Long-Term Surveillance and Monitoring Program

# Annual Site Inspection and Monitoring Report for Uranium Mill Tailings Radiation Control Act Slick Rock, Colorado, Site

1998 Annual Report

February 1999

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

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# Summary

The Slick Rock disposal site, inspected on July 16, 1998, is in good to excellent condition. The primary concern is the establishment of perennial vegetation to control erosion on the spoils pile and in disturbed areas around the disposal cell. Vegetative cover has increased since 1997, but the dominant plant is Russian thistle, an annual weed. Three maintenance tasks are identified: (1) tire ruts in the rock armor near two former standpipes will be filled or smoothed, (2) an old silt fence will be removed to improve the appearance of the site, and (3) a few minor fence repairs will be completed. No cause for a follow-up inspection was identified.


# 1.0 Introduction

This report presents the results of the U.S. Department of Energy's (DOE's) annual inspection of the Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site at Slick Rock, Colorado.

M.K. Kastens, Chief Inspector, and C.S. Goodknight, Assistant Inspector, both of MACTEC-ERS, the Technical Assistance and Remediation contractor at the DOE Grand Junction Office (GJO), conducted the inspection on July 16, 1998. P. Oliver of the Colorado Department of Public Health and Environment participated in the inspection. The inspection was conducted in accordance with (1) the Long-Term Surveillance Plan (LTSP) (*Long-Term Surveillance Plan for the Burro Canyon Disposal Cell Slick Rock, Colorado*, August 1997. U.S. DOE, Albuquerque, N.M., DOE/AL/62350-236, Rev. 0) for this site, and (2) procedures established by GJO to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27.

The purposes of the annual inspection were to confirm the integrity of visible features at the site, to identify changes in conditions that may affect site integrity, and to determine the need, if any, for maintenance or additional inspections and monitoring.

Ground-water monitoring is not required by the LTSP at this site. However, DOE does record water levels in two standpipes installed in the disposal cell in response to a request from the state. An update on water levels in these two standpipes is included in this report.

# 2.0 Inspection Results

To ensure a thorough and efficient inspection, the site was divided into three areas referred to as transects: (1) the riprapped top and side slopes of the disposal cell including the key trench and apron; (2) the area between the disposal cell and the site boundary, including the stock pond, the graded and reseeded area, and the stock fence; and (3) outlying areas beyond the site boundary including the spoils pile. Each of these transects was inspected by walking a series of traverses. Part of the outlying area transect was inspected from a distance.

Within each transect, inspectors examined specific site surveillance features, such as survey and boundary monuments, signs, and site markers. Inspectors examined each transect for evidence of

erosion, settling, slumping, or other phenomena that might affect site integrity or the long-term performance of the site. Features mentioned in this report are shown on the drawing, Figure SRK-1.

## 2.1 Specific Site Surveillance Features

### Access Road, Entrance Gate, and Perimeter Signs

Site access is by an improved gravel and dirt road maintained by San Miguel County. The road is in excellent condition. The road crosses the site boundary at the southwest corner of the site.

The entrance gate and the fence around the site are strung with two strands of smooth (barbless) wire. The gate is closed by a wire loop that slips over the top of the adjoining fence post and by a chain and padlock that secures the gate to the adjoining fence post. The fence and gate provide minimal security; they are only partially successful in preventing cattle from entering and overgrazing revegetated areas of the site.

The entrance sign is inside the stock fence immediately east of the entrance gate. Thirty-two perimeter signs, designated P1 through P32, are spaced at approximately 200-foot (ft) intervals around the site. All signs are attached to steel posts set in concrete about 5 ft inside the site boundary. The sign post at P1 has a bullet hole (SRK PL-1) and the sign at P32 has a bullet hole and is bent (SRK PL-2). All other signs are in excellent condition.

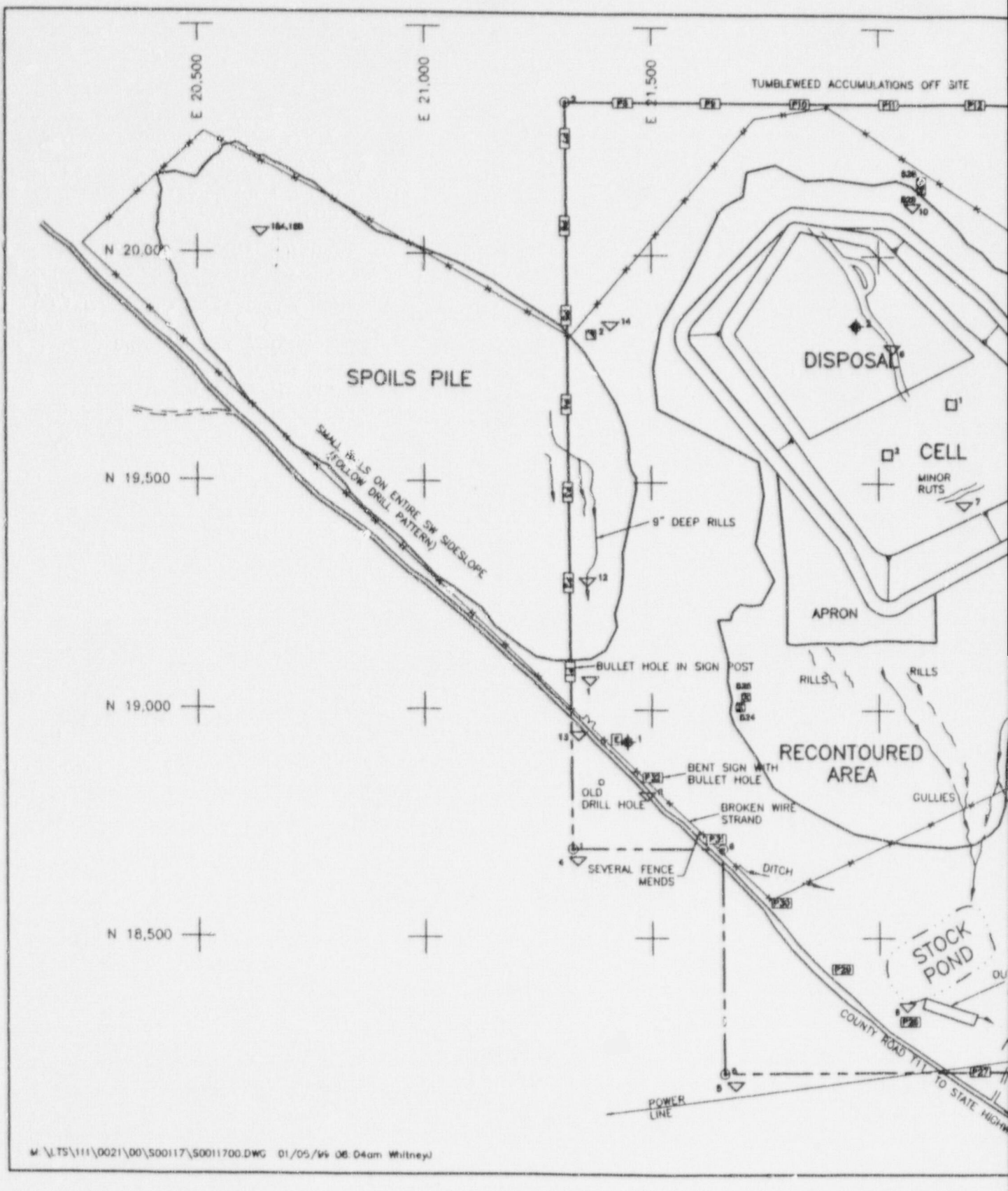
### Site Markers, Survey and Boundary Monuments

There are two granite site markers at this site: SMK-1, near the entrance gate, just east of the entrance sign; and SMK-2, on top of the disposal cell. Both markers are in excellent condition.

There are three survey monuments on site, SM-1, SM-2, and SM-3. None lie exactly on the site boundary but SM-3 is close. All are situated near the stock fence and easy to find. Each survey monument is identified by letters stamped in the aluminum cap:

| Monument | Identifier |
|---|---|
| SM-1 | BC-S |
| SM-2 | BC-N |
| SM-3 | BC-C |

The LTSP states that the three survey monuments are tied to the project survey control point that is about 700 ft east of the southeast corner of the site. Despite an extended search, the project survey control point was not found. All three survey monuments are in excellent condition.

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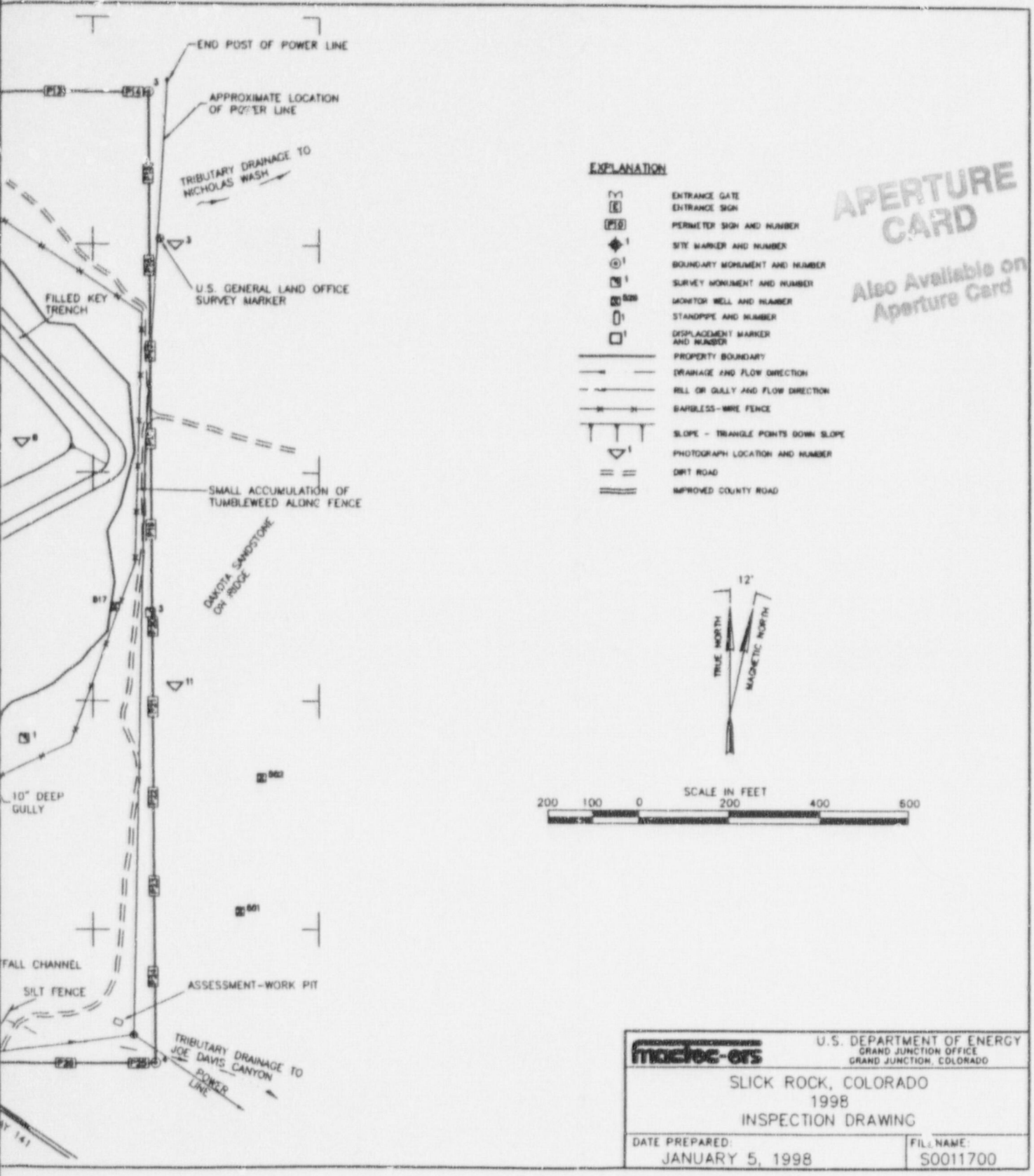




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|---|---|
| macTec-ers | U.S. DEPARTMENT OF ENERGY<br>GRAND JUNCTION OFFICE<br>GRAND JUNCTION, COLORADO |
| SLICK ROCK, COLORADO<br>1998<br>INSPECTION DRAWING | |
| DATE PREPARED:<br>JANUARY 5, 1998 | FILE NAME:<br>S0011700 |

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Six boundary monuments define the site boundary. Two boundary monuments, BM-1 and BM-5, were not found during the 1997 inspection but were found during this year's inspection (SRK PL-4 and SRK PL-5). The cap on each monument is stamped with the monument number, e.g., BM-1. All six boundary monuments are in excellent condition.

## 2.2 Transects

**Disposal Cell Top (including Standpipes), Side Slopes, Key Trench, and Apron**

Top of the Disposal Cell. The top of the disposal cell, the side slopes, key trench, and apron are armored with rounded, cobble-to-pebble sized rock. The rock is in excellent condition. There was no evidence of cracking, settling, slumping, erosion, or other indication of instability.

There are tire tracks in the riprap north and east of site marker SMK-2 between standpipes SP-3 and SP-4 (SRK PL-6). The tracks were made by heavy equipment when two standpipes in the disposal cell were decommissioned and two were reinstalled. To maintain the appearance of the site, these tracks will be filled or smoothed. (See Standpipes below.)

A few scattered Russian thistle plants, most less than 6 inches (in.) tall, were present on the top of the disposal cell. Plant encroachment (biointrusion) in rock-covered areas may increase if precipitation is favorable. Plant encroachment will be monitored during future inspections.

Side Slopes, Key Trenches, and Apron. Side slopes descend from the top of the disposal cell at a maximum grade of 25 percent. At the base of the side slopes is a key trench. The key trenches encircle the disposal cell and are as much as 5-ft deep and 20-ft wide. South of the disposal cell, a rock apron extends down slope for 50 to 200 ft beyond the key trench. Side slopes, key trenches, and apron are all armored with rock and are in excellent condition. Plant encroachment, so far, has not occurred in any of these areas.

Standpipes. Four standpipes were installed in the disposal cell at the state's request when the site was constructed. The purpose of the standpipes was to measure the level of transient water in the disposal cell to evaluate the potential for water to migrate laterally into two sandstone layers exposed in the downslope sidewall of the disposal cell. (The disposal cell at Slick Rock is constructed partially below grade.)

The standpipes may have been installed incorrectly or were subsequently damaged: Data loggers in the standpipes responded to rainfall and snow melt, both of which instantly and temporarily increased the depth of the water in the standpipes. To correct this problem, DOE and the state agreed to abandon the two up-gradient standpipes, SP-1 and SP-2, and reinstall the two downgradient standpipes, SP-3 and SP-4.

Standpipes SP-1 and SP-2 were decommissioned in May 1998. A steel t-post marks the former location of each of standpipe.

Standpipes SP-3 and SP-4 were reinstalled in August 1998. Data loggers installed in the new standpipes are shown in SRK PL-7 and SRK PL-8.

The two sandstone units of concern are the Kd-1 and Kd-2 beds in the Dakota Sandstone. The base of the lower sandstone, Kd-1, is at an elevation of 5,838 ft; the base of Kd-2 is at 5,852 ft. Water level measurements began in 1996. At that time, water levels stood at about 5,841 ft in SP-3 and 5,839 ft in SP-4—both above the base of the Kd-1 sandstone bed. Water levels increased slightly during the early part of 1996. Thereafter, they began a slow downward trend.

The most recent downloading of data loggers, December 1998, shows water levels at 5,837.1 ft in SP-3 (Figure SRK-2) and 5,837.6 ft in SP-4 (Figure SRK-3). Both are below the 5,838 ft datum for Kd-1, the lowermost sandstone unit. The data in Figures SRK-2 and SRK-3 show a gradually decreasing elevation for ground water in the two standpipes over the last 6 months of 1998. (Noise or "bounce" in the data is attributed to changes in barometric pressure.) DOE regards the regression line superimposed on the data in both figures to represent mean water level. Data loggers are down-loaded quarterly.

The LTSP outlines the procedure for monitoring water levels in the standpipes and the criteria for determining when water level monitoring will be discontinued and the two remaining standpipes, SP- 3 and SP-4, will be decommissioned.

DOE will continue to monitor water levels in the two standpipes until a downward trend is consistently observed for three consecutive quarters *and* the water level in both standpipes is at or below the base of the Kd-1 sandstone bed (5,838 ft). At that time, DOE will decommission the remaining standpipes.

**Area Between the Disposal Cell and the Site Boundary**

The area between the disposal cell and the site boundary includes the stock pond, the regraded area, and the stock fence.

Runoff from the disposal cell flows southward into the stock pond that lies at the southern tip of the site. The stock pond was originally constructed as a retention pond during site construction. The pond was dry at the time of this year's inspection (SRK PL-9). The outflow channel below the pond is armored for a short distance with cobbles. The channel continues to the east where it becomes a tributary to Joe Davis Canyon. A silt fence, remaining from site construction, crosses the channel downstream from the armored portion of the channel. The silt fence is no longer needed or functional. It will be removed to improve the appearance of the site.

SLICKROCK, COLORADO STANDPIPE NO. 3

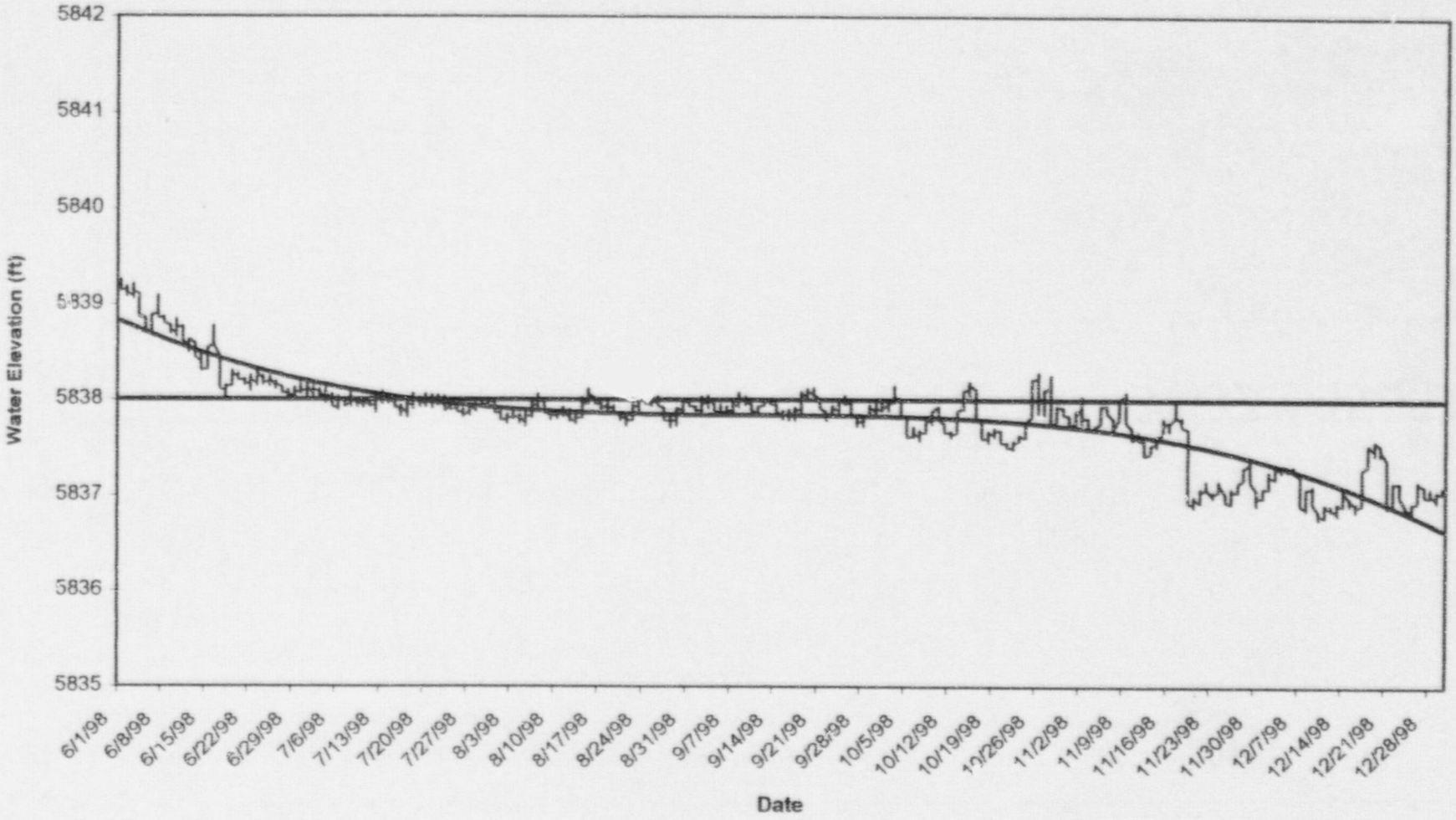



*Figure SRK-2. Slick Rock, Colorado Standpipe No. 3*

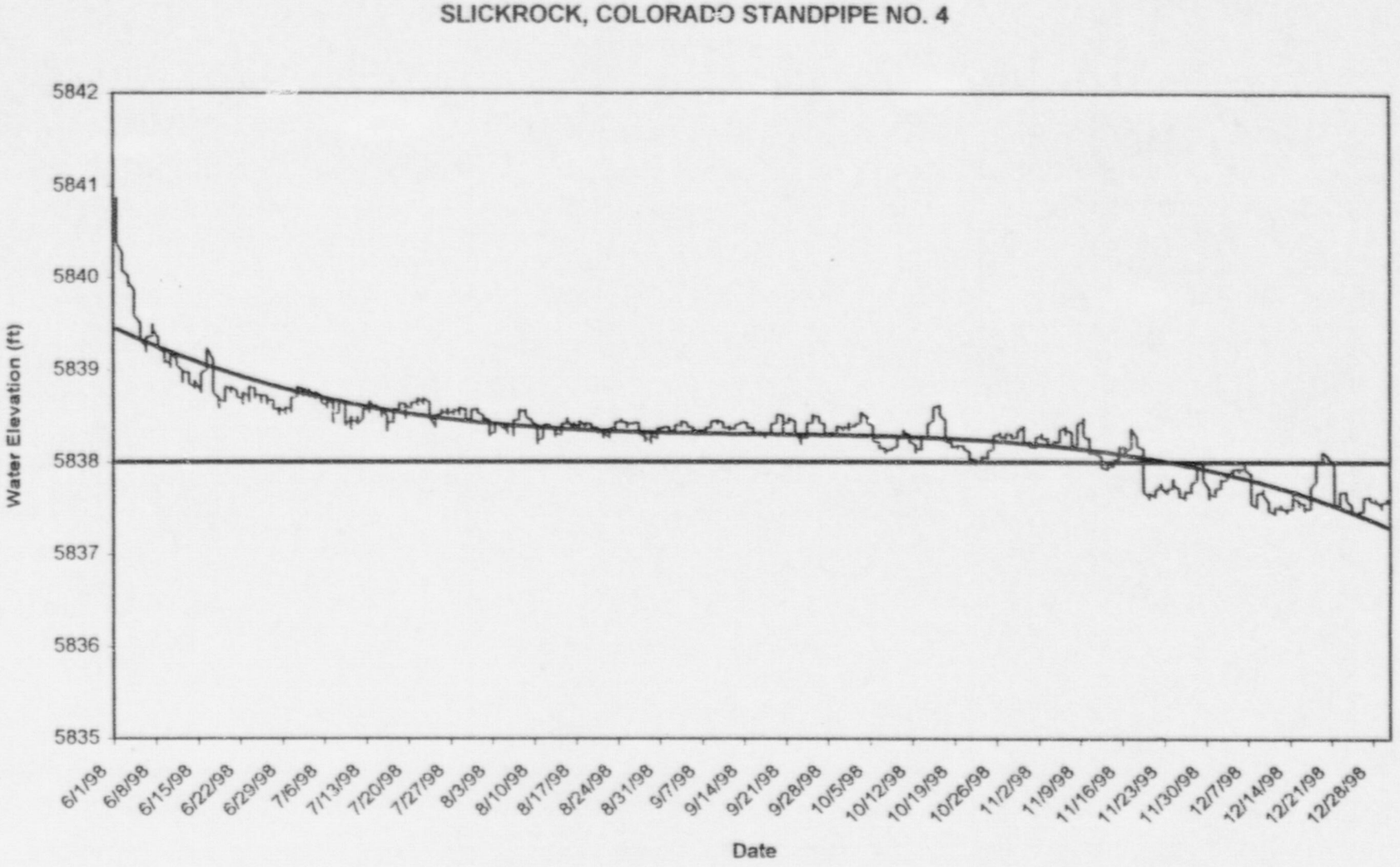



*Figure SRK-3. Slick Rock, Colorado Standpipe No. 4*

Areas disturbed during construction of the disposal cell are mainly in the southern and northeastern parts of the site. These areas were reseeded in 1996 with a mix of native vegetation believed to include thickspike wheatgrass, Arizona fescue, Indian ricegrass, tall fescue, four-wing saltbush, and small burnet. Vegetative cover now ranges from 5 to 30 percent (by visual estimate) and is composed primarily of Russian thistle, an annual weed. However, there is indication that four-wing saltbush, small burnet, and wheatgrass may be establishing. Other species noted in the reseeded areas included Indian ricegrass, tumble mustard, and yellow sweet clover.

Typical vegetative cover in the northeastern part of the site is pictured in SRK PL-10 and in the southeast part of the site in SRK PL-11. It is too soon to evaluate the long-term success of the seeding because the vegetation is only in its second growing season. With time, it is hoped that native perennial vegetation will replace Russian thistle and prevent erosion from occurring. In several places, planting furrows from the reseeding process run parallel to the slope instead of across the slope. This situation has caused or worsened erosion at some places. Progress of revegetation will continue to be monitored.

Minor rill and gully erosion was noted during the 1997 inspection in the recontoured area between the disposal cell apron and the stock pond and between perimeter signs P2 and P4. Some of the rills are as deep as 9 in. The number and depth of rills in this area appeared relatively unchanged from 1997. Vegetation has established in many of the rills, and this condition may inhibit further erosion.

The rills along the west edge of the site, in the area between perimeter signs P2 and P4, appeared to have lengthened since 1997 (SRK PL-12). Whereas they were primarily restricted to the area between P4 and P3 in 1997, they extended to P2 in 1998, and appeared to have deepened. Rills as deep as 9 in. were measured. The progress of erosion in all recontoured areas will continue to be monitored.

A stock fence of sorts surrounds the disposal cell, most of the reseeded areas, and the spoils pile west of the disposal cell. The approximate location of the fence is shown on Figure SRK-1. The fence, such as it is, is in excellent condition except between perimeter signs P31 and P32 where a strand of wire is broken, and west of the entrance gate, where several wires are slack (SRK PL-13).

Inspectors noted that the fence was mended at several places near P32. It is surmised that livestock may have broken through the fence at these locations, and that the holder of the adjacent grazing lease may have made the repairs.

There was evidence at several places that livestock had been inside the fence. A representative of the Colorado Department of Wildlife advised GJO in March that cattle were grazing inside the site.

When cattle graze on young plants, the entire plant is often pulled out of the ground or damaged to the extent that it does not recover. To prevent this situation, and to give desirable young plants an opportunity to fully establish, it is essential that the fence be reinforced to keep cattle

out for the next several years. Adding additional strands of wire to the fence is recommended. It is understood that a smooth wire fence was requested by the U.S. Bureau of Land Management (BLM) to allow antelope to pass without injury. Consideration will be given to adding barbed wire to the fence. Barbed wire at the top of the fence will still permit antelope to crawl under the fence as they are usually wont to do.

**Outlying Areas**

The area outward from the disposal site for a distance of 0.25 mile was visually inspected. No development or disturbance that could affect the site was observed.

The area outside the site boundary is used for grazing. To the north and east, the land supports grass and a few piñon and juniper trees. Elsewhere, the land is mostly grassed. Steep hillsides north and northeast of the site drain eastward into Nicholas Wash. Evidence of off-road recreational vehicle traffic northwest, north, and east of the site was noted.

A spoils pile, composed of material excavated during site construction, forms a mound about 50-ft high west of the site boundary. Reseeding on the spoils pile has produced a cover primarily of Russian thistle with very few desirable perennial plants (SRK PL-14, SRK PL-15A, and SRK PL-15B). On the northeast-facing slope of the spoils pile, growing conditions are apparently a little better and the vegetative cover can be described as moderate. Establishment of vegetation across the entire spoils pile is a goal in order to stabilize the pile and prevent erosion. A series of small rills occurs along the southwest slope of the spoils pile where the drill-seeding furrows ran parallel to the slope. The progress of revegetation and erosion control on the spoils pile will continue to be monitored.

## 3.0 Ground-Water Monitoring

Ground-water monitoring is not required by the LTSP for this site. Continuous monitoring of water levels in standpipes is discussed on pages SRK-5 and SRK-6 of this report.

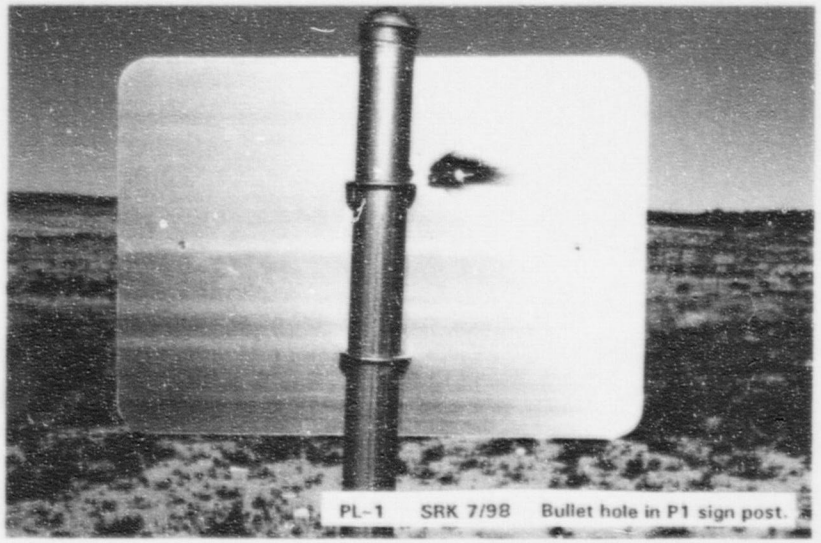
## 4.0 Conclusions

The site is in good to excellent condition. Success of revegetation in areas around the disposal cell continues to be the primary concern. Maintenance requirements include repair of tire tracks in the riprap and fence repair. No cause for a follow-up inspection was identified.

# 5.0 Photographs

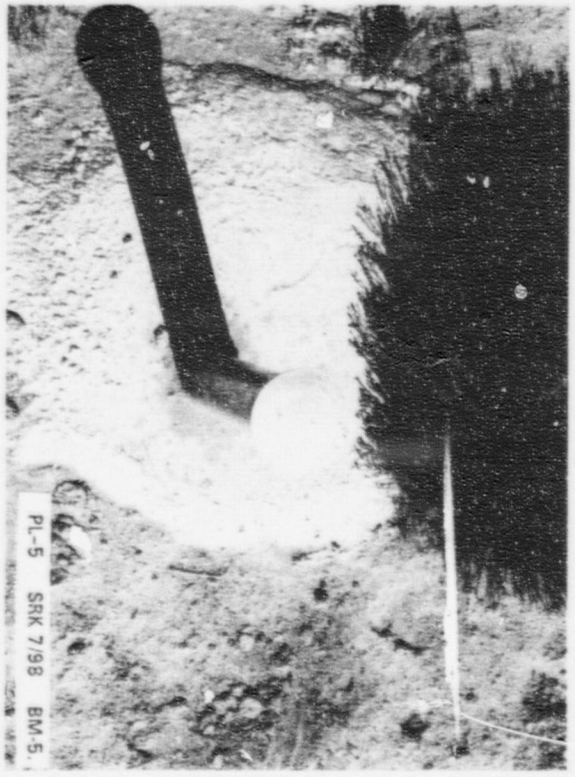
*Table SRK-1. Photographs taken at Slick Rock, Colorado, Disposal Site*

| Photograph Location Number | Photograph Description/Remarks |
|---|---|
| SRK PL-1 | Bullet hole in P1 sign post. |
| SRK PL-2 | Vandalism of P32 sign face. |
| SRK PL-3 | U.S. General Land Office survey marker. |
| SRK PL-4 | BM-1. |
| SRK PL-5 | BM-5. |
| SRK PL-6 | View NW of SMK-2 and ruts in riprap. |
| SRK PL-7 | Standpipe 3 (new lid and data logger). |
| SRK PL-8 | Standpipe 4 (new lid and data logger). |
| SRK PL-9 | Dry stock pond. |
| SRK PL-10 | View looking SE of revegetated area, standing near MW-529. |
| SRK PL-11 | View looking NW at revegetated area, standing near P21. |
| SRK PL-12 | Rills between P2 and P3. |
| SRK PL-13 | Loose wire strands on stock fence, near entrance gate. |
| SRK PL-14 | View looking NW at revegetation on spoils pile. |
| SRK PL-15A | View looking S at vegetation on spoils pile. |
| SRK PL-15B | View looking SE at vegetation on spoils pile. |

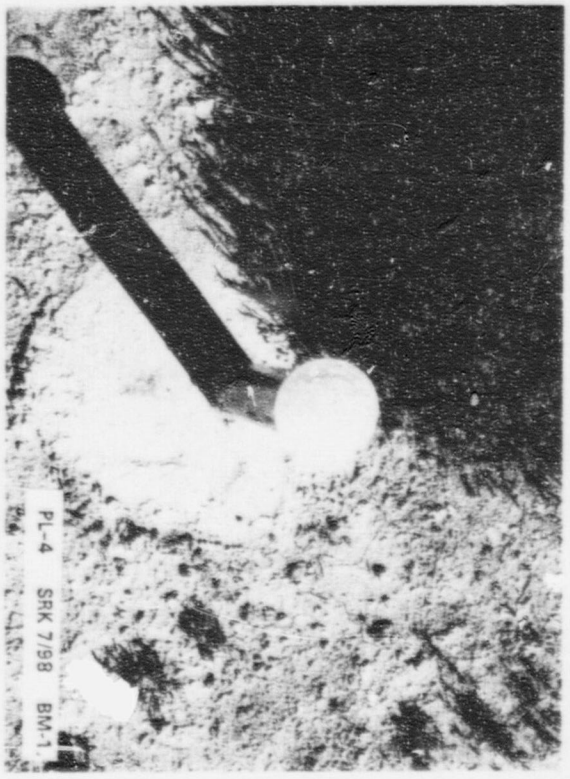


PL-1 SRK 7/98 Bullet hole in P1 sign post.

PL-2 SRK 7/98 Vandalism of P32 sign face.

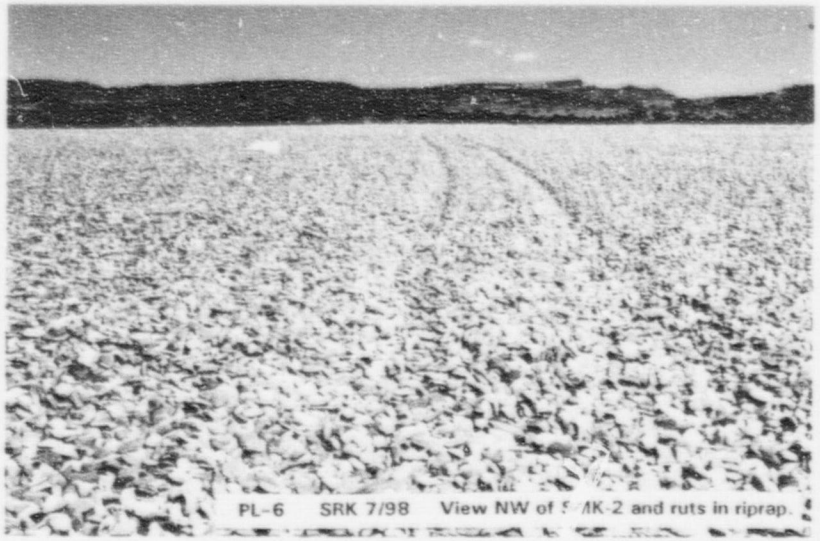


PL-5 SRK 7/98 BM-5.



PL-4 SRK 7/98 BM-1

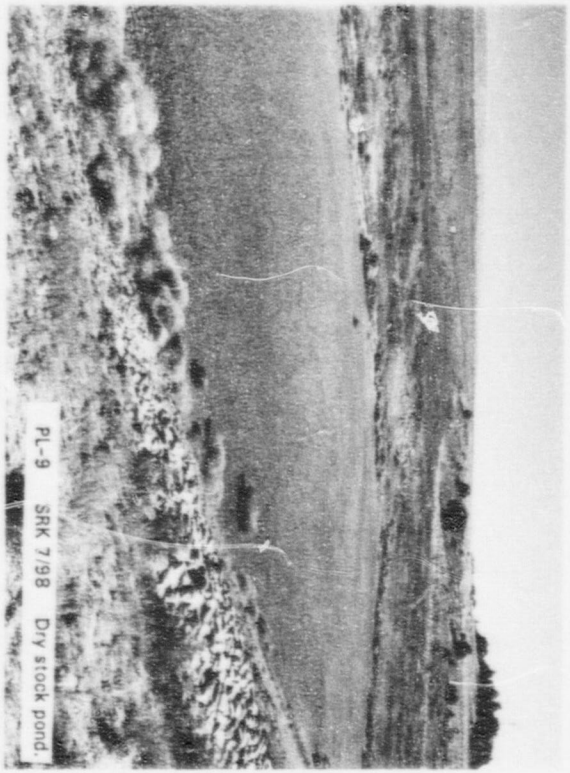
PL-3 SRK 7/98 U.S. General Land Office survey marker.



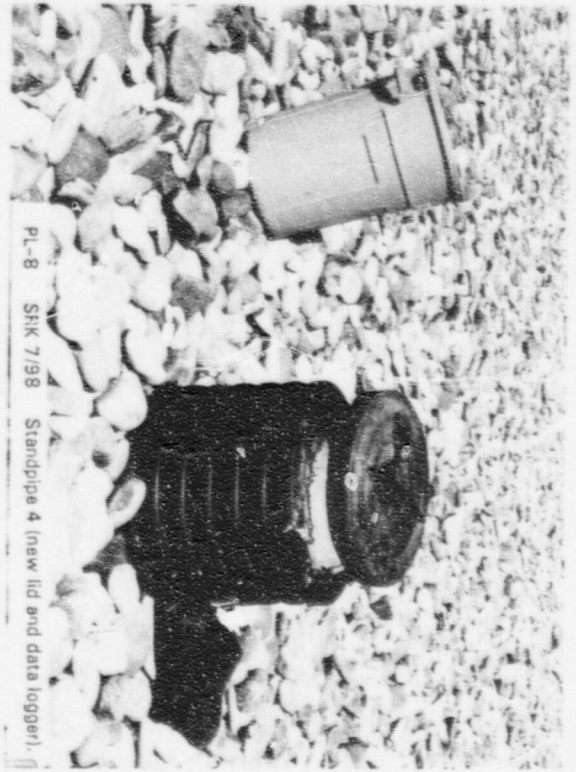
PL-6 SRK 7/98 View NW of S MK-2 and ruts in riprap.

PL-7 SRK 7/98 Standpipe 3 (new lid and data logger).

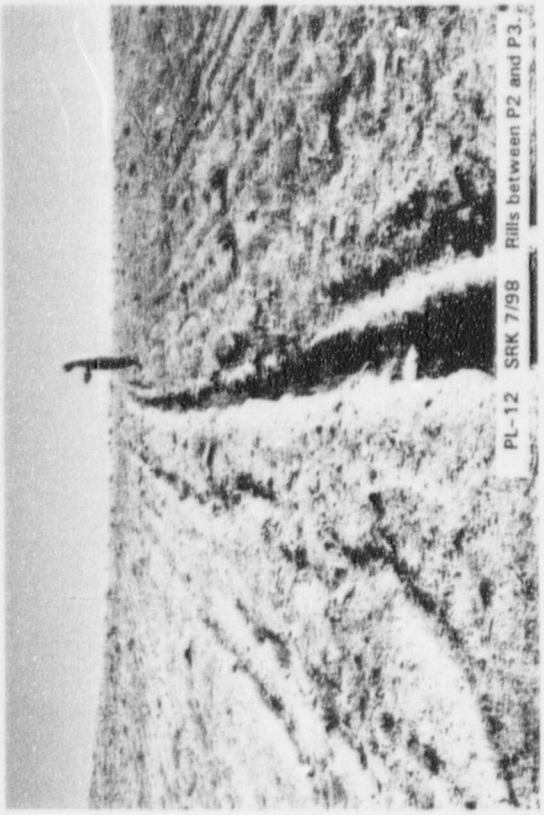
PL-10 SRK 7/98 View looking SE of revegetated area standing near MW-529.



PL-9 SRK 7/98 Dry stock pond.

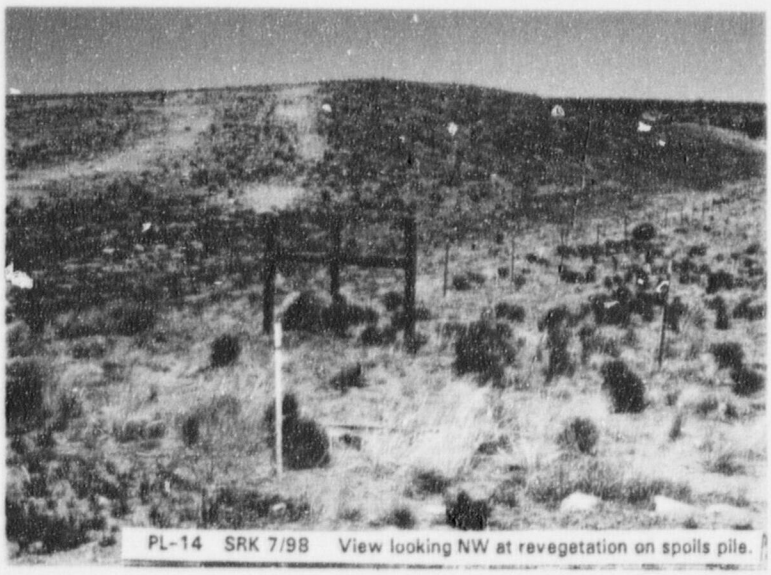


PL-8 SRK 7/98 Standpipe 4 (new lid and data logger).

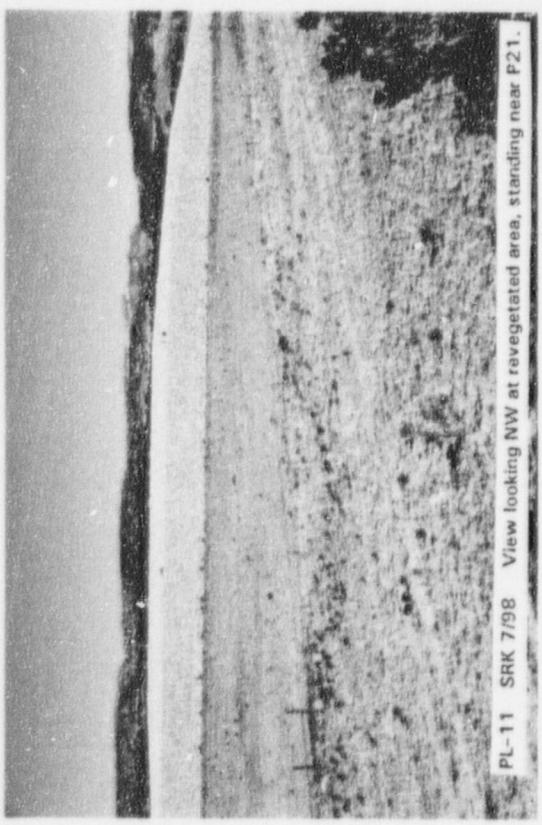


PL-12 SRK 7/98 Rills between P2 and P3.

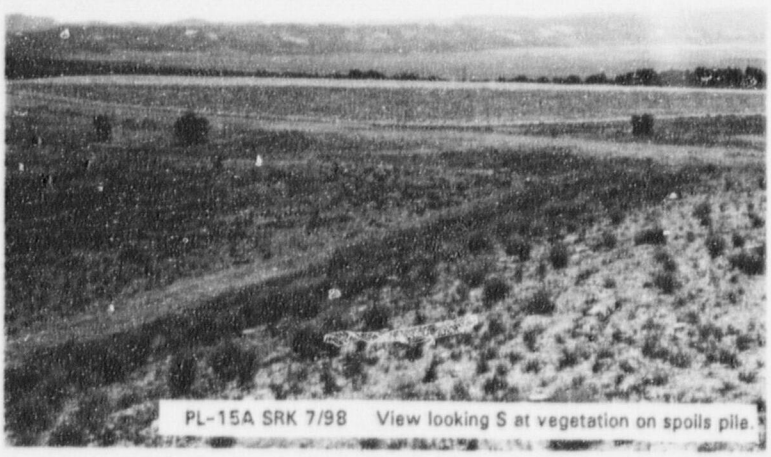
PL-13 SRK 7/98 Loose wire strands on stock fence, near entrance gate.



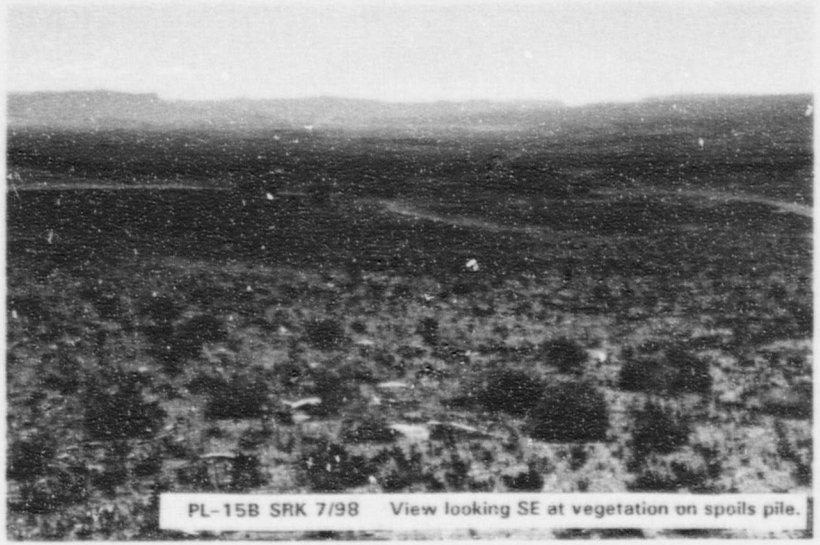
PL-14 SRK 7/98 View looking NW at revegetation on spoils pile.



PL-11 SRK 7/98 View looking NW at revegetated area, standing near P21.



PL-15A SRK 7/98 View looking S at vegetation on spoils pile.



PL-15B SRK 7/98 View looking SE at vegetation on spoils pile.