



Department of Energy
Office of Legacy Management

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U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

40-6659

Subject: Long-Term Surveillance Plan for the Shirley Basin South (Petrotoomics), Title II Site

Reference: Letter from Daniel M. Gillen, NRC to Mr. Art Kleinrath, DOE, titled *Review of the Draft Long-Term Surveillance Plan for the Petrotoomics Company Tailings Disposal Site in Shirley Basin, Wyoming*, dated October 25, 2002

Dear Mr. Janosko:

Enclosed are four copies of the *Long-Term Surveillance Plan (LTSP) for the Shirley Basin South (UMTRCA Title II) Disposal Site, Carbon County, Wyoming*. This LTSP addresses all Nuclear Regulatory Commission (NRC) comments transmitted by the reference letter. Mr. Richard Weller of your staff has been kept apprised of all substantive modifications to the LTSP. This LTSP also reflects the current Department of Energy (DOE) organizational responsibilities resulting from the creation of the Office of Legacy Management within DOE. This LTSP is intended to satisfy the requirements set forth in 10 CFR 40.28 whereby the long-term custodian must provide an LTSP to the NRC as a step in the licensing/license termination process.

This revision reflects the recently concluded deed transfer and the ownership change documents that are now contained in an appendix.

Please call me at (970) 248-6048 if you have questions.

Sincerely,

Thomas C. Pauling
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**Long-Term Surveillance Plan
for the U.S. Department of Energy
Shirley Basin South
(UMTRCA Title II) Disposal Site,
Carbon County, Wyoming**

December 2004



**U.S. Department
of Energy**



**Office of Legacy Management
Long-Term Surveillance Plan**

for the

**Shirley Basin South (UMTRCA Title II) Disposal Site
Carbon County, Wyoming**

December 2004

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

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1.0 Introduction

1.1 Purpose

This Long-Term Surveillance Plan (LTSP) explains how the U.S. Department of Energy (DOE) will fulfill general license requirements of Title 10 *Code of Federal Regulations* Part 40.28 (10 CFR 40.28) as the long-term custodian of the former Petrotomics (Texaco) Shirley Basin uranium mill tailings disposal site in Carbon County, Wyoming. The Long-Term Surveillance and Maintenance (LTS&M) Program at the DOE Office of Legacy Management in Grand Junction, Colorado, is responsible for the preparation, revision, and implementation of this LTSP, which specifies procedures for inspecting the site, monitoring, maintenance, annual and other reporting requirements, and maintaining records pertaining to the site.

1.2 Legal and Regulatory Requirements

The Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978 (42 USC 7901) as amended, provides for the remediation (or reclamation) and regulation of uranium mill tailings at two categories of mill tailings sites, Title I and Title II. Title I includes former uranium mill sites that were unlicensed as of January 1, 1978, and essentially abandoned. Title II includes uranium milling sites under specific license as of January 1, 1978. In both cases, the licensing agency is the U.S. Nuclear Regulatory Commission (NRC), or in the case of certain Title II disposal sites, an Agreement State. The former Petrotomics Shirley Basin site is a Title II site under UMTRCA. The State of Wyoming is not an Agreement State.

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

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

The general (long-term custody) license becomes effective when the current specific license is terminated by the NRC or an Agreement State, and when a site-specific LTSP, this document, is accepted by the NRC.

Requirements of the LTSP and general requirements for the long-term custody of the Shirley Basin South 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 (DOE) of Shirley Basin South Site

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

1.3 Role of the Department of Energy

In December 2003, DOE formally established the Office of Legacy Management (LM). The LM mission includes "...implementing long-term surveillance and maintenance projects at sites transferred to LM to ensure sustainable protection of human health and the environment." As such, the responsibilities of the LTS&M Program are now administered by LM.

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 and portions of sites that do not have a DOE mission after cleanup, as well as other sites (including Title II sites) as assigned, and to establish a common office for the security, surveillance, monitoring, and maintenance of those sites. DOE established the LTS&M Program to fulfill these long-term surveillance and maintenance responsibilities.

2.0 Final Site Conditions

Reclamation at the Shirley Basin South mill facility in Carbon County, Wyoming, consisted of demolishing site structures, relocating the contaminated structural materials and contaminated mill site soils to the Shirley Basin South disposal site, adjacent to the former mill.

2.1 Site History

The Petrotomics Uranium Mill began operation in 1962 as a 500 ton per day mill. In 1968, the mill was expanded to 1,000 tons per day production by the addition of thickeners, leach tanks, and another solvent extraction circuit. In 1970, the mill was expanded again to a capacity of 1,500 tons per day (Getty 1981).

The ore being processed through the mill came from open pit mines in the immediate vicinity of the mill. The mill was a conventional acid leach uranium ore processing plant (Getty 1981).

The tailings from milling operations were placed in the tailings pond from the beginning of operation in 1962. In 1977, an amendment to the NRC license allowed a new dam to be constructed over the original dam. The new dam raised the elevation of the tailings impoundment 35 feet to 7,100 feet above sea level. The new dam was completed in 1979 (Getty 1981).

In 1985, due to the depressed uranium market, the mining and milling operations were shut down and mill decommissioning commenced. Mill components that were not salvaged and sold were buried in mine pit 33-1, the tailings pile, or disposal trenches on site (Petrotomics 2001).

The NRC approved the reclamation plan in 1989. In 1996, Petrotomics applied for Alternate Concentration Limits (ACLs) and was granted approval by the NRC in 1998. Final reclamation was completed in 2001 (Petrotomics 2001).

2.2 General Description of the Disposal Site Vicinity

The Shirley Basin South disposal site is located in rural Carbon County approximately 48 miles south of Casper and 35 miles north of Medicine Bow, Wyoming (Figures 2-1 and 2-2).

The site is at an elevation of about 7,100 feet. The area topography is typical of eastern Wyoming plains with moderate elevation changes. Topography in the immediate vicinity of the site is characterized by rolling hills and valleys. Elevation differences of 250 feet are present within two to three miles of the site (Getty 1981).

The climate of the Shirley Basin is arid to semi-arid, with low annual precipitation and a frost-free growing season of 90 to 110 days. Temperatures are moderately warm during the summer and cold in the winter. Extreme fluctuations in temperatures from day to day and in annual precipitation from year to year are common. These climatic variations have a strong effect on vegetation and in determining land capabilities and use. Summers are accompanied by prevailing southwesterly winds that become stronger as fall approaches. Winter winds are often out of the northwest, creating blizzard conditions (Getty 1981).

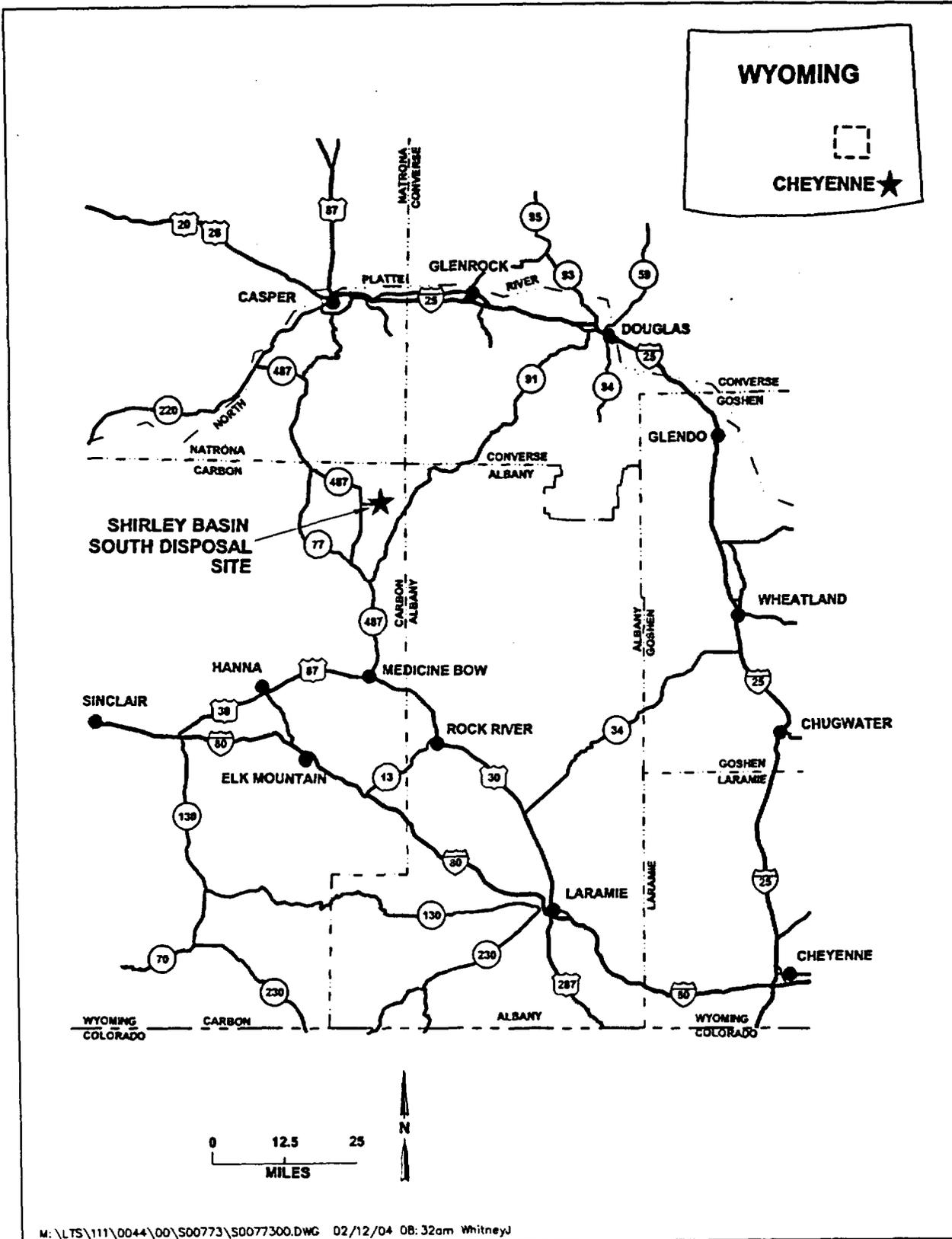


Figure 2-1. General Location Map of the Shirley Basin South, Wyoming, Disposal Site

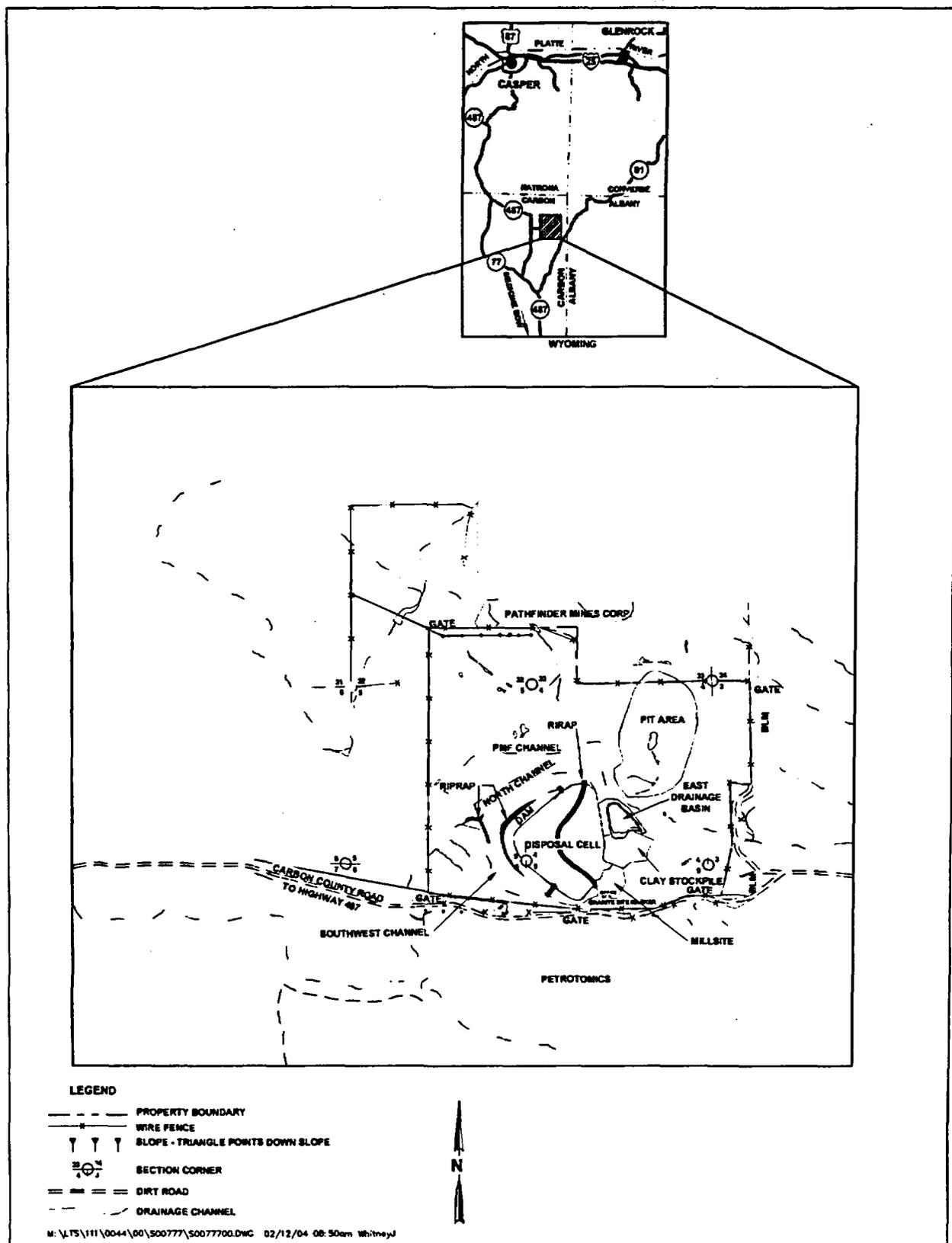


Figure 2-2. Vicinity Location Map Shirley Basin, Wyoming Disposal Site

The climate and weather of central Wyoming is dominated by low- and high- pressure centers, with attendant frontal systems, that migrate through the area throughout the year. The climate is semiarid, with a mean annual precipitation of 10 inches. More than 50 percent of the annual precipitation is received during the months of April, May, and June in the form of wet snows and rain. Temperatures vary from summer highs near 100°F to winter lows near -40°F. The seasons are distinct, with mild summers and harsh winters. Spring and fall are transitional seasons, with warm days and cold nights. Heavy snowfalls can occur during both spring and fall (Getty 1981).

The average annual precipitation in Casper is 11.2 inches, but relatively large variations in monthly and seasonal totals are common. The maximum annual recorded precipitation of 16.24 inches occurred in 1941 (Getty 1981).

The primary land uses in the immediate surrounding vicinity are livestock grazing, wildlife habitat, and mineral exploration. Numerous reclaimed open pit mines exist in the immediate vicinity of the site. All uranium development in the area has ceased. About three miles north of the site is the UMTRCA Title II Pathfinder Shirley Basin mill.

2.3 Disposal Site Description

2.3.1 Site Ownership

The United States Government owns the 1,512-acre Shirley Basin South disposal site property. Supporting real estate information is presented in Appendix A. The site consists of a 142-acre tailings impoundment located on the 1,512-acre parcel and is illustrated on Plate 1.

2.3.2 Directions to the Disposal Site

From Casper, Wyoming, travel southwest on State Highway 220 approximately 20 miles to the junction with State Highway 487. Turn left and proceed south on State Highway 487 for approximately 37 miles, passing the entrance to the Pathfinder Shirley Basin North site while en route to the Shirley Basin South site. Turn left and proceed east on Carbon County Road 2 for approximately 2 miles to the site. The site is on the north side of the county road.

2.3.3 Description of Surface Conditions

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

A combination of contoured topography, drainage swales, and diversion channels convey incident surface water away from the tailings disposal cell. Surface water is conveyed off site or to closed drainage basins on site that are sized to accommodate the runoff from the design precipitation event. Critical portions of the surface drainage system where design basis flow velocities could cause erosion are riprap armored. The narrow interior tailings slope is armored with riprap. Steeper portions of the tailings impoundment dam face and two tailings cover swale discharge points also are armored with riprap.

To the northeast of the tailings disposal area is a reclaimed 153-acre former open pit mine known as Pit 4. North of the disposal site on property owned by the Pathfinder Mines Corporation is a very large former open pit mine known as Pit 33. Ground water is currently refilling the pit. This refilling will continue until the pre-mining equilibrium water table levels are reestablished. The Pathfinder Mines site will eventually be transferred to DOE and become the Shirley Basin North Title II site.

The tailings area itself occupies 142 acres of the 1,512-acre disposal site property. There are a total of 8 monitor wells at the Shirley Basin South site. The entire site property is fenced with a barbed wire stock fence. The final site topography is shown on Plate 2.

2.3.4 Permanent Site Surveillance Features

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

Twenty-seven survey monuments mark the final site boundary. These monuments are a combination of the standard UMTRCA disposal site aluminum-cap monuments placed by the surveyor on behalf of Petrotomics Corporation, brass-cap monuments placed by the U.S. General Land Office, the Bureau of Land Management (BLM), and previous property boundary surveys. Two witness corners were placed in lieu of a corner monument to mark the unstable north property corner on the edge of Pit 33.

One unpolished granite marker with an incised message identifying the site of the Shirley Basin South disposal cell is placed on site property just inside the main entrance gate adjacent to the county road. The message on the granite site marker is shown on Figure 2-3.

Twenty-five warning signs displaying the DOE 24-hour telephone number (Figure 2-4) were placed around the tailings disposal cell and former mill site, each approximately 500 feet apart. Nine more signs were placed along the site property boundary at positions most likely to be approached from off site.

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

2.3.5 Site Geology

The Shirley Basin is a southward extension of the Wind River Basin and lies between the Sweeter Arch and the Laramie Range. The Laramie Mountains are to the northeast and the Shirley Mountains are to the southwest. It is an area of low to moderate relief (Getty 1981).

The major bedrock units in the area are the Wind River and White River shale formations. The Wind River formation is divided into a lower part composed of fine-grained siltstones and mudstones, and an upper part composed of coarse-grained, poorly sorted arkosic sandstones and granite pebble conglomerates, and numerous bedded lenses of siltstone and mudstone (Getty 1981).

SHIRLEY BASIN SOUTH, WYOMING

DATE OF CLOSURE:

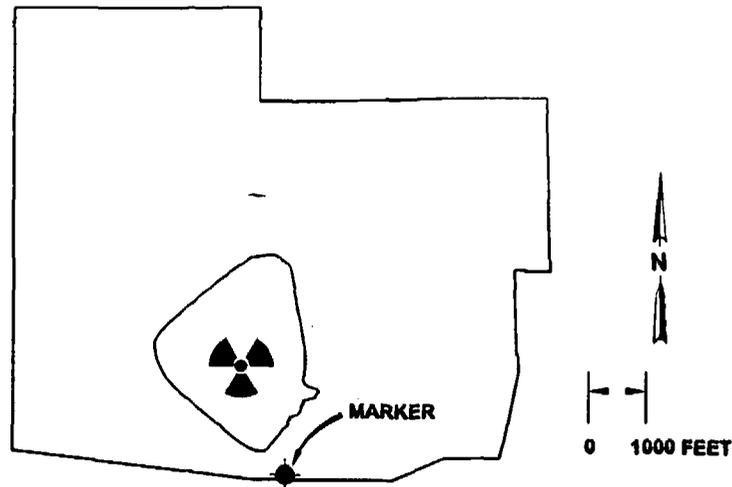
OCTOBER 2000

TONS OF TAILINGS:

6,316,000

RADIOACTIVITY:

974 Curies, Ra-226



M: \LTS\111\0044\00\S00736\S0073600.DWG 02/12/04 09:02am WhitneyJ

Figure 2-3. Site Marker at the Shirley Basin South, Wyoming, Disposal Site

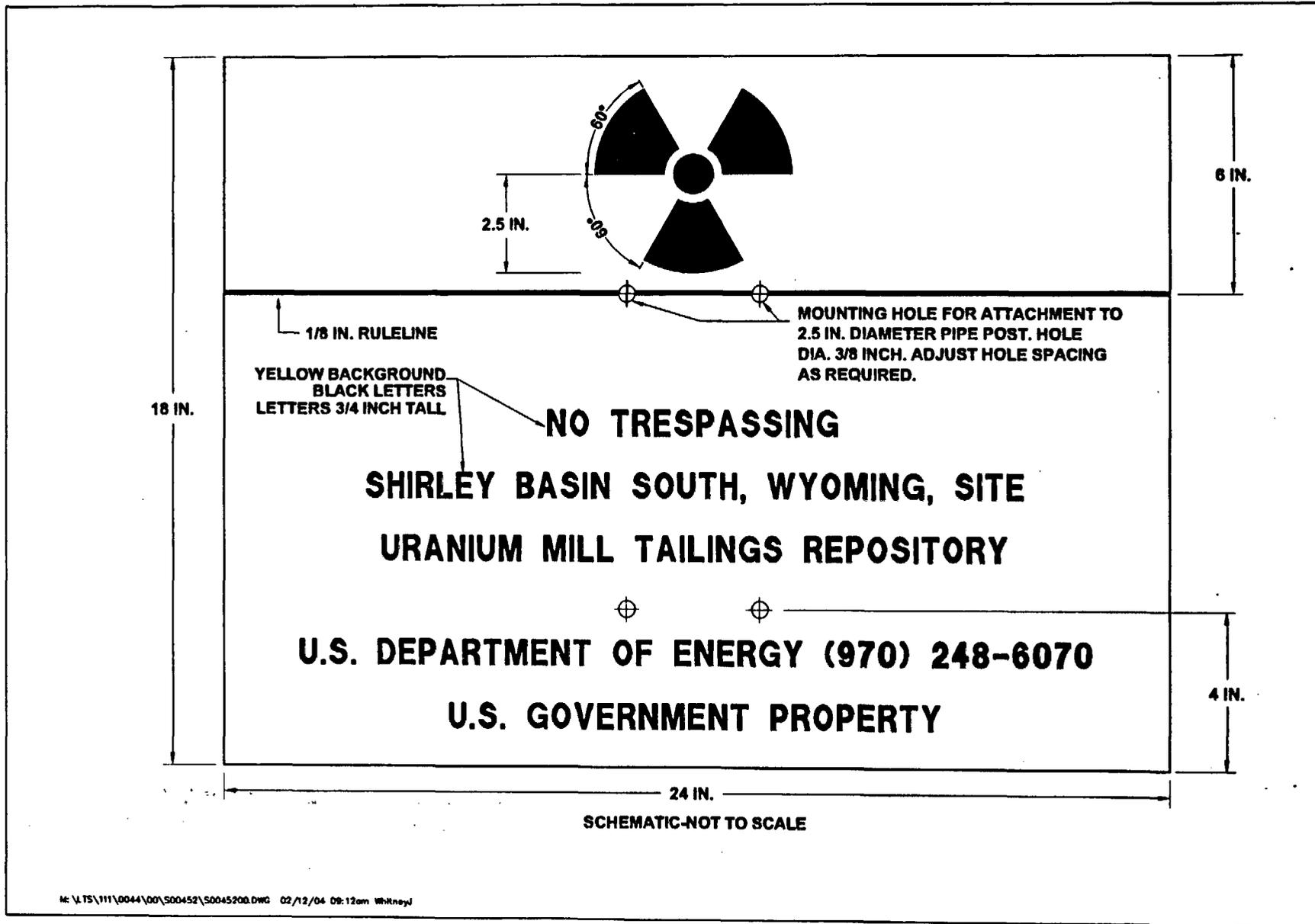


Figure 2-4. Warning Sign at Shirley Basin South, Wyoming Disposal Site

Abrupt changes in lithology and thickness are characteristic of the Wind River formation in Shirley Basin. The thickest section is along a northwesterly trending zone in the central part of the basin where 450 to 550 feet of siltstone and sandstone overlies a major valley on the pre-Wind River erosion surface. In and near this zone the Wind River formation consists of interbedded fine- and coarse-grained rocks, in about equal amounts, interbedded with considerable lignite material (Getty 1981).

All of the economically important uranium deposits in the area occur in the Wind River formation. The ore was produced from open pit mining operations in the immediate vicinity of the site. The uranium ore zone is located about 200 feet to 300 feet below the ground surface (Getty 1981).

2.4 Tailings Impoundment Design

The original tailings impoundment consisted of an earthen dam constructed around 1963. The embankment was approximately 5,000 feet long with a maximum height of 35 feet. An expansion of the tailings embankment was completed in 1979. This expansion resulted in a crest length of approximately 6,400 feet, a top width of 50 feet, and a maximum height of 75 feet. The tailings were pumped to the impoundment as a slurry (Getty 1981). The tailings dam is horseshoe-shaped in the plan view.

The tailings pile was reclaimed in place. The reclaimed tailings impoundment covers approximately 142 acres. The radon barrier achieves the pertinent radioactive emissions standards. The diversion channel system hydraulically isolates the tailings preventing erosion over the long-term and helps to achieve the necessary impoundment stability (Petrotomics 2001).

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 to below regulatory standards, minimizing infiltration of precipitation that could potentially leach contaminants into the subsurface, and physically containing the contaminated materials to prevent dispersion.

The tailings cover consists of 2 feet of compacted clay, 2 feet of compacted sandy overburden, and a minimum of 10 inches of topsoil (Figure 2-5). The topsoil was seeded primarily with grasses that are well adapted to the area. The tailings cover was sloped to shed water via the north swale discharge and the south swale discharge. The swale discharge points are protected by riprap (Petrotomics 2001).

2.4.2 Surface Water Diversion System

The surface water diversion system consists of a combination of contoured surfaces and drainage and collection channels. Riprap armor was placed on the steeper slopes and flow concentration points where design flow velocities would have the potential to erode the tailings encapsulation surfaces without riprap armoring.

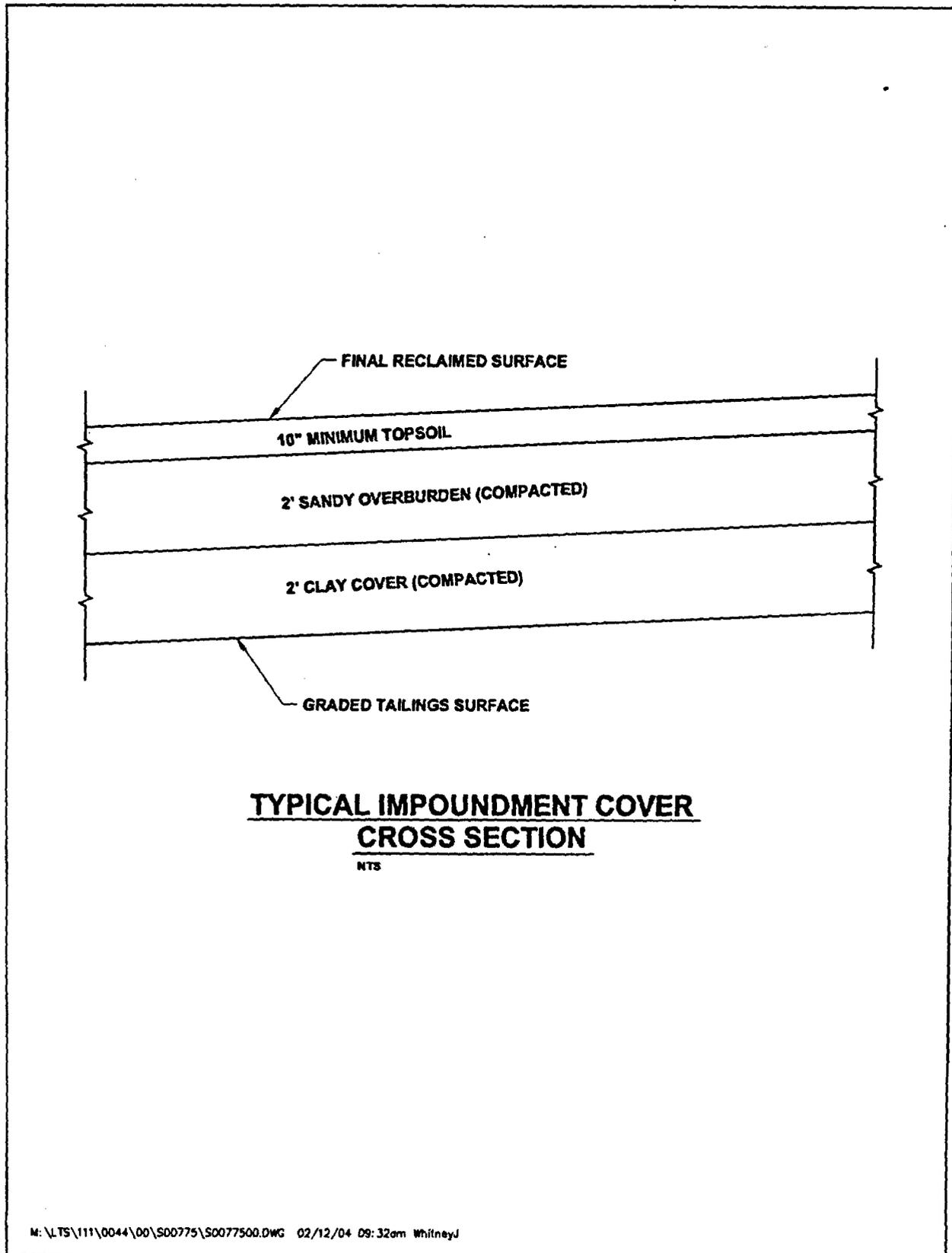


Figure 2-5. Typical Impoundment Cover Cross-Section

Rain falling on roughly the west half of the upper tailings area will flow down a riprap armored 5:1 slope to the lower tailings area. Precipitation falling on the lower tailings area, in addition to the water flowing down the tailings area armored slope from the upper tailings area, is conveyed to either the north swale discharge point or the south swale discharge point and on into the north diversion channel or the southwest diversion channel, respectively. The two discharge points are riprap armored. Precipitation will also be shed down the face of the tailings dam out slope into either the north or southwest diversion channels. The steeper sections (5:1 slope) of the tailings dam out slope are riprap armored. Water in the north and southwest diversion channels flows to the riprap armored channel confluence point and is discharged to a southwest-trending natural drainage feature.

Precipitation falling on roughly the east half of the upper tailings area will flow into the East Drainage basin.

North of the tailings embankment is the probable maximum flood (PMF) channel. Part of the PMF channel drains to the west and discharges to a small closed basin. A larger drainage area is captured by the portion of the PMF channel that flows eastward and discharges into the East Drainage Basin, a closed basin just east of the tailings embankment. The closed drainage basins are large enough to accommodate the PMF water volumes.

2.5 Ground Water Conditions

Shallow site ground water in units called the Upper Sand and Main Sand Aquifers of the Wind River Formation has been affected by seepage from the tailings disposal impoundment. Although the recovery of tailings seepage water had been ongoing for a number of years, the ground water corrective action program (CAP) formally began in 1988. The CAP was designed to recover contaminated ground water and control and minimize the spread of the tailings seepage (Petrotoomics 1996).

Site seepage recovery and ground water remediation activities have essentially dewatered the tailings solids and the Upper Sand Aquifer. Continued efforts to dewater proved to be counter-productive, therefore Petrotoomics Company applied to the NRC for Alternate Concentration Limits (ACLs) in 1996 (Petrotoomics 1996). After discussion and amendments to the application, the NRC concurred with the request for ACLs in October 1998 (NRC 1998). ACLs were granted for cadmium, chromium, nickel, radium-226, radium-228, thorium-230, selenium, and uranium.

Results of characterization, monitoring, and modeling efforts indicated that the direction of ground water flow at the site will change in the Main Sand from primarily north to primarily northeast as remedial ground water pumping is stopped and the water levels in the open mine pits in the immediate vicinity of the site recover to pre-mining/dewatering equilibrium levels (Petrotoomics 1996).

The CAP both dewatered the tailings to reduce the source term and pumped contaminated aquifers to remove hazardous constituents. The extracted water was then evaporated on site. The CAP was able to significantly reduce constituent concentrations but not achieve the site cleanup standards. Since continuation of the CAP could not realistically be expected to achieve concentration standards, the results of the CAP are considered to be as low as reasonably

achievable. Therefore it was necessary for Petrotonics to request ACLs for the identified constituents. In addition to the identified ACL constituents, effects of the tailings water seepage are also indicated by elevated levels of sulfate and total dissolved solids, and low pH in sample analysis results (NRC 1998).

The ground water monitoring plan for the Shirley Basin South site is described in detail in Section 3.7.1.

End of current text

3.0 Long-Term Surveillance Program

3.1 General License for Long-Term Custody

States have right of first refusal for long-term custody of Title II disposal sites (UMTRCA, Section 202 [a]). On July 15, 1994, the State of Wyoming exercised its right of first refusal and declined the long-term custody of the Shirley Basin South site (State of Wyoming 1994). Because the State declined this right, the site was transferred to the DOE for long-term custody.

When the NRC accepts this LTSP and terminates Petrotomics' license, SUA-551, the site is included under the NRC's general license for long-term custody (10 CFR 40.28 [b]). Concurrent with this action, a deed and title to the site are transferred from Petrotomics to DOE.

Although sites are designed to last "for up to 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years [10 CFR 40, Appendix A, Criterion 6]," there is no termination of the general license for the DOE's long-term custody of the site (10 CFR 40.28 [b]).

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

3.2 Requirements of the General License

To meet the requirements of the NRC's license at 10 CFR 40, Section 28, and Appendix A Criterion 12, the long-term custodian must, at a minimum, fulfill the following requirements. The section in the LTSP in which each requirement is addressed is given in parentheses.

1. Annual site inspection. (Section 3.3)
2. Annual inspection report. (Section 3.4)
3. Follow-up inspections and inspection reports, as necessary. (Section 3.5)
4. Site maintenance, as necessary. (Section 3.6)
5. Emergency measures in the event of catastrophe. (Section 3.6)
6. Environmental monitoring. (Section 3.7)

3.3 Annual Site Inspections

3.3.1 Frequency of Inspections

At a minimum, sites must be inspected annually to confirm the integrity of visible features at the site and to determine the need, if any, for maintenance, additional inspections, or monitoring (10 CFR 40, Appendix A, Criterion 12).

To meet this requirement, DOE will inspect the Shirley Basin South 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. The DOE will notify the NRC and the State of Wyoming 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 Shirley Basin South disposal site will be divided into sections called *transects*. Each transect will be individually inspected. Proposed transects for the first inspection of the Shirley Basin South site are listed in Table 3-1 and shown on Figure 3-1.

Table 3-1. Transects Used During First Inspection of the Shirley Basin South Site

Transect	Description
Cover of Tailings Impoundment	Repository impoundment cover.
Containment Dam and Diversion Channels	Riprap placement and integrity.
Site Perimeter and Balance of Site	Site perimeter including 0.25 mile beyond site boundary, area between tailings impoundment and site boundary, site entrance, boundary monuments, entrance sign, and site marker.

The annual inspection will be a visual walk-through. The primary purpose of the inspection will be to look for evidence of cover cracking, wind or water erosion, structural discontinuity of the containment dam, 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. An example of the photograph log is included as Appendix B.

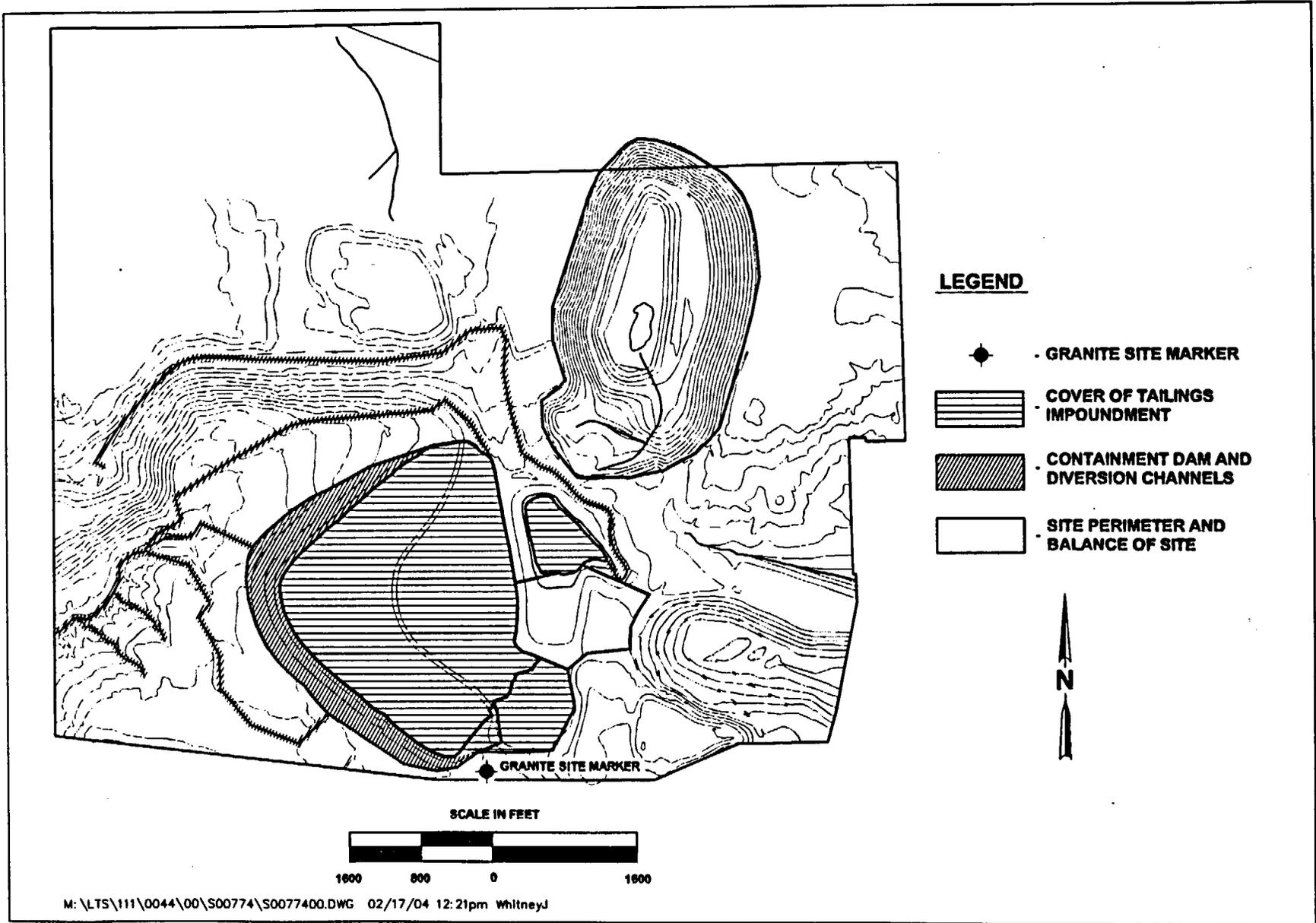


Figure 3-1. Inspection Transects for the Shirley Basin South, Wyoming, Disposal Site

3.3.3 Inspection Checklist

The inspection is guided by the inspection checklist. The initial site-specific inspection checklist for the Shirley Basin South disposal site is presented in Appendix B.

The checklist is subject to revision. At the conclusion of an annual site inspection, inspectors will make notes regarding revisions to the checklist, if necessary, in anticipation of the next annual site inspection. Revisions to the checklist will include such items as new discoveries or changes in site conditions that must be inspected and evaluated during the next annual inspection.

3.3.4 Personnel

Annual inspections normally will be performed by a minimum of two inspectors. Inspectors will be experienced engineers and scientists who have been specifically trained for the purpose through participation in previous site inspections.

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

3.4 Annual Inspection Reports

Results of annual site inspections will be reported to the NRC within 90 days of the last site inspection of that calendar year (10 CFR 40, Appendix A, Criterion 12). In the event that the annual report cannot be submitted within 90 days, DOE will notify the NRC of the circumstances. Annual inspection reports will also be distributed to the State and any other stakeholders who request a copy. The annual inspection report for the Shirley Basin South disposal site is included in a document containing the annual inspection reports for all sites licensed under 10 CFR 40.28.

3.5 Follow-up Inspections

Follow-up inspections are unscheduled inspections that may be required (1) as a result of discoveries made during a previous annual site inspection, or (2) as a result of changed site conditions reported by a citizen or outside agency.

3.5.1 Criteria for Follow-up Inspections

Criteria necessitating follow-up inspections are required by 10 CFR 40.28 (b)(4). DOE will conduct follow-up inspections should the following occur.

1. A condition is identified during the annual site inspection, or other site visit that requires personnel, perhaps personnel with specific expertise, to return to the site to evaluate the condition.

2. DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

With respect to citizens and outside agencies, DOE will establish and maintain lines of communications with local law enforcement and emergency response agencies to facilitate notification in the event of significant trespass, vandalism, or natural disaster. Due to the remote location of the Shirley Basin South 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 occurrence notification process (DOE Order 232.1);
- Respond with an immediate follow-up inspection or emergency response team;
- Implement measures as necessary to contain or prevent dispersion of radioactive materials (Section 3.6).

3.5.2 Personnel

Inspectors assigned to follow-up inspections will be selected on the same basis as for the annual site inspection (see Section 3.3.4).

3.5.3 Reports of Follow-up Inspections

Results of routine follow-up inspections will be included in the next annual inspection report (Section 3.4). Separate reports will not be prepared unless DOE determines that it is advisable to notify the NRC or other outside agency of a problem at the site.

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

3.6 Routine Site Maintenance and Emergency Measures

3.6.1 Routine Site Maintenance

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

The cover of the tailings impoundment was constructed with minimal slope to promote positive drainage while minimizing runoff water velocities. The cover has been revegetated with indigenous plant species that are expected to endure for the long-term. Because of the vegetation and mild slopes, adverse wind or water erosion impacts that would require maintenance are not anticipated. The tailings impoundment area is fenced to prevent damage from livestock grazing in the vicinity. Areas where runoff water could achieve erosional velocities have been armored with riprap.

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. Results of routine site maintenance will be summarized in the annual site inspection report.

3.6.2 Emergency Measures

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

3.6.3 Criteria for Routine Site Maintenance and Emergency Measures

Conceptually, there is a continuum in the progression from minor routine maintenance to large-scale reconstruction of the tailings impoundment following a potential disaster. Criteria, although required by 10 CFR 40.28 (b)(5), for triggering particular DOE responses for each progressively

more serious level of intervention, are not easily defined because the nature and scale of all potential problems cannot be foreseen. The information in Table 3-2 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. The DOE's priority (urgency) in column 1 of Table 3-2 bears an inverse relationship with DOE's estimate of probability. The highest priority response is also believed to be the least likely to occur.

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

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

^aOther changes or conditions will be evaluated and treated similarly on the basis of risk.

3.6.4 Reporting Maintenance and Emergency Measures

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

In accordance with 10 CFR 40.60, within 4 hours of discovery of any Priority 1 or 2 event listed in Table 3-2, DOE will notify:

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

The phone number for the required 4-hour contact to the NRC Operations Center is (301) 816-5100.

3.7 Environmental Monitoring

Ground Water Monitoring

The NRC has granted alternate concentration limits (ACLs) for uranium, radium-226, radium-228, thorium-230, cadmium, chromium, nickel, lead, and selenium at the point of compliance (POC) wells (NRC 1998, NRC 2002). DOE also will analyze ground water samples for sulfate, chloride, nitrate, and total dissolved solids as these parameters can be useful indicators of contaminant migration. The established ACL values and pertinent ground water protection standards are shown in Table 3-3.

Table 3-3. Analytes, Alternate Concentration Limits, and Ground Water Protection Standards for the Shirley Basin South, Wyoming, Disposal Site

ANALYTE	ACL	GROUND WATER PROTECTION STANDARD*
Uranium	9.2 mg/L	NA
Radium-226	91.3 pCi/L	NA
Radium-228	25.7 pCi/L	NA
Thorium-230	2409 pCi/L	NA
Cadmium	0.079 mg/L	NA
Chromium	1.83 mg/L	NA
Lead	0.05 mg/L	NA
Nickel	6.15 mg/L	NA
Selenium	0.12 mg/L	NA
Chloride	NA	2,000 mg/L
Sulfate	NA	3,000 mg/L
TDS	NA	5,000 mg/L

*Wyoming Class III Ground Water Protection Standards for Livestock use are applicable to this site.

Table 3-4 summarizes the ground water monitoring plan. The locations of the monitor wells in the ground water monitoring network are shown on Figure 3-2. The intent of the annual sampling is to verify that the ACLs are not exceeded at the POC wells, and to verify continued compliance with the pertinent ground water protection standards.

If an ACL is exceeded at a POC well, or trends indicate a ground water protection standard may be exceeded at the site boundary, DOE will inform NRC and the Wyoming Department of Environmental Quality of the results and conduct confirmatory sampling. If the confirmatory sampling verifies the exceedance or threat of exceedance, DOE will develop an evaluative monitoring work plan and submit that plan to the NRC for review prior to initiating the evaluative monitoring program. Results of the evaluative monitoring program will be used, in consultation with the NRC, to determine if corrective action is necessary.

Results of the ground water monitoring program will be included in the annual inspection report (Section 3.4). Ground water monitoring results will include iso-concentration maps for uranium and sulfate. Also, concentration versus time graphs in all wells for uranium and sulfate will be reported.

Once every 10 years, beginning in 2010, DOE will check the records at the Wyoming State Engineer's Office to determine if there have been significant changes in water demands in the vicinity of the site.

Table 3-4. Ground Water Monitoring Plan for the Shirley Basin South, Wyoming, Disposal Site

WELL DESIGNATION	MONITORING FREQUENCY	ANALYTES	COMMENTS
MW-40-SC	Annually	Uranium, Radium-226, Radium-228, Lead, Chloride, Nitrate, Nickel, Selenium, Thorium-230, Sulfate, TDS, Cadmium, Chromium, pH, electrical conductivity, water level	Upgradient well, Upper Sand Aquifer
MW-5-SC	Annually	Uranium, Radium-226, Radium-228, Lead, Chloride, Nitrate, Nickel, Selenium, Thorium-230, Sulfate, TDS, Cadmium, Chromium, pH, electrical conductivity, water level	POC well, Upper Sand Aquifer
MW-51-SC	Annually	Uranium, Radium-226, Radium-228, Lead, Chloride, Nitrate, Nickel, Selenium, Thorium-230, Sulfate, TDS, Cadmium, Chromium, pH, electrical conductivity, water level	POC well, Upper Sand Aquifer
MW-54-SC	Annually	Uranium, Radium-226, Radium-228, Lead, Chloride, Nitrate, Nickel, Selenium, Thorium-230, Sulfate, TDS, Cadmium, Chromium, pH, electrical conductivity, water level	Upper Sand Aquifer
MW-10-DC	Annually	Uranium, Radium-226, Radium-228, Lead, Chloride, Nitrate, Nickel, Selenium, Thorium-230, Sulfate, TDS, Cadmium, Chromium, pH, electrical conductivity, water level	Main Sand Aquifer
MW-5-DC	Annually	Uranium, Radium-226, Radium-228, Lead, Chloride, Nitrate, Nickel, Selenium, Thorium-230, Sulfate, TDS, Cadmium, Chromium, pH, electrical conductivity, water level	POC well, Main Sand Aquifer
MW-19-DC	Annually	Uranium, Radium-226, Radium-228, Lead, Chloride, Nitrate, Nickel, Selenium, Thorium-230, Sulfate, TDS, Cadmium, Chromium, pH, electrical conductivity, water level	POC well, Main Sand Aquifer
MW-KGS#3	Annually	Uranium, Radium-226, Radium-228, Lead, Chloride, Nitrate, Nickel, Selenium, Thorium-230, Sulfate, TDS, Cadmium, Chromium, pH, electrical conductivity, water level	Lower Sand Aquifer; Analysis results used to verify hydraulic isolation from contaminated aquifers.

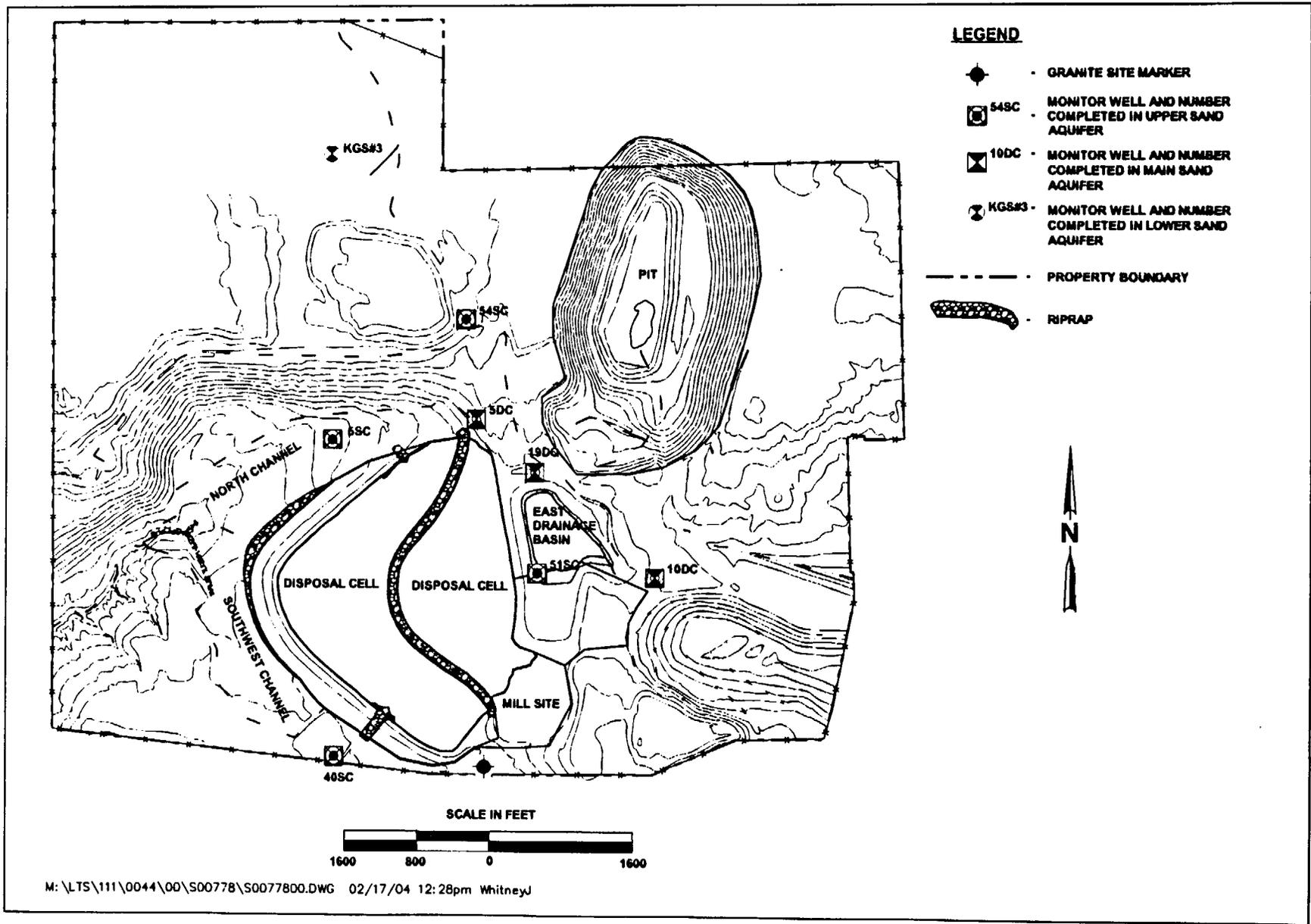


Figure 3-2. Location of Monitor Wells in the Ground Water Monitoring Network

3.8 Records

DOE-LM receives and maintains select records at their office in Grand Junction, Colorado, to support post-closure site maintenance. These records are being maintained by LM because they contain critical information required to protect human health and the environment, manage land and assets, protect legal interests of DOE and the public, and mitigate community impacts resulting from the cleanup of legacy waste. The records are managed in accordance with the following requirements.

Requirements

Title 44, United States Code (U.S.C.), Chapter 29, Records Management by the Archivist of the United States and by the Administrator of General Services, Chapter 31, "Records Management by Federal Agencies," and Chapter 33, "Disposal of Records."

Title 36, *Code of Federal Regulations* Chapter 12, Subchapter B, "Records Management;"

DOE G 1324.5B, *Implementation Guide*;

LM Information and Records Management Transition Guidance.

3.9 Quality Assurance

All activities related to the surveillance and maintenance of the Shirley Basin South site will comply with DOE Order 414.1A, *Quality Assurance (QA)* and ANSI/ASQC E4-1994, *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs* (American Society for Quality Control 1994).

QA requirements will be transmitted through procurement documents to subcontractors if/when appropriate.

3.10 Health and Safety

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

Specific guidance is contained in the *Office of Land and Site Management Project Safety Plan* (DOE 2004). This Project Safety Plan identifies specific hazards associated with the anticipated scope of work and provides direction for the control of these hazards. During the pre-inspection briefing, personnel are required to review the plan to ensure that they have an understanding of the potential hazards and the health and safety requirements associated with the work to be performed.

End of current text

4.0 References

American Society for Quality Control (ASQC), 1994. *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs*, ANSI/ASQC E4-1994, Energy and Environmental Quality Division, Environmental Issues Group.

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

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

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

Getty, 1981. *Environmental Report for Source Materials License SUA-551*, Petrotomics Mill, Docket No. 40-6659, April 1, 1981.

NRC (U.S. Nuclear Regulatory Commission), 1998. Letter from J. Holonich, NRC, to R. Juday, Petrotomics Company, *Concurrence on Alternate Concentration Limits Source Material License SUA-551, Amendment NO. 63*, October 6, 1998.

———, 2002. Letter from D. Gillen, NRC, to S. Pfaff, Petrotomics Company, Petrotomics Company Request for an Alternate Groundwater Protection Standard for Selenium, License Amendment No. 75 to Source Materials License SUA-551, September 27, 2002.

Petrotomics, (Petrotomics Company) 2001. *Tailings Reclamation Construction Completion Report*. November 2001.

———, 1996. *Petrotomics Tailings Facility Application for Alternate Concentration Limits to Amend USNRC Source Material License SUA-551*. September 1996.

State of Wyoming, 1994. Letter to Joseph E. Virgona, Project Manager, U.S. Department of Energy from Dennis Hemmer, Director of the Wyoming Department of Environmental Quality, declining custody of all UMTRCA Title II sites within the State of Wyoming, July 15, 1994.

End of current text

Appendix A

Real Estate Information

DEED OF CONVEYANCE

THIS CONVEYANCE, made this 1st day of March, 2005, between PETROTOMICS COMPANY, a Delaware corporation, (hereinafter the "Grantor"), whose address is 6001 Bollinger Canyon Road, Building K, Room 2008, San Ramon, CA 94583-2324, and the UNITED STATES OF AMERICA, of Washington, DC (hereinafter the "Grantee"), consists of three sections.

1. Section 1: Conveyance with General Warranty of Title. For good and valuable consideration, the receipt of which is hereby acknowledged, Grantor hereby grants, conveys, and warrants unto the Grantee the following described real property (hereinafter the "Subject Lands"):

Parcel 1

A tract of land located in Sections 32 and 33, Township 28 North, Range 78 West, 6th Principal Meridian, and in Sections 3, 4, 5, 8, 9, and 10, Township 27 North, Range 78 West, 6th Principal Meridian, Carbon County, Wyoming, more particularly described as follows:

Beginning at the NW corner of Section 3, T27N, R78W (Point 1, 614715.32N, 811724.93E), this being the point of beginning; thence N89°33'24"E, 1102.21 ft. (Point 2, 614723.85N, 812827.11E) along the north section line; thence S1°21'41"E, 1620.76 ft. (Point 3, 613103.55N, 812865.61E); thence S1°22'39"E, 1408.25 ft. (Point 4, 611695.70N, 812899.46E); thence S88°40'34"W, 435.28 ft. (Point 5, 611685.65N, 812464.30E); thence N00°00'30"E, 41.10 ft. (Point 6, 611726.74N, 812464.31E); thence S88°38'36"W, 187.13 ft. (Point 7, 611722.31N, 812277.23E); thence S1°22'E, 1321.85 ft. (Point 8, 610400.84N, 812308.76E); thence S1°22'13"E, 157.67 ft. (Point 9, 610243.22N, 812312.53E); thence S78°44'07"E, 34.86 ft. (Point 10, 610236.41N, 812346.72E); thence S1°19'59"E, 306.45 ft. (Point 11, 609930.04N, 812353.85E); thence S11°15'53"W, 256.67 ft. (Point 12, 609678.31N, 812303.71E); thence S11°16'28"W, 942.81 ft. (Point 13, 608753.69N, 812119.38E), to a point in Section 10; thence S15°19'19"W, 354.90 ft. (Point 14, 608411.40N, 812025.60E); thence S88°37'24"W, 982.28 ft. (Point 15, 608387.80N, 811043.60E), to a point in Section 9; thence S67°11'49"W, 1000.61 ft. (Point 16, 608000.00N, 810121.20E); thence due West 121.20 ft. (Point 17, 608000.00N, 810000.00E), which is the old SE corner of the NRC area; thence due West 2333.75 ft. (Point 18, 608000.00N, 807666.25E); thence N83°31'21"W, 4243.34 ft. (Point 19, 608478.70N, 803450.00E), to a point in Section 8; thence due North 7792.11 ft. (Point 20, 616270.81N, 803450.00E), to a point in Section 32; thence due East 3004.07 ft. (Point 22, 616270.81N, 806454.07E), to a point on the 32/33 Section line; thence N89°11'02"E, 1327.53 ft. (Point 23, 616289.72N, 807781.47E) to the NE corner of the S½SW¼SW¼ Sec. 33, T28N, R78W, 6th P.M.; thence S00°07'57"W, 1656.54 ft. (Point 24, 614633.19N, 807777.64E) to the SE corner of SW¼SW¼ Sec. 33; thence N89°11'44"E, 1323.70 ft. (Point 25, 614651.77N, 809101.20E) to the 33/4 quarter corner; thence N88°36'45"E, 2624.50 ft. (Point 1,

614715.32N, 811724.93E) to the NW corner of Section 3, the point of beginning.

This parcel contains 1,512.00 acres, more or less.

Parcel II

Township 27 North, Range 78 West, 6th Principal Meridian, Carbon County, Wyoming
Section 9: N $\frac{1}{2}$ N $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$

This parcel contains 14.92 acres, more or less.

The acquiring federal agency is the Department of Energy.

TO HAVE AND TO HOLD the above described premises, together with all and singular the rights and appurtenances thereof to the same belonging or in anywise appertaining to the use, benefit, and behalf of the Grantee, its successors and assigns, forever.

The Grantor, for itself and its successors, does hereby covenant and agree that it will **WARRANT AND FOREVER DEFEND** title to the above premises unto the Grantee, its successors and assigns, against all and every person or persons claiming the whole or any part thereof, excepting from Grantor's warranty, however, all easements, rights-of-way, restrictions, exceptions, and reservations of record, including but not limited to reservations or exceptions contained in Patents affecting the Subject Lands or in the acts authorizing the issuance of such Patents, and further excepting from Grantor's warranty all existing easements to High Plains Power, Inc., as reflected in that certain instrument recorded June 10, 2002, in Book 1020, at Page 120 of the records of Carbon County, Wyoming.

2. **Section 2: Conveyance with Special Warranty of Title.** **FOR THE SAME CONSIDERATION SET OUT ABOVE**, Grantor hereby grants and conveys to Grantee the following water and water rights used on or appurtenant to the Subject Lands, to wit:

- (a) the 5-SC monitoring well, Permit Number UW-144485;
- (b) the 40-SC monitoring well, Permit Number UW-144486;
- (c) the 5-DC monitoring well, Permit Number UW-144487;
- (d) the 51-SC monitoring well, Permit Number UW-76138;
- (e) the 54-SC monitoring well, Permit Number UW-90022;
- (f) the 10-DC monitoring well, Permit Number UW-87372;
- (g) the 19-DC monitoring well, Permit number UW-111140;
- (h) the KGS #3 (Mine Shop Well) monitoring well, Permit Number UW-31943;
- (i) the Pit 4 Surface Water Reservoir, Permit Number 10315 RES;
- (j) the East Basin Reservoir, Permit Number 9743 RES; and
- (k) all ditches, canals, and structures appurtenant to the aforesaid reservoirs or necessary to the use of any or all water rights related thereto.

TO HAVE AND TO HOLD the above-described water and water rights, together with all and singular the rights, members, and appurtenances thereof to the same, belonging or in anywise appertaining to the use, benefit, and behalf of the Grantee, its successors and assigns forever.

The Grantor, for itself and its successors, does hereby covenant and agree that it will **WARRANT AND FOREVER DEFEND** title to the above described water and water rights and appurtenances thereto unto the Grantee, its successors and assigns, against all and every person or persons claiming the whole or any part thereof, by, through, or under the Grantor.

3. Section 3. Quitclaim of Certain Interests. FOR THE SAME CONSIDERATION SET OUT ABOVE, Grantor, for itself, its successors and assigns, hereby releases and quitclaims to the Grantee, all right, title, and interest which the Grantor may have in the banks, beds, and waters of any streams bordering the Subject Lands, and also all interest in alleys, roads, streets, ways, strips, gores, or railroad rights of way abutting or adjoining said land and in any means of ingress or egress appurtenant thereto.

IN WITNESS WHEREOF, the Grantor has executed this Deed of Conveyance on the date set forth above.

Petrochemics Company,
a Delaware corporation,

By: 

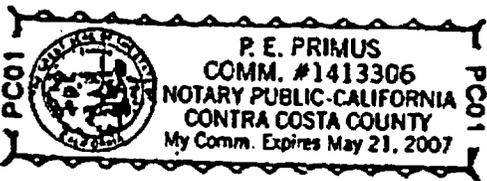
Gordon A. Turl, Assistant Secretary

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California }
 County of Contra Costa } ss.
 On March 1, 2005 before me, P. E. Primus
Notary Public
 personally appeared Corven A. Teri
Name(s) of Signer(s)

- personally known to me
- proved to me on the basis of satisfactory evidence

to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.



WITNESS my hand and official seal.
P. E. Primus
Signature of Notary Public

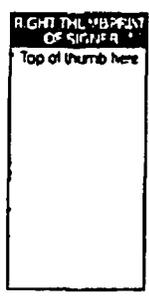
OPTIONAL
 Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: _____
 Document Date: _____ Number of Pages: _____
 Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer

Signer's Name: _____
 Individual
 Corporate Officer - Title(s): _____
 Partner - Limited General
 Attorney-in-Fact
 Trustee
 Guardian or Conservator
 Other: _____
 Signer is Representing: _____



Appendix B

Initial Site Inspection Checklist

Inspection Checklist: Shirley Basin South

Date of This Revision: _____

Last Annual Inspection: _____

Inspectors: _____ and _____

Next Annual Inspection (Planned): _____

No.	Item	Issue	Action
1	Access	Access is from a county road.	None.
2	Specific site surveillance features	See attached list.	Inspect. Identify maintenance requirements
3	Vegetation	The cover of the tailings impoundment has been revegetated to control wind and water erosion, although vegetation is not integral to the tailings isolation design.	Inspect impoundment cover and note condition of vegetation. There should not be any grazing on the impoundment cover.
4	Riprap	Certain areas have been armored with riprap for erosion protection.	Inspect riprap, note evidence of rock displacement or rock degradation.

Checklist of Site Specific Surveillance Features: Shirley Basin South

Feature	Comment
Access Road	
Entrance Gate	
Entrance and Perimeter Signs	Total: 34
Perimeter Fence	Barbed-wire stock fence
Boundary Monuments	Total: 27
Site Marker	
Monitor Wells	Total: 8 Upgradient Well: MW-40-SC (Upper Sand Aquifer) POC wells: MW-5-SC and MW-51-SC (Upper Sand Aquifer) POC wells: MW-5-DC and MW-19-DC (Main Sand Aquifer) MW-54-SC, MW-10-DC, and MW-KGS#3

**THIS PAGE IS AN
OVERSIZED DRAWING OR
FIGURE,
THAT CAN BE VIEWED AT THE
RECORD TITLED:
PLATE 1
“LONG-TERM SURVEILLANCE PLAN
SHIRLEY BASIN SOUTH, WYOMING
DISPOSAL SITE”**

WITHIN THIS PACKAGE

D-01

**THIS PAGE IS AN
OVERSIZED DRAWING OR
FIGURE,
THAT CAN BE VIEWED AT THE
RECORD TITLED:
PLATE 2
“LONG-TERM SURVEILLANCE PLAN
SHIRLEY BASIN SOUTH, WYOMING
DISPOSAL SITE”**

WITHIN THIS PACKAGE

D-02