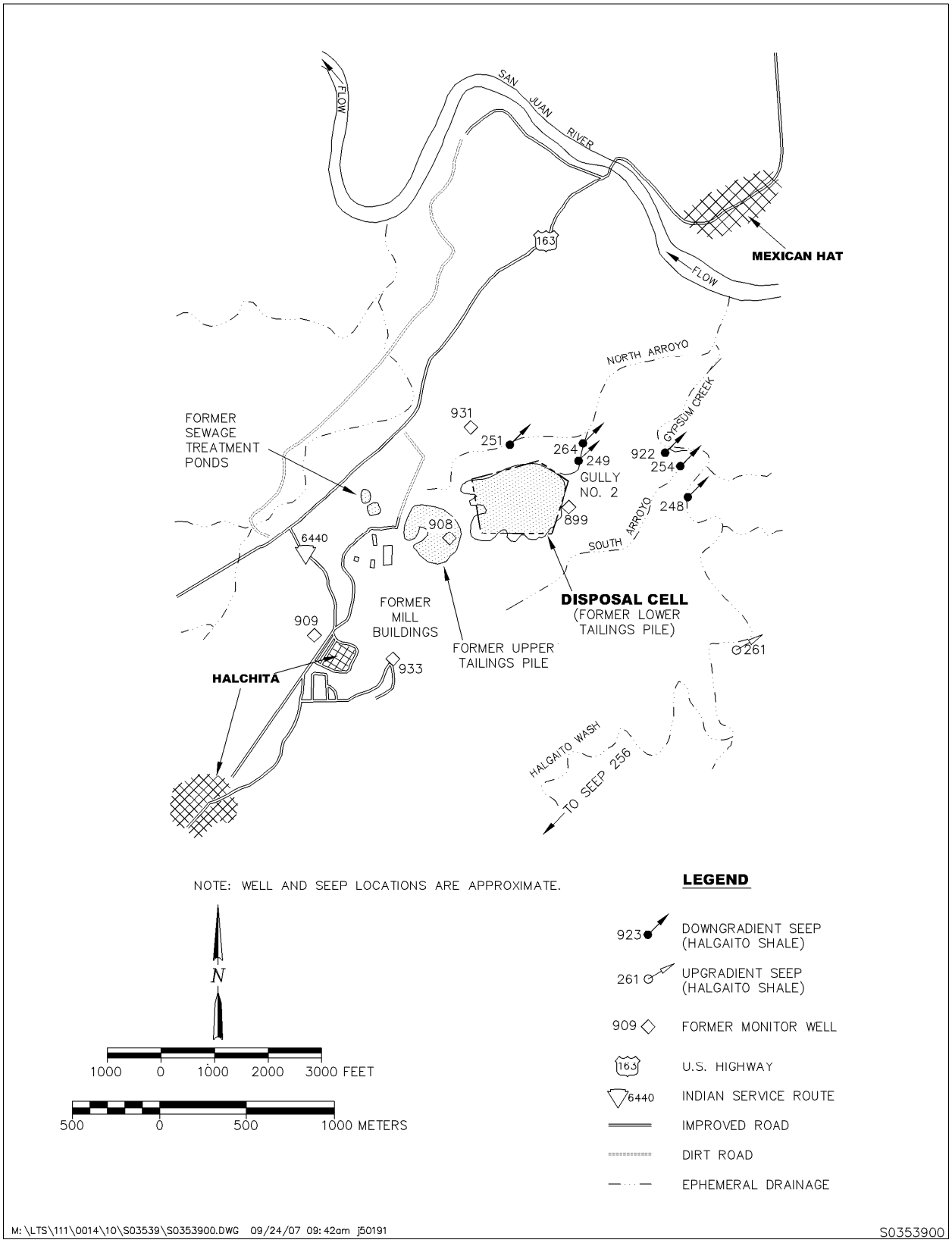

Figure 2–7. Seep and Former Monitor Well Locations at the Mexican Hat, Utah, Disposal Site

All of these seeps have exhibited very low flow rates, and have been observed to be dry at certain times of the year, particularly, following periods of dry weather (DOE 2006). These seeps are primarily a result of transient drainage from the former processing site tailings ponds and from the wet tailings material that was placed within the disposal cell, and to a lesser extent, from natural recharge. Historical records (including aerial photographs) also indicate that many of the seeps were present, at least intermittently, prior to processing-site activities and before site remediation occurred, although to a lesser degree (DOE 1990; Snelling 1971). Natural recharge to the Halgaito Shale formation does occur as evidenced by the presence of seeps upgradient of the site (Figure 2−7).

The Honaker Trail Formation contains an aquifer below the Halgaito Shale. This deeper aquifer is isolated from ground water in the Halgaito Shale because the lower portion of the Halgaito Shale is a very effective confining layer and an upward hydraulic gradient in the Honaker Trail Formation prevents ground water in the Halgaito Shale from entering the Honaker Trail Formation (DOE 1995). Water levels in the confined Honaker Trail aquifer are above the perched water levels in the Halgaito Shale and above the ground surface in some locations, including at the disposal site. Ground water in the Honaker Trail aquifer flows northeast toward the San Juan River, which is the discharge area for the aquifer. Recharge to the aquifer is limited and may occur as precipitation in areas to the southwest where the formation is closer to or exposed at the ground surface. Recharge may also occur as upward flow from deeper units.

2.4 Tailings Impoundment and Repository Design

In designing the repository for permanent disposal of contaminated material, analyses were performed to evaluate slope stability, settlement and cover cracking, liquefaction, and the need for radon attenuation, frost protection, and erosion protection. The radon barrier over the disposal area was constructed to achieve the pertinent radioactive emissions standards. Diversion channels were designed to hydraulically isolate the disposal area preventing erosion over the long-term. Additional information can be found in the *Remedial Action Plan for the Codisposal and Stabilization of the Monument Valley and Mexican Hat Uranium Mill Tailings at Mexican Hat, Utah* (DOE 1993) and in the *Mexican Hat, Utah, Monument Valley, Arizona, Completion Report* (MK-F 1997).

The Mexican Hat and Monument Valley RRMs were consolidated, compacted, and stabilized at the location of the lower tailings pile at the Mexican Hat site. The Mexican Hat cell contains approximately 4.4 million tons of RRM including uranium mill tailings, contaminated soils, and mill site debris (e.g., demolished building materials).

2.4.1 Encapsulation Design

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

The cover placed over the disposal cell has three components, as shown as a generalized cross section in Figure 2−8. The RRM was encapsulated with a radon barrier composed of fine-grained material, the purpose of which is to control radon emanation and water infiltration. The radon

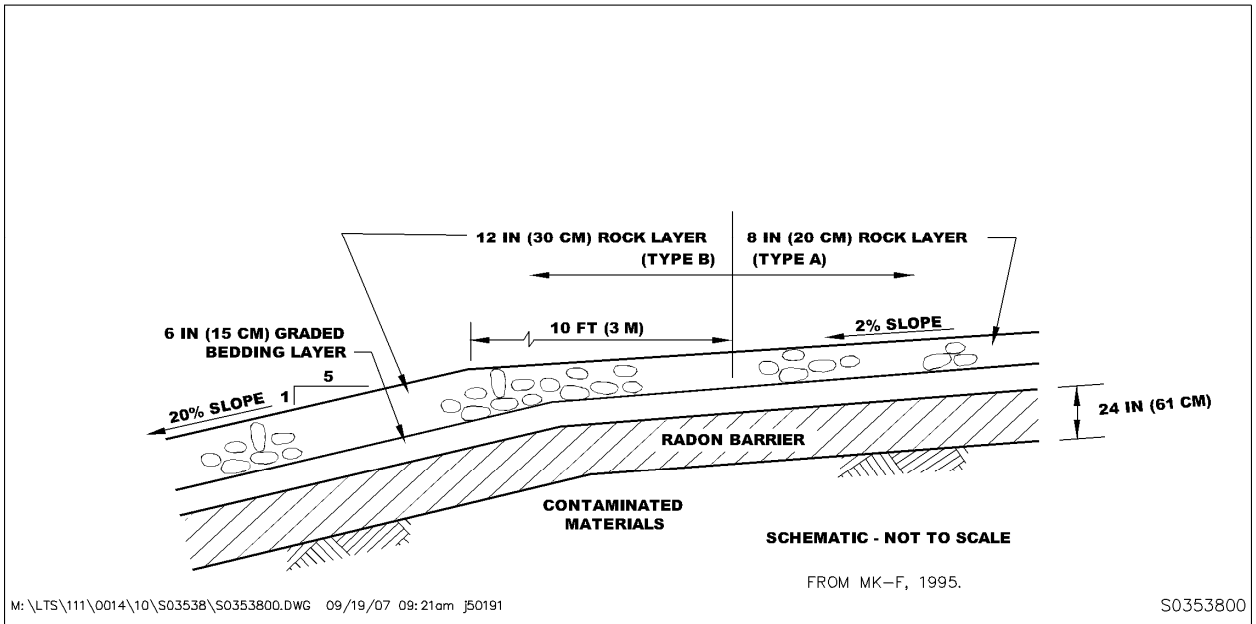

Figure 2–8. Generalized Cross Section of Disposal Cell Cover, Mexican Hat, Utah, Disposal Site

barrier consists of 24 inches of compacted silty sand amended with 10 percent bentonite clay. The radon barrier is covered with a 6-inch thick graded bedding layer of coarse sand and gravel. The graded bedding layer protects the fine-grained radon barrier during placement of the rock layers and functions as a drain that sheds water laterally off the disposal cell while protecting the radon barrier from erosion caused by interstitial flow. The graded bedding layer was covered with a layer of coarser-grained material to prevent erosion due to wind or rain. The erosion protection layer consists of an 8-inch-thick layer of 1.7-inch or larger mean-diameter rock (riprap) on the top of the disposal cell and a 12-inch-thick layer of 4.4-inch or larger mean-diameter rock on the sideslopes and aprons of the disposal cell (Figure 2−3).

The sideslopes of the disposal cell were limited to a 20 percent grade to create a stable slope, and the top of the disposal cell has a 2 percent grade to promote drainage.

2.4.2 Surface Water Diversion System

The site-wide grading plan forms the basis of the surface water diversion system. The plan uses contours approved with the reclamation plan for the repository (DOE 1993). The Mexican Hat disposal cell and a portion of the surrounding area were graded and permanent drainage features were constructed to minimize erosion (Figure 2−3). The top of the disposal cell has a 2 percent grade to promote drainage. Runoff from the western watershed at the site and the western sideslope of the disposal cell will be intercepted by the west diversion channel which discharges into the North Arroyo. The southwest diversion channel will direct runoff from the watershed southwest of the disposal cell into the west diversion channel. Runoff from the eastern sideslopes of the disposal cell will flow eastward and northeastward as sheet flow and be released across the rock-covered aprons at the base of the cell. Runoff from the top of the disposal cell will flow to the north, and northeast as sheet flow and then down the northern sideslope across the rock-covered apron into the north diversion channel and into the North Arroyo.

The west, north, southwest, and diversion channels are sized to carry the runoff from 1-hour rainfall intensity of a probable maximum precipitation event and are excavated into an erosion-resistant layer of sandstone and lined with engineered rockfill (riprap). The north diversion channel also has an excavated keyway with riprap at its outfall into the North Arroyo to prevent headcutting, and three gullies on the northern and eastern sides of the disposal cell are armored with riprap (i.e., north, northeast, and east toe drains) to prevent advancement toward the cell. There is also a drainage channel approximately 150 feet long at the southeast corner of the base of the disposal cell. This drainage channel is lined with riprap and drains into the South Arroyo.

2.5 Ground Water Conditions

Ground water within the upper unit of the Halgaito Shale beneath and directly downgradient of the site is contaminated from, and primarily the result of, historical on-site uranium-processing operations. However, the upper unit of the Halgaito Shale is not considered an aquifer and has no current or potential use as a ground water resource because it is limited in areal extent and yield, and has naturally poor water quality (see Section 2.5.1). Because the ground water in this upper unit is not considered an aquifer and cannot be used for production, any risk from exposure to site-related contaminants within ground water in this unit is only of concern where it surfaces via seeps along North Arroyo, South Arroyo, and Gypsum Creek. Based on the low flows observed

historically from these seeps, they also do not constitute a water resource and do not provide sufficient volume to present a significant risk to human health and the environment (DOE 2006).

Ground water within the lower unit of the Halgaito Shale, classified as the uppermost aquifer beneath the site, is hydrogeologically isolated from the site-related ground water contamination that occurs in the upper unit of the Halgaito Formation (see Section 2.3.6). As a result, ground water in this uppermost aquifer beneath the site was not contaminated from historical uranium processing operations (or remedial actions), and will not likely become contaminated from the disposal cell, as designed. Recharge to the uppermost aquifer is also not affected by site-related contamination since it occurs upgradient (southwest) of the site, and from upward flow from deeper formations (DOE 2006).

Ground water within the Honaker Trail Formation aquifer that lies directly beneath the Halgaito Shale is also effectively isolated hydrogeologically from the site-related contamination that is found in ground water within the upper unit of the Halgaito Shale by the overlying confining layers and an upward hydraulic gradient (DOE 2006). The ground water in the Honaker Trail Formation is not contaminated from the uranium processing activities, but its natural quality in the vicinity of the Mexican Hat Disposal Site likely is unsuitable for consumption (see Section 2.5.1 and Table 2–1). Former monitor wells at the disposal site showed the presence of hydrogen sulfide gas and naturally occurring petroleum. The Halgaito Shale and Honaker Trail Formation produced a limited amount of oil in the oil field near the town of Mexican Hat (DOE 1995; 1993).

2.5.1 Background Ground Water Quality

Background ground water quality was determined for the Halgaito Shale and underlying Honaker Trail Formation at the Mexican Hat Disposal Site. The Halgaito Shale contains only minor amounts of naturally occurring water, and upgradient monitor wells in the shale were dry. Therefore, background ground water quality for the Halgaito Shale was determined using Seep 256 in Halgaitoh Wash and Seep 261 in Gypsum Creek upgradient of the disposal site (Figure 2−7). The water quality of these seeps is very similar, and both seeps appear to be isolated from ground water contamination related to the disposal site. Background ground water quality for the Honaker Trail Formation was determined using monitor well MW−0909 upgradient of the disposal site (Figure 2−7) (DOE 1995; 1993).

The background ground water quality of the Halgaito Shale and Honaker Trail Formation is generally similar because both units are lithologically similar (Table 2−1). Both units contain the same calcium sulfate as the mineral gypsum, which has been positively identified in outcrops of the Halgaito Shale. This is reflected in the background ground water quality. Ground waters from both units contain relatively high concentrations of sulfate as the dominant anion (2,000 to 3,300 milligrams per liter [mg/L]) balanced by nearly equal equivalents of sodium, calcium, and magnesium. The pH of the ground waters is slightly alkaline, and the ground waters in both units are oxidizing. Total dissolved solids in the ground waters range from 3,200 to 5,300 mg/L (DOE 1995; 1993).

Table 2–1. Background Ground Water Quality for the Halgaito Shale and Honaker Trail Formation, Mexican Hat, Utah, Site

Constituent	Halgaito Shale[a]	Honaker Trail Formation[b]
Alkalinity	189−289	133–159
Aluminum	<0.05	<0.1–0.3
Ammonium	<0.01−0.5	0.1–0.4
Antimony	<0.02	<0.003–0.006
Arsenic	<0.01	<0.01–0.02
Barium	<0.002−0.02	<0.01–0.1
Beryllium	<0.005	
Boron	0.3−0.4	0.1–1.0
Bromide	0.5−0.9	
Cadmium	<0.001	<0.001–0.005
Calcium	410−555	330–445
Chloride	109−181	93–110
Chromium	<0.01	<0.01–0.09
Cobalt	<0.03	<0.05
Copper	<0.01	<0.01–0.04
Fluoride	0.4−2.2	1.3–1.5
Iron	<0.03−0.2	<0.03–0.13
Lead	<0.005	<0.01
Lead-210 (pCi/L)	0.0−1.0	
Magnesium	44−265	141 -190
Manganese	<0.01−0.66	0.01–0.02
Mercury	<0.0002	<0.0002
Molybdenum	<0.01−0.02	<0.01–0.20
Nickel	<0.04	<0.04–0.11
Nitrate	<1.0−8.9	0.8–11.1
pH	7.1−8.0	7.1–7.4
Phosphate	<0.01−0.01	<0.1–0.1
Polonium-210 (pCi/L)	0.5−0.7	0.0
Potassium	6−15	5.4–8.5
Radium-226 (pCi/L)	0.0−1.5	0.0–0.3
Radium-228 (pCi/L)	0.0−6.0	0.0–8.5
Selenium	<0.03	<0.005 0.04
Strontium	10−13	<:0.1–9.2
Silver	<0.01	<0.01
Silica - $Si0_2$	16−25	14–16
Sodium	270−740	397–470
Sulfate	2,200−3,300	1,980 – 2,380
Sulfide	<0.1−4.4	<0.1–64.4
Thallium	<0.03	
Thorium-230 (pCi/L)	0−1.7	0.0–0.30
Tin	<0.05	<0.005
Total dissolved solids	3,700−5,300	3,170 – 3,730
Total organic carbon		<1–31
Uranium	0.01−0.05	0.04–0.06
Vanadium	<0.01−0.02	<0.01–0.49
Zinc	<0.005−0.01	<0.01–0.03

[a]Data are from Seeps 256 (Halgaitoh Wash) and 261 (Gypsum Creek) (Figure 2−7) from 1990 to 1994.
[b]Data were collected from monitor well 909 (Figure 2−7) from 1985 to 1993.

All data are in milligrams per liter unless noted as picocuries per liter (pCi/L). Values given as less than (<) are below the minimum detection limit for the analysis.

Several constituents commonly found in the solutions produced by the uranium processing at the Mexican Hat site are also present naturally in ground water from the seeps upgradient of the site. However, the concentrations of these constituents in the ground water are below those in the tailings piles pore water. Constituents that occur naturally in ground water from the upgradient seeps include ammonium, boron, magnesium, manganese, molybdenum, nitrate, silica, sulfate, and uranium (DOE 1995; 1993).

2.5.2 Historical Ground Water Monitoring

Ground water monitoring is not required at the Mexican Hat Disposal Site under the current protection strategy (NRC 1996). Ground water monitoring is not required because the upper unit of the Halgaito Shale is not considered an aquifer, and therefore is not a current or potential source of drinking water, and the underlying uppermost aquifer within the lower unit of the Halgaito Shale and the Honaker Trail Formation is hydrogeologically isolated from contamination in the overlying formation. No contamination related to the former Mexican Hat processing site was detected in the uppermost aquifer during operational and pre-disposa-cell construction monitoring (DOE 1987; 1995).

However, due to concerns raised by the Navajo Nation, additional ground water monitoring was performed at the site from November 2000 to August 2002, as a best management practice (BMP). This monitoring was performed to demonstrate analytically that no site-related contamination occurred in the confined uppermost aquifer and that the upward hydraulic gradient continued. Ground water monitoring was conducted both upgradient and downgradient of the current disposal cell (and of the former processing site and tailings piles). Monitor well MW−0899, located approximately 150 feet downgradient of the disposal cell on the east side, and monitor well MW−0909, located approximately 3,000 feet upgradient from the disposal site on the west side, were sampled (Figure 2–7). Sample analysis included the following indicator parameters of site-related contamination: uranium, sulfate, and nitrate. DOE agreed to perform this monitoring on a semiannual basis through 2002 and then evaluate the need for continued monitoring (DOE 2006). A summary of the results of this BMP ground water monitoring is provided in Table 2–2.

Table 2–2. Summary of Results of BMP Ground Water Monitoring of the Uppermost Aquifer at the Mexican Hat Disposal Site

Monitor Well *(Number and Location)*	**Uranium** *MCL = 0.044 mg/L*		**Sulfate** *MCL = none*		**Nitrate** *MCL = 44 mg/L*	
	Range	**Average**	**Range**	**Average**	**Range**	**Average**
Downgradient						
MW–0899	0.008−0.014	0.010	4,220−4,600	4,390	0.02-0.09	0.04
Upgradient (Background)						
MW–0909	0.039−0.064	0.046	1,750−2,800	2,103	0.8−12.4	7.6

Concentrations reported in mg/L.
MCL = maximum concentration limit (40 CFR 192).
Nitrate reported as NO_3.

The ground water monitoring results from this 2-year period confirmed that no site-related contamination occurred in the confined uppermost aquifer and that the upward hydraulic gradient

continued. The results of the BMP ground water monitoring were presented in the report *Resolution of Seep and Ground Water Monitoring at the Mexican Hat, Utah, UMTRCA Title I Disposal* Site (DOE 2006). This report, submitted to the Navajo Nation and NRC, concluded that ground water monitoring was not required and recommended decommissioning the remaining wells at the site.

Concurrence to discontinue ground water monitoring and to decommission the remaining monitor wells at the site was received from the Navajo AML/UMTRA Department by letter correspondence in July 2006 (Navajo Nation 2006). DOE completed the well decommissioning activities on April 28, 2007. Currently, no ground water monitoring wells remain at the site.

2.5.3 Historical Seep Monitoring

Seep monitoring is not required at the Mexican Hat Disposal Site under the current protection strategy (NRC 1996), although discontinuous ephemeral perched ground water, contaminated as a result of historical site-related uranium processing activities, occurs within the upper unit of the Halgaito Shale beneath the site. This perched ground water intermittently seeps out at several locations along North Arroyo, South Arroyo, and Gypsum Creek downgradient of the site.

Due to concerns raised by the Navajo Nation, DOE performed annual monitoring of six seeps under the LTSP (Revision 2) as a BMP to evaluate disposal cell performance (in accordance with Subpart A of 40 CFR 192), and quarterly monitoring of 11 seeps for 3 years under the ground water compliance action plan (DOE 1999) as a BMP to demonstrate ground water compliance (in accordance with Subpart B of 40 CFR 192). Seep monitoring performed by DOE included water quality sampling and analysis for uranium, sulfate, and nitrate (indicator parameters of site-related contamination), and flow rate. Monitoring was performed from 1998 through 2005 (historical monitoring of some seeps occurred as early as 1985). A summary of the results of this BMP seep monitoring is provided in Table 2–3.

In 2006, an evaluation of the seep-monitoring program was conducted and presented in the report *Resolution of Seep and Ground Water Monitoring at the Mexican Hat, Utah, UMTRCA Title I Disposal* Site (DOE 2006). This report, submitted to the Navajo Nation and NRC, concluded that due to the intermittent low to non-existent flows observed in the seeps over the years that there was no significant risk to human health and the environment unless the seep flows were to significantly increase. Based on the monitoring results, the hydrogeological conditions at the site, the continued low yield (flows) from the seeps, and the absence of any receptors to demonstrate risk, a recommendation was made to discontinue water quality monitoring of the seeps and to only continue monitoring the flow rate of the seeps. The recommendation was to monitor seep flow rates qualitatively through photo documentation and observational description during the site annual inspections, with the understanding that if flows were to significantly increase, as compared to historical levels, the need to resume water quality monitoring would be re-evaluated.

Concurrence to the recommendation to discontinue all water quality monitoring of the seeps and to continue monitoring the flow rate of the several seeps at the site was received from the Navajo AML/UMTRA Department by letter correspondence in July 2006 (Navajo Nation 2006). Current seep monitoring is discussed in Section 3.7.2.

Table 2–3. Summary of Results of BMP Seep Water Quality Monitoring at the Mexican Hat Disposal Site

Seep *(Number and Location)*	**Uranium** *MCL = 0.044 mg/L*		**Sulfate** *MCL = none*		**Nitrate** *MCL = 44 mg/L*	
	Range	Average	Range	Average	Range	Average
North Arroyo						
0249 (downgradient)	0.483–1.18	0.789	2,850–3,813	2,847	114–800	347
0251 (downgradient)	0.013–2.10	0.647	614–5,650	2,438	30–2,260	637
0255 (downgradient)	0.568–1.71	0.866	2,620–7,000	3,421	97–1,190	437
0264 (downgradient)	0.120–2.16	0.941	1,100–6,310	3,482	110–1,110	508
Gypsum Creek						
0248 (downgradient)	0.380–0.779	0.563	1,900–4,010	3,157	4.7–393	163
0253 (downgradient)	0.017–0.488	0.311	2,170–4,290	3,210	16–161	95
0254 (downgradient)	0.612–0.838	0.742	2,300–3,880	3,061	381–994	597
0261 (upgradient)	0.007–0.094	0.027	2,690–3,950	3,232	0.016–8.9	0.829
0922 (downgradient)	0.212–0.503	0.354	2,870–3,907	3,140	1.8–338	132
0923 (crossgradient)	0.012–0.039	0.023	1,460–6,000	3,339	0.049–13.7	2.92
0924 (downgradient)	0.190–0.403	0.296	2,570–3,770	3,017	5.5–116	77.4
Halgaito Wash						
0256 (background)	0.010–0.046	0.028	2,030–3,260	2,310	0.017–3.8	0.662

Concentrations reported in mg/L.
MCL = maximum concentration limit (40 CFR 192).
Nitrate reported as NO_3.

3.0 Long-Term Surveillance Program

3.1 General License for Long-Term Custody

UMTRCA authorized DOE to enter into Cooperative Agreement (CA) (DE-FC04-85AL26731) with the Navajo Nation, and NRC required it prior to bringing the site under the general license (see previous discussion in Section 2.3.1). Signing of this cooperative agreement transferred the RRM to DOE and established DOE's long-term care responsibility for the site. Upon NRC's approval of this LTSP, the site was included under the NRC's general license for long-term custody (10 CFR 40.27 [b]).

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 NRC general license for the DOE's long-term custody of the site (10 CFR 40.27 [b]).

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

3.2 Requirements of the General License

To meet the requirements of the NRC's license at 10 CFR 40, Section 27, 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 Mexican Hat Disposal Site once each calendar year. The date of the inspection may vary from year to year, but DOE will endeavor to inspect the site approximately once every 12 months unless circumstances warrant variance. Any variance to this inspection frequency will be explained in the inspection report. DOE will notify

NRC and the Navajo Nation 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 Mexican Hat Disposal Site will be divided into sections called *transects.* Each transect will be inspected individually. Proposed transects for the annual inspections of the Mexican Hat Disposal Site are listed in Table 3–1.

Table 3–1. Transects Used During the Annual Inspections of the Mexican Hat Disposal Site

Transect	Inspection Description
Disposal Cell; Top, Side Slopes, and Apron	Inspect integrity and long-term performance; check for erosion, settling, slumping, riprap rock degradation, deep-rooted vegetation, and biointrusion.
Surface Water Diversion System; West Diversion Channel, North Diversion Channel, Southwest Diversion Channel, North Toe Drain, Northeast Toe Drain, and East Toe Drain	Inspect integrity and long-term performance; check for erosion and head cutting, riprap rock degradation, sediment accumulation, and excessive vegetation.
Site Perimeter and Balance of Site	Inspect site perimeter and area between tailings impoundment and site boundary, including the site entrance, survey and boundary monuments, entrance sign, and site marker.
Outlying Area	Inspect the area 0.25 mile beyond site boundary; check for any activity that may adversely impact site integrity.

Refer to Figure 2–3.

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 or settlement, condition of riprap, 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.

3.3.3 Inspection Checklist

The field inspection is guided by the inspection checklist. The site-specific inspection checklist for the Mexican Hat Disposal Site is presented in Appendix C.

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

3.4 Annual Inspection Report

Results of annual site inspections will be reported to NRC within 90 days of the last site inspection of that calendar year (10 CFR 40, Appendix A, Criterion 12). In the event that the annual report cannot be submitted within 90 days, DOE will notify NRC of the circumstances. Annual inspection reports also will be distributed to the Navajo Nation, and any other stakeholders who request a copy. For compliance, the annual inspection report for the Mexican Hat Disposal Site is included in a document submitted to NRC that contains the annual inspection reports for all Title I sites licensed under 10 CFR 40.27.

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 40.27(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 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 communication with local law enforcement and emergency response agencies to facilitate notification in the event of significant trespass, vandalism, or natural disaster. Notification

agreements with the San Juan County Sheriff's Office and the U.S. Geological Survey's National Earthquake Information Center are included in Appendix D. Due to the remote location of the Mexican Hat Disposal 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 (nonroutine) follow-up inspection. Slope failure, disastrous storm, major seismic event, and deliberate human intrusion are among these conditions.

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

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

- Notify NRC pursuant to 10 CFR 40, Appendix A, Criterion 12, or 10 CFR 40.60, whichever is determined to apply;
- Begin the DOE Environment, Safety, and Health Reporting process (DOE Order 231.1A, Chg. 1; DOE 2004);
- Respond with an immediate follow-up inspection or mobilization of an 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 (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 it is advisable to notify NRC or other outside agency of a problem at the site.

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

3.6 Routine Site Maintenance and Emergency Measures

3.6.1 Routine Site Maintenance

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

The cover was constructed with minimal slope to promote positive drainage while minimizing runoff water velocities. Erosion protection in the form of riprap has been placed over the cover and is expected to endure for the long-term. Because of the riprap and mild slopes, adverse wind or water erosion impacts that would require maintenance are not anticipated. Areas where runoff water could achieve erosional velocities have been armored with riprap sized to withstand these forces.

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

In alignment with the LM EMS, proposed site maintenance activities will be assessed for opportunities to improve environmental performance and sustainable environmental practices. Some areas for consideration include reusing and recycling products or wastes, using environmentally preferable products (i.e., products with recycled content, such as office furniture and concrete and asphalt, products with reduced toxicity, and energy efficient products), using alternative fuels, using renewable energy, and making environmental habitat improvements.

3.6.2 Emergency Measures

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

3.6.3 Criteria for Routine Site Maintenance and Emergency Measures

Conceptually, there is a continuum in the progression from minor routine maintenance to large-scale reconstruction of the disposal areas following a potential disaster. Criteria, for triggering particular DOE responses for each progressively more serious level of intervention, although

required by 10 CFR 40.27 (b)(5), are not easily defined because the nature and scale of all potential problems cannot be foreseen. The information in Table 3–2 will, however, serve as a guide for appropriate DOE responses. The table shows that the difference between routine maintenance and emergency response is primarily one of urgency and degree of threat or risk. DOE's priority (urgency) in column 1 of Table 3–2 bears an inverse relationship with DOE's estimate of probability. The highest priority response is also believed to be the least likely to occur.

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

Priority	Description[a]	Example	Response
1	Breach of disposal cells 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 riprap integrity or vegetation.	Erosion not immediately affecting disposal cell, change in riprap protection layer thickness.	Evaluate, assess impact, respond as appropriate to address problem.

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

3.6.4 Reporting Maintenance and Emergency Measures

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

In accordance with 10 CFR 40.60, DOE will notify:

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

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

3.7 Environmental Monitoring

3.7.1 Ground Water Monitoring

Ground water monitoring is not required at the Mexican Hat Disposal Site under the current protection strategy (NRC 1996). Ground water monitoring is not required because the upper unit of the Halgaito Shale is not considered an aquifer, and therefore is not a current or potential source of drinking water, and the underlying uppermost aquifer within the lower unit of the Halgaito Shale and the Honaker Trail Formation is hydrogeologically isolated from contamination in the overlying formation. No contamination related to the former Mexican Hat Processing Site was detected in the uppermost aquifer. Additional information regarding historical ground water monitoring is provided in Section 2.5.

There are no ground water monitoring wells remaining at the Mexican Hat Disposal Site.

3.7.2 Seep Monitoring

Seep monitoring is performed at the Mexican Hat Disposal Site as a BMP due to concerns raised by the Navajo Nation; NRC did not require seep monitoring under the current protection strategy for the site (NRC 1996). Additional information regarding historical seep monitoring is provided in Section 2.5.

BMP seep monitoring at the Mexican Hat Disposal Site includes monitoring seep flow rates, qualitatively, through photo documentation and observational description, during the site annual inspections at the following locations (Figure 2–7):

- North Arroyo, Seeps 251 and 264
- South Arroyo, Seeps 254 and 922
- Gypsum Creek, Seeps 248 and 261 (upgradient/background)
- Gulley No 2, Seep 249

The need to resume water quality monitoring of the seeps will be re-evaluated if observed seep flows were to significantly increase, as compared to historical levels. Seep flow rates will be monitored annually through observation for a period of 10 years (through 2016), at which time an evaluation would be conducted to determine the need to continue or discontinue the monitoring.

3.7.3 Vegetation Monitoring

Riprap rock was selected as the cover material over the disposal areas and surface water control features on site. Vegetation at the disposal site is sparse and not expected to significantly help maintain erosional stability. Annual inspections will include visual observations to ensure that undesirable plant species, including deep-rooted plants on the disposal cell cover and noxious weeds, do not proliferate at the site. Natural plant community succession is expected and will not adversely impact the performance of the containment system.

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 DOE-LM because they contain critical information required to protect human health and the environment, manage land and assets, protect legal interests of the 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 Mexican Hat Disposal Site will comply with DOE Order 414.1C, *Quality Assurance* (DOE 2005). Quality assurance requirements are routinely fulfilled by use of a work planning process, standard operating procedures, trained personnel, documents and records maintenance, and assessment activities. Requirements will be transmitted through procurement documents to subcontractors if and when appropriate.

3.10 Health and Safety

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

Specific guidance is contained in the *Office of Land and Site Management Project Safety Plan* (DOE 2007). This Project Safety Plan identifies specific hazards associated with the anticipated scope of work and provides direction for the control of these hazards.

During the pre-inspection briefing, personnel are required to review the plan to ensure that they have an understanding of the potential hazards and the health and safety requirements associated with the work to be performed.

4.0 References

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

Executive Order 13423. *Strengthening Federal Environmental, Energy, and Transportation Management*, January 24, 2007.

42 USC 7901., *Uranium Mill Tailings Radiation Control Act of 1978*, United States Code.

DOE Order 450.1. *Environmental Protection Program,* Chg. 2, January 15, 2005.

DOE (U.S. Department of Energy), 1985. *Cooperative Agreement between the United States Department of Energy and the Navajo Nation*, DOE Cooperative Agreement Number DE-FC04-85AL26731, U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, New Mexico.

DOE (U.S. Department of Energy), 1987. *Environmental Assessment, Remedial Action at the Mexican Hat Uranium Mill Tailings Site, Mexican Hat, Utah, DOE/EA-0332,* U.S. DOE UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

DOE (U.S. Department of Energy), 1989. *Environmental Assessment of Remedial Action at the Monument Valley Uranium Mill Tailings Site, Monument Valley, Arizona,* DOE/EA-0368, U.S. DOE, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

DOE (U.S. Department of Energy), 1990. *Assessment of Seeps in the Vicinity of the Mexican Hat Tailings Disposal Cell*, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

DOE (U.S. Department of Energy), 1993. *Remedial Action Plan for the Codisposal and Stabilization of the Monument Valley and Mexican Hat Uranium Mill Tailings at Mexican Hat, Utah,* UMTRA-DOE/AL-050509.0000, DOE UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, October.

DOE (U.S. Department of Energy), 1995. *UMTRA Project Site Observational Work Plan, Mexican Hat, Utah,* DOE/AL/62350-153, Rev. 0, DOE UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

DOE (U.S. Department of Energy), 1999. *Ground Water Compliance Action Plan for the Mexican Hat, Utah, UMTRA Project Site*, U00455AA, prepared by the U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado.

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

DOE (U.S. Department of Energy), 2004. *Environment, Safety, and Health Reporting,* DOE Order 231.1A, Chg. 1, June.

DOE (U.S. Department of Energy) 2005. *Quality Assurance,* DOE Order 414.1C, June.

DOE (U.S. Department of Energy), 2006. *Resolution of Seep and Ground Water Monitoring at the Mexican Hat, Utah, UMTRCA Title I Disposal Site* DOE-LM/GJ1139-2006, prepared by S.M. Stoller Corporation for the DOE Office of Legacy Management, Grand Junction, Colorado.

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

FBDU (Ford, Bacon and Davis Utah, Inc.), 1981. *Engineering Assessment of Inactive Uranium Mill Tailings, Mexican Hat Site, Mexican Hat, Utah,* DOE/UMT-0 109, FBDU 360-03, UC 70, prepared by Ford, Bacon and Davis Utah, Inc., for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

MK-F (MK-Ferguson Company), 1997. *Mexican Hat, Utah, Monument Valley Arizona, Completion Report*, prepared by MK-Ferguson Company for the U.S. Department of Energy, UMTRA Project Team, Environmental Restoration Division, Albuquerque, New Mexico.

Navajo Nation, 2006. Letter from R. Bush, DOE-LM to M. Roanhorse, Navajo AML Reclamation, Re: Mexican Hat UMTRA Site, July 25.

NRC (U.S. Nuclear Regulatory Commission), 1986. *Final Technical Evaluation Report for the Remedial Action of the Monument Valley, Arizona, and Mexican Hat Tailings Site, Mexican Hat, Utah, Uranium Mill Tailings Sites*, Division of Low-Level Waste Management and Decommissioning, Office of Nuclear Material Safety and Safeguards, Washington, D.C.

Snelling, R. N, 1971. "Environmental Survey of the Uranium Mill Tailings Pile, Mexican Hat, Utah," *Radiological Health Data Reports,* Vol. 12, Southwestern Radiological Health Laboratory, Bureau of Radiological Health, Las Vegas, Nevada.

Appendix A

Real Estate Information

Legal Description

Remedial action at the Mexican Hat Uranium Mill Tailings Remedial Action site consisted of consolidation and stabilization of the contaminated materials on-site. Remedial action also included the relocation of contaminated materials at the Monument Valley, Arizona, site to the Mexican Hat site. Under the requirements of the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978, as amended, and under the terms of the Cooperative Agreement between the Navajo Nation and the federal government, the Navajo Nation and DOE participated in the selection and performance of remedial action at the two designated sites through completion.

The Mexican Hat designated processing site consisted of approximately 235 acres. The acreage of the final disposal site consists of approximately 119 acres.

Transfer of the final Disposal Site

DOE and the Navajo Nation executed a Custodial Access Agreement (CAA) titled "Transfer of Custody of the Uranium Mill Tailings Disposal Cells and Right of Access to the Uranium Mill Tailings Disposal Sites Located on the Navajo Nation." The CAA conveys to the federal government title to the residual radioactive materials stabilized at the repository site. The UMTRCA authorized DOE to enter into Cooperative Agreement DE-FC04-85AL26731 with the Navajo Nation. The purpose was to perform remedial actions at the former processing sites designated by the Secretary of Energy pursuant to UMTRCA at Shiprock, New Mexico; Monument Valley, Arizona; Mexican Hat, Utah; and Tuba City, Arizona. The U.S. Nuclear Regulatory Commission also required such an agreement prior to bringing the sites under the general license in Title 10 of the *Code of Federal Regulations* 10 CFR §40.27.

The CAA ensures that DOE has perpetual access to the respective sites and grants DOE custody of the residual radioactive materials, cover components, and engineered features (including, but not limited to drainage ditches, erosion control markers, fencing, boundary markers, and monitor wells).

The effective date of the CAA is August 12, 1996, having been executed by DOE's Contracting Officer, Juan Williams, the Navajo Nation President, Albert Hale, and the Bureau of Indian Affairs Area Director, Wilson Barber, Jr.

Legal Description

A tract or parcel of land located in the Navajo Reservation described as follows: Beginning point is reached by moving South 6817.30 feet and West 4247.41 feet from the NE corner of Section 7, Township 42 South, Range 19 East, Salt Lake Base and Meridian to Station 1 and thence S28° 44' 53"W 798.41 feet to the point of beginning. From the point of beginning move:

S38° 12’ 22” E591.76 feet, thence
S03° 34’ 35” W545.06 feet, thence
S29° 54’ 00” W960.90 feet, thence
S71° 26’ 45” W1671.90 feet, thence
N87° 06’ 49” W238.30 feet, thence
N51° 18’40” W617.51 feet, thence
N19° 04’ 19” E483.54 feet, thence
N01° 17’ 32” E1064.27 feet, thence
N62° 55’ 49” E914.14 feet, thence
N81° 01’ 39” E288.53 feet, thence
N58° 01’ 52” E332.42 feet, thence
S78° 25’ 48” E907.44 feet, to the point of beginning containing 118.798 acres.

Appendix B

Custodial Access Agreement

TRANSFER OF CUSTODY
OF THE URANIUM MILL TAILINGS DISPOSAL CELLS
AND RIGHT OF ACCESS
TO THE URANIUM MILL TAILINGS DISPOSAL SITES
LOCATED ON THE NAVAJO NATION

THIS AGREEMENT is entered into by and among the UNITED STATES OF AMERICA, acting through the United States Department of Energy (hereinafter referred to as the "DOE"), the Navajo Nation (hereinafter referred to as the "Nation"), with the concurrence of the United States Department of Interior, Bureau of Indian Affairs (hereinafter referred to as the "BIA.")

WHEREAS, Title I of the Uranium Mill Tailings Radiation Control Act of 1978, P.L. 95-604, 42 U.S.C. § 7901 *et seq.*, (hereinafter referred to as "UMTRCA") authorized the DOE to enter into Cooperative Agreement No. DE-FC04-83AL16258 and Cooperative Agreement No. DE-FC04-85AL26731 with the Nation to perform remedial actions at the former uranium processing sites designated by the Secretary of Energy pursuant to UMTRCA at Shiprock, New Mexico, Monument Valley, Arizona, Mexican Hat, Utah, and Tuba City, Arizona; and

WHEREAS, the United States Nuclear Regulatory Commission will, after DOE compliance with 40 CFR part 192, subparts A, B, and C, license the long-term monitoring and maintenance of the Residual Radioactive Material stabilized and disposed at Shiprock, New Mexico, Mexican Hat, Utah, and Tuba City, Arizona, pursuant to 10 CFR § 40.27; and

WHEREAS, UMTRCA section 105(b) (42 U.S.C. § 7915(b)) requires that the Residual Radioactive Materials shall be transferred to the Secretary of Energy and permanently retained and maintained by the Secretary under the conditions established in a license issued by the Nuclear Regulatory Commission, subject to the provisions of UMTRCA section 104(f)(2) and (h) (42 U.S.C. § 7914(f)(2) and (h)); and

WHEREAS, the BIA administers certain activities affecting the custody and use of lands belonging to the Nation.

NOW THEREFORE, the Parties agree that:

I. PURPOSE

The purpose of this Agreement is to transfer the custody of the disposal cells and to provide a right of access to the disposal sites from the Navajo Nation to the DOE to allow DOE to conduct long term care of the disposal sites, without affecting the trust status of the land. Nothing in this Agreement shall limit or modify any responsibility or obligation due by any agency of the Federal government to the Nation under treaty or any other provision of law.

II. DEFINITIONS

As used throughout this Agreement, the following terms shall have the meanings set forth below:

A. The term "Disposal Cells" means the encapsulated residual radioactive material located at the disposal sites, including the cell cover component and any associated engineering features, including but not limited to drainage ditches, erosion control markers, fencing, boundary markers, and monitor wells.

B. The term "Disposal Sites" means the disposal cell and the land immediately surrounding the disposal cell which are located at the former uranium processing sites designated by the Secretary of Energy (44 FR 74892, December 18, 1979) at Shiprock, New Mexico, Mexican Hat, Utah, and Tuba City, Arizona, as more fully described in the legal descriptions and plot plans appended hereto as Attachments 1 - 3 to this Agreement.

C. The term "Department of Energy" or "DOE" means the United States Department of Energy and its contractors and agents, including any successor agency, or any other federal agency designated by the President or identified by Congress in subsequent legislation to perform any task or hold authority pursuant to UMTRCA or any subsequect legislation that affects the status of the Disposal Sites.

D. The term "Environmental Protection Agency" or "EPA" means the United States Environmental Protection Agency and its contractors and agents, including any successor agency.

E. The term "Long Term Care" includes monitoring, maintenance, and emergency measures necessary to protect the public health, safety, and the environment, and other actions necessary to comply with the standards promulgated under section 275(a) of the Atomic Energy Act of 1954, as amended (42 U.S.C § 2022(a)).

F. The term "Nuclear Regulatory Commission" or "NRC" mean the United States Nuclear Regulatory Commission and its contractors and agents, including any successor agency.

G. The term "Residual Radioactive Material" means (i) wastes from the millsite or a vicinity property which the Secretary of the DOE determined to be radioactive, in the form of tailings resulting from the processing of ores for the extraction of uranium and other valuable constituents of the ores; and (ii) other wastes which the Secretary of DOE determines to be radioactive, which relates to such processing including any residual stock of unprocessed ores of low-grade materials.

H. The term "Right of Access" means with prior notification to the Nation, (i) unrestricted ingress and egress on all weather roads to the Disposal Sites; and (ii) access to and use of a peripheral area outside the Disposal Sites which, at the discretion of the DOE, is necessary to meet the groundwater compliance standards promulgated by the U.S. Environmental Protection Agency (hereinafter "EPA") (60 FR 2854, January 11, 1995), or any subsequent regulations promulgated by the EPA.

I. The term "Transfer of Custody" means the transfer by the Nation to the DOE of the sole right to control all activities deemed necessary and proper by the DOE affecting the long term care of the Disposal Cells for up to 1000 years to ensure the protection of the public health, safety and the environment, consistent with the requirements of UMTRCA section 105(b) (42 U.S.C. § 7915(b)).

III. TRANSFER OF CUSTODY

A. The Nation shall convey by resolution a permanent transfer of custody of the disposal cells to the DOE to use for all activities deemed necessary and proper by the DOE to perform long term care of the disposal cells pursuant to the DOE's license from the NRC; provided that such activities do not

infringe on any other rights or privileges of the Nation or of their people as citizens.

B. Transfer of custody of the disposal cells by the Nation to the DOE shall be made after acceptance by the Nation of the final Completion Report for the disposal cells. Nothing in this Agreement shall alter the terms on which the Nation approved the remedial action plans for the stabilization of the residual radioactive material at the disposal cells.

C. The Nation shall not designate, use, or empower anyone to perform any act which may interfere with the purposes of this Agreement. Any use by any party, including the DOE, for purposes other than those consistent with this Agreement shall be subject to prior approval by the DOE, the *NRC*, and the Nation, with the concurrence of the BIA.

D. The disposal cells shall remain in the custody of the DOE for so long as the disposal cells are monitored and maintained by the DOE to protect the public health, safety, and the environment pursuant to the license issued by the *NRC*. Beneficial title of the residual radioactive material shall remain with the Nation. However, the Nation shall not breach the integrity of the disposal cells in order to obtain beneficial use of the residual radioactive material.

IV. RIGHT OF ACCESS

The Nation hereby grants a right of access to the DOE, the EPA, and the NRC for all purposes and activities deemed necessary and proper by the DOE or the *NRC* for the disposal sites' long term care for so long as the DOE remains in custody of the disposal cells.

The Parties to this Agreement are as follows and each has been executed by an individual having the authority to so execute this Agreement in accordance with their rules and regulations:

U.S. DEPARTMENT OF ENERGY

By: _____ Date: 6/14/96

Juan Williams, Contracting Officer
United States Department of Energy
P.O.Box 5400
Albuquerque, New Mexico 87185-5400

NAVAJO NATION

By: _____ Date: AUG 05 1996

Albert Hale, President
The Navajo Nation
P.O.Box 9000
Window Rock, Arizona 86515

CONCURRENCE:

U.S. DEPARTMENT OF INTERIOR
BUREAU OF INDIAN AFFAIRS

By: _____ Date: AUG 12 1996

Wilson Barber, Jr., Area Director
Navajo Area Office
P.O Box 1060
Gallup, New Mexico 87301

ATTACHMENT 2

CUSTODY DOCUMENTATION

ATTACHMENT 2

CUSTODY DOCUMENTATION

Remedial action at the Mexican Hat UMTRA site consisted of consolidation and stabilization of the contaminated materials on-site. Remedial action also included the relocation of contaminated materials at the Monument Valley, Arizona site to the Mexican Hat site. Under the requirements of the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978, as amended, and under the terms of the Cooperative Agreement between the Navajo Nation and the federal government, the Navajo Tribe and the DOE participated in the selection and performance of remedial action at the two designated sites through completion.

The Mexican Hat designated processing site consisted of approximately 235 acres. The acreage of the final disposal site consists of approximately 119 acres.

Transfer of the Final Disposal Site

The DOE and the Navajo Nation executed a Custodial Access Agreement (CAA) titled "Transfer of Custody of the Uranium Mill Tailings Disposal Cells and Right of Access to the Uranium Mill Tailings Disposal Sites Located on the Navajo Nation". The CAA conveys to the federal government title to the residual radioactive materials stabilized at the repository site. The UMTRCA authorized the DOE to enter into Cooperative Agreement DE-FC04-85AL26731 with the Navajo Nation. The purpose was to perform remedial actions at the former processing sites designated by the Secretary of Energy pursuant to UMTRCA at Shiprock, New Mexico; Monument Valley, Arizona; Mexican Hat, Utah; and Tuba City, Arizona. The Nuclear Regulatory Commission also required such an agreement prior to bringing the sites under the general license in Title 10 Code of Federal Regulations (10 CFR) Part 40.27.

The CAA ensures that the DOE has perpetual access to the respective sites and grants the DOE custody of the residual radioactive materials, cover components, and engineered features (including, but not limited to drainage ditches, erosion control markers, fencing, boundary markers, and monitor wells).

The effective date of the CAA is August 12, 1996 having been executed by the DOE's Contracting Officer, Juan Williams; the Navajo Nation President, Albert Hale; and the Bureau of Indian Affairs Area Director, Wilson Barber, Jr.

Legal Description

A tract of land located within the Navajo reservation and described as follows:

> Beginning point is reached by moving South 68 17.30 feet and West 4247.41 feet from the Northeast corner of Section 7, Township 42 South, Range 19 East, Salt Lake Base and Meridian to Station 1 and thence S28°44'53"W 798.41 feet to the point of beginning. From the point of beginning thence: S38°12'22"E 591.76 feet; thence S03°34'35"W 545.06 feet; thence S29°54'00"W 960.90 feet; thence S71°26'45"W 1671.90 feet; thence N87°06'49"W 238.30 feet; thence N51°18'40"W 617.51 feet; thence N19°04'19"E483.54 feet; thence N01°17'32"E 1064.27 feet; thence N62°55'49"E 914.14 feet; thence N81°01'39"E 288.53 feet; thence N58°01'52"E 332.42 feet; thence S78°25'48"E 907.44 feet to the point of beginning containing 118.798 acres.

Repository

Real estate correspondence and related documents are filed with and maintained by the Property Management Branch, Property and Administrative Services Division, Albuquerque Operations Office, P. O. Box 5400, Albuquerque, NM 87185-5400, (505) 845-6450.

Appendix C

Site Inspection Checklist

INSPECTION CHECKLIST
MEXICAN HAT, UTAH, UMTRCA TITLE I DISPOSAL SITE

Date of This Revision:

Last Annual Inspection:
Inspectors:

Next Annual Inspection (Planned):
Scheduled Inspectors:

No.	ITEM	ISSUE	ACTION
1	Protocols	Notify representative of the Navajo AML/UMTRA Department of inspection.	
2	Access	Access is by a short dirt road that leads from U.S. Highway 163. The dirt road is unmarked.	
3	Specific site surveillance Features	See attached list (inspect and identify maintenance requirements).	
4	Disposal cell top	Inspect integrity and long-term performance (check for erosion, settling, slumping, rock degradation, vegetation, and biointrusion).	
5	Side slopes and diversion channels	Inspect integrity and long-term performance (check condition of the side slopes and diversion channels).	
6	Area between the cell and the site boundary	Inspect integrity.	
7	Outlying area	Inspect surrounding area (0.25 mile) for activities that may adversely impact site integrity.	
8	Vegetation	Cut and treat any deep-rooted plants found growing on cell and any noxious weeds or invasive plants on site.	
9	Ground water monitoring	Ground water monitoring is not a requirement of the LTSP due to hydrogeologic conditions that protect the uppermost aquifer beneath the site.	
10	Seep monitoring	The LTSP requires qualitative monitoring (photographic documentation and description) of seep flows. In accordance with the LTSP, the following seeps will be monitored; 248, 249 (or 264 if dry), 251, 254, 261, and 922. Seeps are marked with tee-posts and signs warning that the water may not be potable.	

Specific Site Surveillance Features—Mexican Hat, Utah, Disposal Site

FEATURE	COMMENT
Access Road	
Entrance Gate	
Entrance Sign	
Perimeter Signs (43)	
Perimeter Fence	
Site Markers (2)	
Survey monuments (4)	
Boundary Monuments (12)	

Appendix D

Agency Notification Agreements

Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

June 12, 1997

Mr. Mike Lacy
San Juan County Sheriff's Department
P.O. Box 788
Monticello, UT 84535

Dear Mr. Lacy:

The U.S. Department of Energy (DOE) is requesting notification in the event of any unusual activities or events occurring in San Juan County, Utah, associated with the Mexican Hat disposal site. The purpose of the notification request is to assist the DOE in monitoring and maintaining the integrity of its disposal site.

If anything out of the ordinary associated with the disposal site is observed by your staff or reported to your office, we would appreciate notification to the DOE Grand Junction Office 24-hour phone at (970)248-6070. If the notification request discussed above is agreeable to you, please sign this letter and return it in the envelope provided.

Thank you for your attention in this matter. Give me a call at (505)845-5668 if you have any questions.

Sharon J. Arp
Site Manager
Uranium Mill Tailings Remedial Action Team
Environmental Restoration Division

cc:
J. McBee, TAC
J. Virgona, GJO

The San Juan County Sheriff's office agrees to contact the DOE Grand Junction Office 24-hour phone at (970) 248-6070 if any unusual event or anomaly is observed or reported at the Mexican Hat disposal site, Mexican Hat, Utah.

Mike Lacy
San Juan County Sheriff

Date

A3-1

Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

June 12, 1997

Mr. Kee Thinn
District Commander
Navajo Police Department
P.O. Box Drawer 22
Kayenta, AZ 86033

Dear Mr. Thinn:

The U.S. Department of Energy (DOE) is requesting notification in the event of any unusual activities or events occurring in San Juan County, Utah, associated with the Mexican Hat disposal site. The purpose of the notification request is to assist the DOE in monitoring and maintaining the integrity of its disposal site.

If anything out of the ordinary associated with the disposal site is observed by your staff or reported to your office, we would appreciate notification to the DOE Grand Junction Office 24-hour phone at (970)248-6070. If the notification request discussed above is agreeable to you, please sign this letter and return it in the envelope provided.

Thank you for your attention in this matter. Give me a call at (505)845-5668 if you have any questions.

Sharon J. Arp
Site Manager
Uranium Mill Tailings Remedial Action Team
Environmental Restoration Division

cc:
J. McBee, TAC
J. Virgona, GJO

The Navajo Police Department agrees to contact the DOE Grand Junction Office 24-hour phone at (970) 248-6070 if any unusual event or anomaly is observed or reported at the Mexican Hat disposal site, Mexican Hat, Utah.

Kee Thinn
Navajo Police Department

Date

A3-2

National Earthquake Information Center

World Data Center A for Seismology

Director
(303) 236-1510
Research
(303) 236-1506

U.S. Geological Survey
Box 25046, DFC, MS-967
Denver, Colorado 80225 USA
Telex: (WUTCO) 5106014123ESL UD

Operations
(303) 236-1500
QED
(800) 358-2663

Clinton C. Smythe
Engineering and Construction Group Leader
Uranium Mill Tailings Remedial Action
Project Office
2155 Louisiana NE, Suite 4,000
Albuquerque, NM 87110

Dear Mr. Smythe:

This letter is to confirm that the DOE Grand Junction Projects Office (24-hour phone line, (303) 248-6070 has been added to our notification list for the occurrence of earthquakes near the following locations:

Disposal Site	Latitude	Longitude
COLORADO		
Durango (Bodo Canyon)	N37.15	W107.90
Grand Junction	N38.91	W108.32
Gunnison (Landfill)	N38.51	W106.85
Maybell	N40.55	W107.99
Naturita (Dry Flats)	N38.21	W108.60
Rifle (Estes Gulch)	N39.60	W107.82
Slick Rock (Burro Canyon)	N38.05	W108.87
IDAHO		
Lowman	N44.16	W115.61
NEW MEXICO		
Ambrosia Lake	N35.41	W107.80
NORTH DAKOTA		
Bowman	N46.23	W103.55
OREGON		
Lakeview (Collins Ranch)	N42.2	W120.3
PENNSYLVANIA		
Canonsburg	N40.26	W80.25
Burrell VP	N40.62	W79.65
TEXAS		
Falls City	N28.91	W98.13
UTAH		
Mexican Hat	N37.10	W109.85
Salt Lake City (Clive)	N40.69	W113.11

A3-3

National Earthquake Information Center
World Data Center A for Seismology

Director
(303) 236-1510
Research
(303) 236-1506

U.S. Geological Survey
Box 25046, DFC, MS-967
Denver, Colorado 80225 USA
Telex: (WUTCO) 5106014123ESL UD

Operations
(303) 236-1500
QED
(800) 358-2663

Clinton C. Smythe -2-

We have entered the following selection criteria into our notification program:

1. Any earthquake of magnitude 3.0 or greater, within 0.3 degrees (about 20 miles) of any site shown above, or

2. Any earthquake of magnitude 5.0 or greater, within 1.0 degrees (about 70 miles) of any site shown above.

Sincerely,

Bruce W. Presgrave

Bruce Presgrave
U.S. Geological Survey
National Earthquake Information Center
P.O. Box 25046
Mail Stop 967
Denver Federal Center
Denver, Colorado 80225

Please address future correspondence to Stuart Koyanagi at the above address. I have moved to a different project.

Thank you + best regards,

Bruce Presgrave

A3-4