9.0 Lakeview, Oregon, Disposal Site

9.1 Compliance Summary

The Lakeview Disposal Site, inspected on June 25 and 26, 2003, was in good condition. A revised Long-Term Surveillance Plan, which includes a recalculated median diameter of the side slope riprap (the minimum size required to protect the cell from erosion by storm runoff), is pending U.S. Nuclear Regulatory Commission (NRC) concurrence. Results of the fifth annual gradation test on the west side slope indicate that the median diameter of the riprap remains substantially above the recalculated minimum size. A damaged perimeter sign was replaced and broken strands of the perimeter fence were repaired. No need was identified for a follow-up or contingency inspection.

9.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Lakeview, Oregon, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan for the Collins Ranch Disposal Site, Lakeview, Oregon* (DOE/AL/62350–19F, Rev. 3, U.S. Department of Energy [DOE], Albuquerque Operations Office, August 1994) and in procedures established by the DOE office at Grand Junction to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 9–1. A revised Long-Term Surveillance Plan for the site, prepared in August 2002, is pending NRC concurrence.

Table 9–1. License Requirements for the Lakeview, Oregon, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 6.1	Section 9.3.1
Follow-up or Contingency Inspections	Section 7.0	Section 9.3.2
Routine Maintenance and Repairs	Section 8.0	Section 9.3.3
Ground Water Monitoring	Section 5.3	Section 9.3.4
Corrective Action	Section 9.0	Section 9.3.5

9.3 Compliance Review

9.3.1 Annual Inspection and Report

The site, northwest of Lakeview, Oregon, was inspected on June 25 and 26, 2003. Results of the inspection are described below. Features and the photograph locations (PLs) mentioned in this report are shown on Figure 9–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

9.3.1.1 Specific Site Surveillance Features

Access Road, Entrance Gate, Fence, and Signs—Access to the site is gained by traveling a gravel road that heads west off County Road 2–16B. The 1.2-mile access road between the county road and the DOE property boundary has a perpetual easement across private property

(Collins Ranch). A DOE lock is on a cable gate across the access road at a cattle guard approximately 0.5 mile east of the site.

9A A barbed wire boundary fence encompasses the site. Broken strands on the west and north boundary fence were repaired.

9B The entrance sign, replaced in 2002, was in good condition. Nine of the twelve perimeter signs were in good condition. Perimeter signs P9, P10, and P12 have been damaged by bullets, and sign P10 was replaced; signs P9 and P12 are still legible.

Site Markers and Monuments—The two site markers, three survey monuments, and three boundary monuments were in excellent condition.

Monitor Wells—Nine monitor wells are in the ground water monitoring network. All of the wells were inspected and found to be locked and in good condition.

9.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into three areas referred to as transects: (1) the top of disposal cell; (2) the side slopes of the disposal cell and adjacent drainage channel, aprons, and trench drains; and (3) the site perimeter and outlying area.

Top of the Disposal Cell—The design for the top of the disposal cell has produced conditions that favor the growth of deep-rooted plants. The top slope was seeded with grasses, but the low water-storage capacity of the thin (nominal 4-inch-thick) topsoil layer has limited grass growth to scattered patches of deeper-rooted wheat grasses. Movement of precipitation through the riprap and bedding layers and into the radon barrier favors the growth of shrubs. Many mature rabbitbrush plants and sagebrush plants grow on the top of the disposal cell (PL–1), and shrub density currently exceeds that of the native plant community adjacent to the site.

Deep-rooted plants have the potential to increase the hydraulic conductivity of the radon barrier, allowing meteoric water to leach contaminants from the encapsulated tailings and into the underlying soil and ground water. In contrast, an increase in plant cover indicates an increase in transpiration rate, which removes water from the root zone and reduces the probability of saturation and leaching of contaminants.

9C DOE, in collaboration with Sandia National Laboratories, continues to conduct a risk-based performance evaluation of the cell cover to determine how biointrusion affects infiltration through the radon barrier. Fieldwork in 2003 focused on developing scenarios and sequence of processes or events that describe possible future conditions at the disposal cell. Soils and vegetation at locations around the disposal cell site were characterized. These sites, selected as disposal site analogs, represent a reasonable range of wet and dry future climate scenarios. Soil physical properties, plant community characteristics, and leaf area index were measured at the analog sites. The saturated hydraulic conductivity was measured with air-entry permeameters (PL–2). These analog site data will be used to conduct performance calculations and sensitivity/uncertainty analyses using the Framework for Risk Analysis in Multimedia Environmental Systems model developed by Pacific Northwest National Laboratory. Results of the analyses, expected to be completed in 2004, will be presented in a separate report.

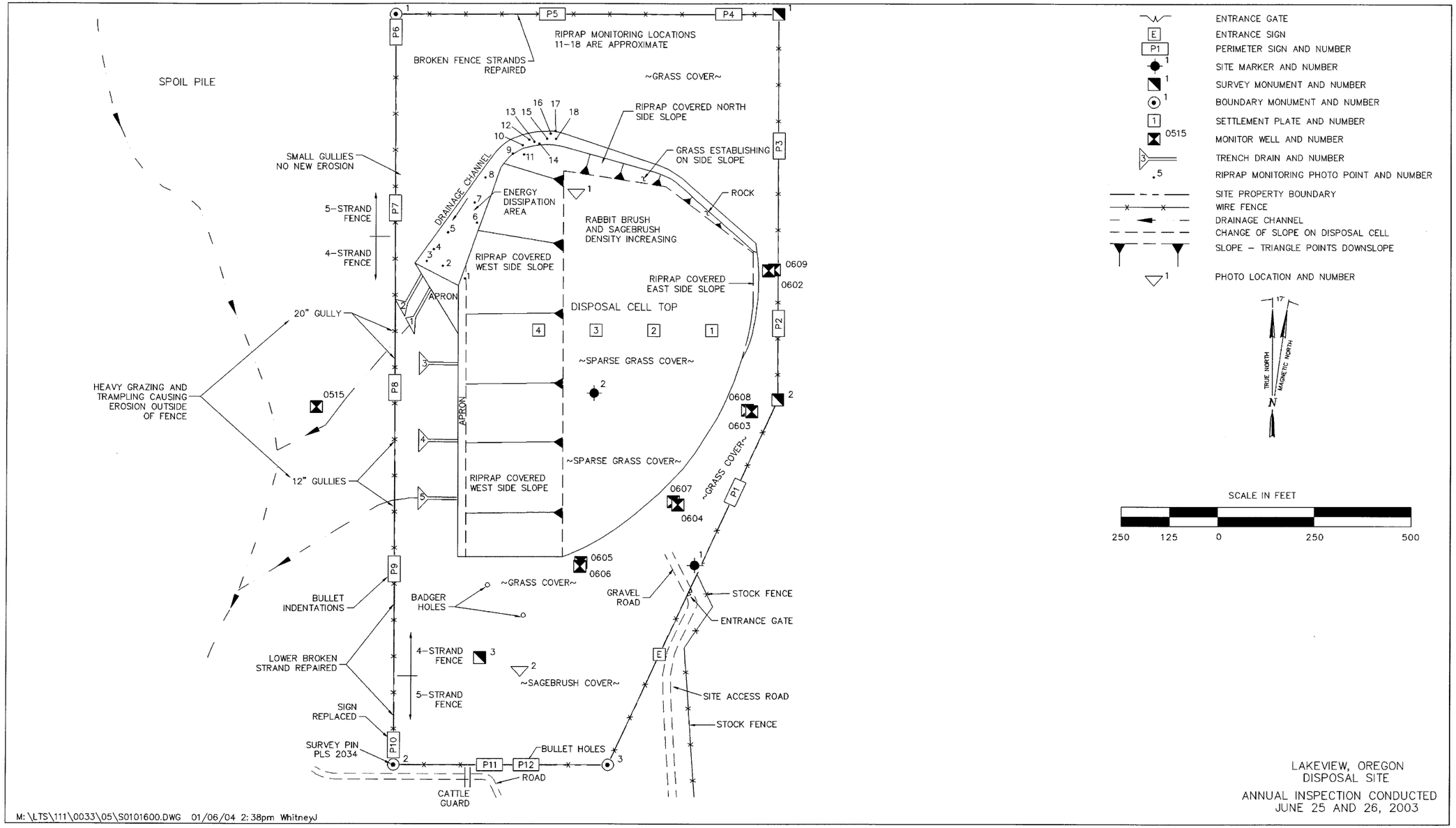

Figure 9–1. 2003 Annual Compliance Drawing for the Lakeview, Oregon, Disposal Site

Side Slopes of the Disposal Cell and Adjacent Drainage Channel, Aprons, and Trench Drains— Riprap for the Lakeview disposal cell was sized to withstand the erosive energy of a probable maximum precipitation event—a conservative, worst-case scenario in which the most severe meteorological conditions possible combine and occur at the same time. The original design specified a minimum side slope riprap median rock diameter (D_{50}) of 2.7 inches. Deterioration of riprap on the west and north side slopes and in the energy dissipation area at the lower end of the drainage channel is an ongoing concern because the percentage of crumbling rocks on the surface has noticeably increased since the riprap was placed in 1989. Observations indicated that the riprap could degrade to a value less than the designed D_{50}.

To determine if the riprap degradation posed a risk for cell erosion, DOE recalculated the minimum D_{50} using the U.S. Army Corps of Engineers Hydrologic Modeling System computer model currently accepted by NRC. The recalculated minimum D_{50} necessary to protect the disposal cell is 1.8 inches. DOE submitted a revised Long-Term Surveillance Plan in 2002 addressing the recalculated D_{50}; the plan is pending NRC concurrence.

9D

A side slope riprap field gradation test was performed for the fifth year during the 2003 inspection. Particle size distribution (weight percent) by count data was collected at 27 locations. The results indicate an average D_{50} of 2.74 inches. The average D_{50} in 2002 was 2.35 inches. The apparent increase in mean rock diameter may be related to the sampling method. Only rocks at the surface of the riprap layer are sampled and most sample locations are randomly generated. Pieces of crumbling rocks may drop into the interstices of the layer leaving more durable rock at the surface.

DOE will continue annual gradation tests at the Lakeview disposal cell to ensure that the side slopes of the cell are protected from erosion. If it becomes apparent that the riprap is continuing to deteriorate and that the measured D_{50} will eventually fall below 1.8 inches, DOE, in consultation with NRC, will evaluate alternatives and take corrective action, as necessary.

Eighteen photograph points for long-term rock monitoring in the energy dissipation area were re-photographed. No discernable rock degradation was observed since monitoring began at the original ten locations established in 1997 or at the eight additional locations established in 2000.

Grass encroachment has increased in the riprap on the north side slope, in the upper (eastern) part of the drainage channel, and in the energy dissipation area at the lower end of the drainage channel. Plant growth in the drainage channel is not significant and does not degrade the function of the channel.

Standing water observed during past inspections was absent from the large depression in the lower end of the drainage channel. Water is a concern because inundation may accelerate deterioration of the large riprap due to freeze-thaw processes and secondary mineralization or alteration.

Site Perimeter and Outlying Area—Gullies that formed in seeded areas extending west of Trench Drains 1, 2, 3, 4, and 5 were filled with rock in 2000. The rock has arrested the headcutting that was proceeding from the Collins Ranch property onto the DOE property. The native grass and shrub communities within 0.25 mile of the site boundary were unchanged.

9.3.2 Follow-up or Contingency Inspections

No follow-up or contingency inspections were required in 2003.

9.3.3 Routine Maintenance and Repairs

DOE replaced a damaged perimeter sign and performed minor fence repairs in 2003.

9.3.4 Ground Water Monitoring

DOE monitors ground water at this site once every 5 years. Eight point-of-compliance wells are located east of the cell, and an upgradient well is located west of the cell. Ground water was sampled in 1999 and the results were included in the 1999 annual report. Ground water will be sampled again in 2004.

9.3.5 Corrective Action

Corrective action is action taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2003.

9.3.6 Photographs

Table 9–2. Photographs Taken at the Lakeview, Oregon, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	120	Shrubs growing on the top slope of the disposal cell.
PL–2	70	Air-entry permeameter test at a soil analog site.

LKV 6/2003. PL-1. Shrubs growing on the top slope of the disposal cell.

LKV 6/2003. PL-2. Air-entry permeameter test at a soil analog site.

End of current section