2000 Reclamation Success Trip Report

Uranium Lease Management Program

August 2000

Prepared by Environmental Services Group
MACTEC-ERS

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1.0 Overview

Between mid-June and late-July 2000, 56 sites on 15 U.S. Department of Energy (DOE) uranium lease tracts were assessed for reclamation success. The purpose of the assessment was to inspect vegetation establishment and soil stability to determine if the site had been successfully reclaimed. Once a lease tract is considered successfully reclaimed, it may be proposed for relinquishment to the U.S. Bureau of Land Management (BLM), upon which it may be returned to public domain. This trip report summarizes the results of the reclamation assessments.

To determine reclamation success, the following parameters were recorded at each site: 1) percent plant cover, 2) percent litter cover, 3) percent rock cover, 4) percent bare ground, and 5) erosion condition. Percent covers for plants, litter, rock, and bare ground were determined by ocular estimate. Erosion condition was determined by observing gullying; rilling; depth of soil removal around rocks, plants, or debris; pedestaling of stones or plants; and presence of flow patterns. On the basis of these observations, the site was then subjectively rated as stable, slightly eroding, moderately eroding, or severely eroding.

After conditions at the reclaimed sites were observed and recorded, they were compared with the conditions on adjacent, relatively undisturbed lands. Conditions that compared favorably were given a "reclamation success" descriptor of good, very good, or excellent, and conditions that compared unfavorably were given a descriptor of fair, poor, or very poor. The overall soil stability of the sites also was factored into the assessment. Table 1 summarizes the rankings and observations at each of the reclaimed sites. Copies of the field sheets are in Appendix A, and photographs of the reclaimed areas are in Appendix B.

Although precipitation in 2000 was less than usual, most of the areas reclaimed in 1999 benefited from higher-than-normal precipitation in late summer/fall 1999. As a result, first-year plant growth at many of the reclaimed sites was better than anticipated. In the hot, arid climate of southwest Colorado, it may take 3 to 4 years for newly reclaimed sites to establish permanent, non-weedy vegetation. Often, first-year plant cover consists of annual weedy species such as kochia, Russian thistle, cheatgrass, lambsquarter, and redstem filaree. Sweet clover also is found at many of the newly reclaimed sites. Although somewhat of a weedy species, this plant is a good "soil builder" or nitrogen fixator; this plant takes nitrogen from the soil that is unavailable to most plants and synthesizes it into a form that is available for use by other plants. Section 2.0 provides details of the plant cover observed at each of the reclaimed mine sites, and Section 3.0 summarizes results of the reclalmation assessments. Also in Section 3.0 is a table that summarizes the status of each of the evaluated mine sites.

Table 1. Summary of Site Conditions on Uranium Lease Tracts

Reclaimed Site	Date Reclaimed	Plant Cover (%)	Litter Cover (%)	Rock Cover (%)	Bare Ground (%)	Erosion Condition	Reclamation Success
C–JD–5, Mineral Joe 4, portal area	Summer 1998 by lessee	45	5	20	30	Stable	Very Good
C–JD–5, Mineral Joe 4, waste rock dump area	Summer 1998 by lessee	35	trace	30	35	Stable	Good
C–JD–7, Drill Holes 98–1, 98–2, 98–3, 98–4	Fall 1998 by lessee	10-30	--	--	--	Stable	Fair-Good
C–JD–7, Oversight Mine	1999 by Cotter for DOE	25	trace	20	55	Stable	Fair (Poor on west-facing slope)
C–SR–10, Test Plot 1a	July 1996 by lessee Fall 1998 by DOE	35	5	10	50	Stable	Excellent
C–SR–10, Test Plot 1b	July 1996 by lessee Fall 1998 by DOE	25	5	20	50	Stable	Fair
C–SR–10, Test Plot 1c	1993 by lessee Fall 1998 by DOE	5	0	75	20	Moderate	Very Poor
C–SR–10, Test Plot 2a	July 1996 by lessee Fall 1998 by DOE	30	5	10	55	Stable	Very Good
C–SR–10, Test Plot 2b	July 1996 by lessee Fall 1998 by DOE	30	5	10	55	Stable	Fair
C–SR–10, Test Plot 2c	1993 by lessee Fall 1998 by DOE	5	0	80	15	Moderate	Very Poor
C–SR–10, Test Plot 3a	July 1996 by lessee Fall 1998 by DOE	35	5	10	50	Stable	Excellent
C–SR–10, Test Plot 3b	July 1996 by lessee Fall 1998 by DOE	30	5	10	55	Stable	Fair

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Reclaimed Site	Date Reclaimed	Plant Cover (%)	Litter Cover (%)	Rock Cover (%)	Bare Ground (%)	Erosion Condition	Reclamation Success
C–SR–10, Test Plot 3c	1993 by lessee Fall 1998 by DOE	5	0	75	20	Moderate	Very Poor
C–SR–10, Test Plot 4	1993 by lessee Fall 1998 by DOE	0	0	80	20	Moderate	Very Poor
C–SR–10, Test Plot 5	1993 by lessee Fall 1998 by DOE	0	0	80	20	Moderate	Very Poor
C–SR–10, Test Plot 6	1993 by lessee Fall 1998 by DOE	0	0	80	20	Moderate	Very Poor
C–SR–11, Ike #1	Summer 1999 by Cotter for DOE	30	trace	10	60	Stable	Fair
C–SR–11, Ike #2	Summer 1999 by Cotter for DOE	30	trace	10	60	Stable	Good
C–SR–11, Ike #3	Summer 1999 by Cotter for DOE	35	trace	5	60	Stable	Poor
C–SR–11, Ike #4 waste rock dump area	Summer 1999 by Cotter for DOE	5	0	50	45	Slight	Poor
C–SR–11, Ike #4 portal and trench areas	Summer 1999 by Cotter for DOE	35	trace	15	50	Stable	Good
C–SR–11, Brighton waste rock dump area	Summer 1999 by Cotter for DOE	5	0	80	15	Slight	Poor
C–SR–11, Brighton west portal area	Summer 1999 by Cotter for DOE	20	0	40	40	Stable	Fair
C–SR–11, Brighton big portal	Summer 1999 by Cotter for DOE	40	0	30	30	Stable	Fair
C–SR–11, Lower Brighton	Summer 1999 by Cotter for DOE	50	10	10	30	Slight	Fair

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Reclaimed Site	Date Reclaimed	Plant Cover (%)	Litter Cover (%)	Rock Cover (%)	Bare Ground (%)	Erosion Condition	Reclamation Success
C–SR–11, Park	Summer 1999 by Cotter for DOE	10	0	40	50	Stable	Fair
C–SR–11, Tomboy	Spring 1999 by Cotter for DOE	20-40	trace	30	30-50	Moderate	Fair
C–SR–11, Mercantile North	Spring 1999 by Cotter for DOE	40	trace	30	30	Stable	Fair
C–SR–11, Mercantile South	Spring 1999 by Cotter for DOE	25	5	25	45	Stable	Very Good
C–SR–11, Emma Lou	Spring 1999 by Cotter for DOE	45	5	10	40	Stable	Good
C–SR–11A	Spring 1997 by DOE Fall 1998 by DOE	25	5	25	45	Stable	Good
C–SR–12, Vent area	Sept 1998 by DOE	50	trace	trace	50	Stable	Excellent
C–SR–12, Subsidence area	Sept 1998 by DOE	50	trace	trace	50	Stable	Excellent
C–SR–16, Fraction #5	June 1999 by DOE	8	2	50	40	Moderate	Fair
C–SR–16, Charles T SW pit and waste rock dump	June 1999 by DOE	30	5	30	35	Stable	Good
C–SR–16, Charles T SW big pit	June 1999 by DOE	35	5	30	30	Stable	Fair
C–SR–16, Charles T SW north incline trench	June 1999 by DOE	30	trace	35	30	Stable	Fair
C–SM–18 pond area	Fall 1995 by lessee Fall 1998 by lessee	35	10	10	40	Stable	Fair-Good
C–AM–19, Vent Hole #2	Fall 1998 by lessee	25	5	30	40	Stable	Good

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Reclaimed Site	Date Reclaimed	Plant Cover (%)	Litter Cover (%)	Rock Cover (%)	Bare Ground (%)	Erosion Condition	Reclamation Success
C–AM–19, Vent Hole #3	Fall 1998 by lessee	25	5	30	40	Stable	Good
C–AM–19, Cliff Dweller waste rock dump, flat area	Dec 1998 by lessee	30	0	20	50	Stable	Fair-Good
C–AM–19, Cliff Dweller waste rock dump, hillside area, with topsoil	Dec 1998 by lessee	25	0	40	35	Slight	Good in areas with topsoil; Poor in areas with no topsoil
C–AM–19, Golden Cycle Mine	1978 by lessee Nov 1998 by DOE	15	0	40	45	Slight	Fair
C–AM–19, King Solomon topsoiled areas	Dec 1998 by lessee	20	0	20	60	Slight	Fair
C–AM–19, King Solomon non-topsoiled areas	Dec 1998 by lessee	trace	0	70	30	Slight	Very Poor
C–AM–19, Worcester Shaft	Spring 1999 by DOE	20	5	45	30	Slight	Fair
C–LP–22A, TNT #1	Summer 1999 by Cotter for DOE	45	trace	20	35	Stable	Good
C–LP–22A, TNT #2	Summer 1999 by Cotter for DOE	25	trace	10	65	Stable	Good
C–LP–22A, TNT #3	Summer 1999 by Cotter for DOE	30	5	10	55	Stable	Fair
C–LP–23	Fall 1998 by DOE	20	trace	trace	80	Stable	Fair
C–G–26, Blunder Mine	Summer 1999 by UMETCO for BLM	15	trace	50	35	Stable	Fair

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Reclaimed Site	Date Reclaimed	Plant Cover (%)	Litter Cover (%)	Rock Cover (%)	Bare Ground (%)	Erosion Condition	Reclamation Success
C–G–26, Lucky Boy	Summer 1999 by UMETCO for BLM	25	trace	35	40	Stable	Fair
C–G–26, Calamity #2	May 1999 by DOE	20	trace	40	40	Stable	Good
C–G–26A, Queen of Hills, Portals 1,2,3,4,5	May 1999 by DOE	15	trace	50	40	Stable	Fair
C–G–26A, Matchless	May 1999 by DOE	25	trace	10	65	Stable	Fair
C–G–26A, Small Spot	May 1999 by DOE	30	5	10	55	Stable	Fair
C–G–26A, Hummer	May 1999 by DOE	20	trace	50	30	Stable	Good
C–G–26A, Sunflower	May 1999 by DOE	30	trace	30	40	Stable	Good
C–G–27, G–1/G–1A	July 1999 by DOE	35	trace	20	45	Stable	Fair
C–G–27, Ronnie #1	July 1999 by DOE	25	trace	25	50	Stable	Fair
C–G–27, BLM Subsidence	July 1999 by DOE	30	5	25	40	Stable	Fair
C–G–27, Neglected	July 1999 by DOE	30	5	25	40	Stable	Fair
C–G–27A, G-2 Mine	July 1999 by DOE	45	trace	15	40	Stable	Excellent
C–G–27A, Hansen Claim	July 1999 by DOE	30	trace	20	50	Stable	Good

2.0 Results and Recommendations

C–JD–5, Mineral Joe 4 Mine: Cotter Corporation recontoured and reclaimed the portal area and waste rock dump at the Mineral Joe 4 Mine in summer 1998. In July 1999, the portal area had 50 percent plant cover, and the reclaimed waste rock dump had 25 percent plant cover. Both areas were dominated by sweet clover and annual weeds such as lambsquarter and Russian thistle. The dominance of these species, typical of a first-year seeding, gave both areas a fair rating for reclamation success.

At the time of the June 2000 assessment, the reclaimed portal area and waste rock dump were still covered primarily by sweet clover, but the number and variety of perennial grasses had increased significantly. In the portal area, perennial grasses increased from 3 to 10 percent, and the number of annual weeds decreased from 15 to 3 percent. In the waste rock dump area, perennial grasses increased from 2 to 3 percent, and the number of annual weeds decreased from 9 to 3 percent. Both areas are stable. Reclamation success is considered very good at the portal area and good at the waste rock dump area. Photos of the areas are shown in Appendix B as photos P–1 and P–2, respectively. The portal area is considered successfully restored and does not need to be assessed again, whereas the waste rock dump should be visited again in 2002 to confirm that perennial grass species have become more established.

C–JD–7, Drill Holes 98–1, 98–2, 98–3, and 98–4: These sites were reclaimed by Cotter Corporation in fall 1998 and visited in July 1999 to assess first-year success. At that time, the soils at all the sites were stable, but plant cover was sparse and dominated by annual weeds. In June 2000, the sites were evaluated again and determined to be successfully restored. Although the areas were still sparsely vegetated (10-30 percent cover), the annual weeds were mostly gone, and the areas have good potential to successfully revegetate. These sites do not need to be revisited.

C–JD–7, Oversight Mine: This area was reclaimed by Cotter Corporation in spring 1999. In June 1999, the lower bench of the Oversight Mine was visited to look at Cotter Corporation's reclamation effort. Inspectors noted that surface water runoff above the reclaimed, pocked sideslope was collecting, channelizing, and then flowing down the pocked sideslope, creating gullies in the process.

In spring 2000, DOE–GJO rerouted surface runoff away from the pocked sideslope by constructing diversion ditches and water bars on the reclaimed areas above the mine site. Another diversion ditch was constructed across the lower bench to divert on-site water to an undisturbed area of the mine site. At the time of the June 2000 inspection, the diversions appeared to be functioning well, as no new erosion was observed, and the pre-existing gullies were filling in.

Vegetative cover on the pocked sideslope was dominated by sweet clover and rated as fair. The west-facing portion of the sideslope was 99-percent bare and rated as poor. This area likely consists of poorer soils than the more vegetated areas. Photos P-3 and P-4 in Appendix B show site conditions. This site should be evaluated again in 2001 to determine if corrective action is needed on the west-facing portion.

C-JD-9: This lease tract was not visited during the reclamation assessment, as the inspectors learned that Cotter Corporation had not yet attempted to control the Russian knapweed, Canada thistle, and musk thistle that were located in the land slump area and on the top-side of the lease tract by the shed and pond. These weeds are considered noxious and need to be controlled this year. A compliance visit should be made in fall 2000 (knapweed can be effectively sprayed in the fall; Canada thistle and musk thistle are more effectively srayed during their bud stage) and again in summer 2001.

C-SR-10, Sam Mine, Waste Rock Dump: This site, originally seeded in 1993, was composed of 90-98 percent bare ground in August 1995 (Rust Geotech Inc. 1995). In July 1996, the lessee backfilled the top area with 3-4 inches of soil borrowed from a local sediment pond and reseeded. At the time of the July 1997 inspection, the top area contained 20-30 percent bare ground and had a vegetative cover of approximately 65 percent cheatgrass in addition to traces of other weeds and seeded species. It was hypothesized that the backfilled soil contained a significant amount of cheatgrass seed.

At the time of the July 1998 inspection, the amount of seeded grass species had increased from 3 to 15 percent, and the amount of cheatgrass had decreased from 65 to 45 percent.

In November 1998, DOE-GJO reseeded the mine site and divided the site into six "test plots," with the intent to "casually" observe the differences in reclamation success over time from the application of different reclamation treatments. Figure 1 depicts the location of the test plots in relation to site features, and Table 2 summarizes the treatments applied to each test plot. Test plots 1, 2, and 3 were subdivided into three subplots on the basis of differences in topsoil and slope, both of which strongly affect reclamation success.

On November 16, 1998, the entire waste rock dump was seeded with a perennial seed mix, and the various reclamation treatments were applied. From November 17 through 19, 100 head of cattle were fed certified weed-free hay throughout the top two-thirds of the site; the lower third of the site on the lower portion of the sideslope could not accomodate cattle because of the slope steepness. Hence, test plots 4, 5, and 6 did not receive the benefits of seed incorporation, manure addition, or hay mulch application.

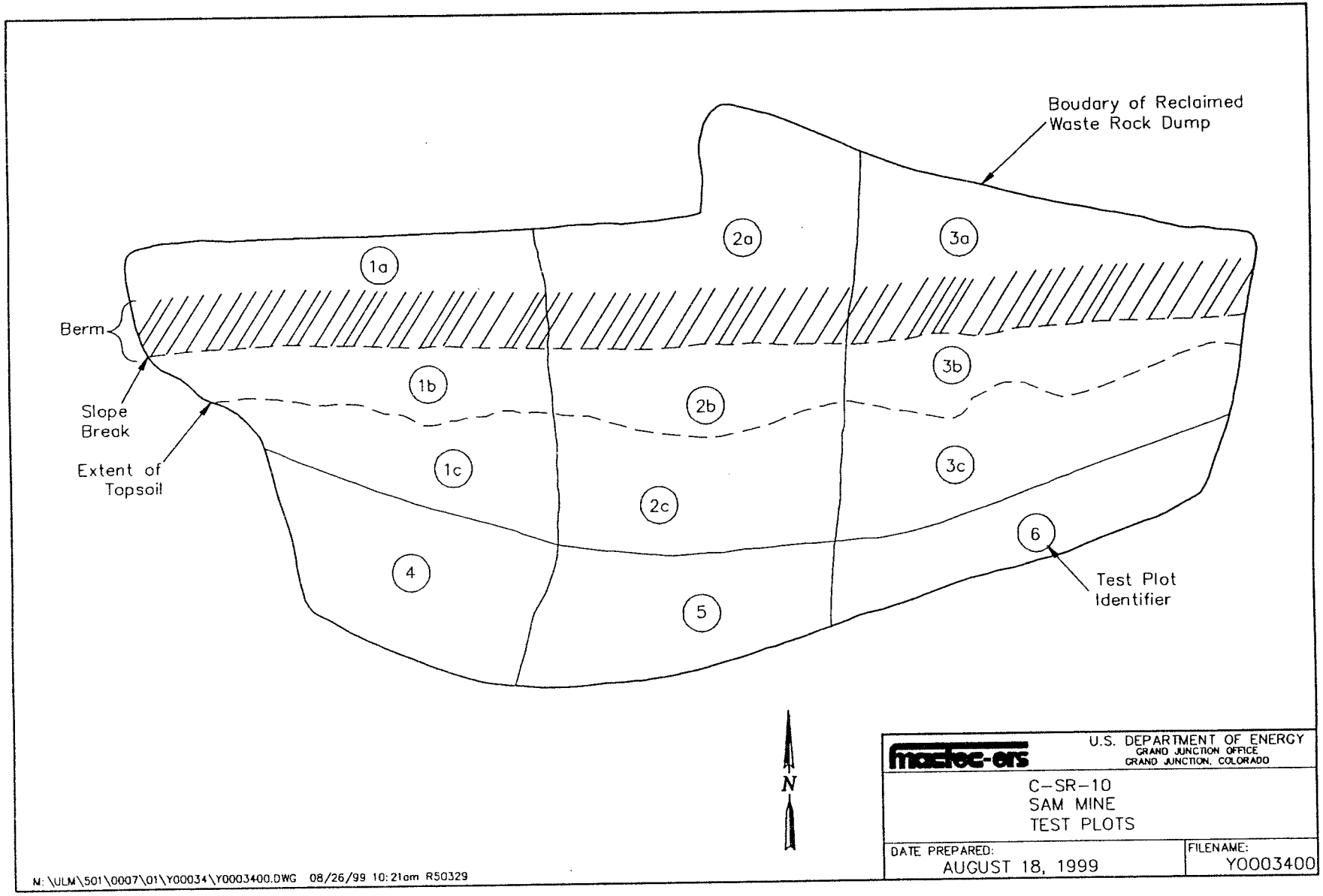


Figure 1. C-SR-10 Sam Mine, Test Plot Layout

Table 2. Summary of Reclamation Treatments at Sam Mine

Test Plot Identifier	Reclamation Treatment	Use of Cattle	Other Factors
1	• perennial seed mix • Regreen cover crop (@ 37 lbs/A) • hay mulch • cattle manure • hoof impact	yes	1a—topsoil, flat slope 1b—topsoil, 15-20% slope 1c—no topsoil, 20% slope
2	• perennial seed mix • hay mulch • cattle manure • hoof impact	yes	2a—topsoil, flat slope 2b—topsoil, 15-20% slope 2c—no topsoil, 20% slope
3	• perennial seed mix • Biosol (@ 650 lbs/A) • hay mulch • cattle manure • hoof impact	yes	3a—topsoil, flat slope 3b—topsoil, 15-20% slope 3c—no topsoil, 20% slope
4	• perennial seed mix • Regreen cover crop (@ 37 lbs/A) • Biosol (@ 880 lbs/A)	no	no topsoil, 30% slope
5	• perennial seed mix	no	no topsoil, 30% slope
6	• perennial seed mix • Biosol (@ 750 lbs/A)	no	no topsoil, 30% slope

Results after two seasons of growth are similar to those after one season of growth. As in 1999, subplots 1a, 2a, and 3a had the greatest percentage of seeded species and the lowest percentage of weedy species compared to all other subplots and plots. The topsoil cover and flat slope, which provide a fertile rooting medium and moisture retention, were advantageous to plant growth. In 1999, subplot 3a contained the highest plant cover—65 percent versus 40 percent for subplots 1a and 2a. It was unknown whether this difference was a result of the Biosol or whether this area had always had higher plant cover (probably the latter, because this difference did not show up in subplots 1b, 2b, and 3b). In 2000, plant cover was approximately the same between subplots 1a, 2a, and 3a—all averaged between 30 and 35 percent, and all subplots were dominated by seeded grasses. The average total plant cover decreased from 1999 to 2000, possibly because of heavier grazing pressure in 2000. However, the

percentage of weedy species decreased in 2000; for example, cheatgrass decreased from 20 percent to 10 percent.

All subplots containing topsoil (1a, 2a, 3a, 1b, 2b, 3b) had higher plant cover than all plots and subplots containing no topsoil (1c, 2c, 3c, 4, 5, 6). Of all the reclamation treatments and site factors, the presence of topsoil seems to have made the biggest difference in reclamation success.

Average plant cover in the "b" subplots, which contain topsoil but are on a 15 to 20 percent slope, was 30 percent. In comparison, the average plant cover in the "a" subplots was 30-35 percent. The average plant cover in the "c" subplots, however, was 5 percent—these plots are on a 20 percent slope and do not contain topsoil. In plots 4, 5, and 6, only a trace of vegetation was detected (75 percent was rock and 25 percent was bare ground); these plots are on a 30 percent slope and contain no topsoil. These results are the same as those in 1999. Photos P–5, P–6, and P–7 illustrate the differences in vegetative cover between the plots.

As in 1999, no clear-cut differences existed between subplots 1b, 2b, and 3b, nor between subplots 1c, 2c, and 3c, nor between plots 4, 5, and 6. It appears that after 2 years of growth, the use of Biosol and Regreen have not had a noticeable effect on revegetation success. It is unlikely that a difference will be detected in 2001.

The top, flat portion of this site (subplots 1a, 2a, and 3a) is considered successfully restored. The upper portion of the sideslope (subplots 1b, 2b, and 3b) has had limited success—total vegetative cover is good (30 percent), but cheatgrass composes 10 percent of the cover. As has occurred on the top portion, this percentage is likely to decrease over time as the perennial seeded grasses become established.

The sideslope area of the mine site has never successfully revegetated. It continues to be composed of rock and bare ground, with only a small cover of vegetation. Although this area was reseeded in November 1998, most of it was too steep to accomodate livestock for seed incorporation. The primary factors limiting successful revegetation of this sideslope is the lack of a fertile rooting medium (i.e., topsoil material) and slope steepness. This slope may eventually support some sparse shrub and tree growth, but it will never support a good stand of grass. The preponderance of rock on the slope will prevent the slope from failing or slumping, but gully development is likely to continue until a "badland" type of topography exists. Unless a method is developed for pocking these steep sideslopes, very little can be done to improve vegetative cover on this portion of the site.

C–SR–11: Numerous mine sites on this lease tract were reclaimed in spring and summer 1999 by Cotter Corporation for DOE–GJO. They were visited in June 2000 to assess first-year vegetative growth and erosion condition.

Ike #1: Half the total plant cover (15 percent) was composed of sweet clover, and the other half was composed of seeded grasses, cheatgrass, and annual forbs. Although reclamation success was rated as fair after 1 year of growth, the site has excellent potential because of the presence of topsoil. The site is stable and should be evaluated again in 2002 to confirm that it has successfully revegetated.

Ike #2: After 1 year, relamation success was rated as good on this reclaimed portal and waste rock dump. Total plant cover was 30 percent and composed primarily of seeded grasses, *Astragalus* species, and sweet clover. No problem with erosion was noted, and no future erosion problems are anticipated. This site can be considered successfully restored and does not need to be revisited.

Ike #3: This site was considered in poor condition because of the predominance of annual weedy species such as Russian thistle, gray thistle, mustards, kochia, and cheatgrass. They composed approximately half of the 35-percent cover; the other half was composed of sweet clover. These weedy species will help protect the site from erosion and will provide a good cover for the establishing seeded grasses. Because of the presence of topsoil, this site has excellent potential for successful revegetation. It should be reevaluated in 2002.

Ike #4: When the former waste rock dump, portal, and trench were reclaimed and pocked, topsoil was available for the portal and trench areas only. A significant difference in first-year vegetation was noted because of this difference. The waste rock dump area had 5 percent total cover, whereas the portal and trench areas had 35 percent cover. None of the areas had an erosion problem. Photo P–10 shows conditions at the portal and trench areas. All these sites should be reevaluated in 2002.

Brighton, Waste Rock Dump: No topsoil was available for this steep site and as a result, plant cover was 5 percent and considered poor. Eighty percent of the cover is composed of rock. Because of the pocking, no off-site erosion is taking place and future potential for erosion is low. This site should be visited again in 2001, and if it is still in poor condition, other revegetation alternatives should be evaluated.

Brighton, West Portal Area: This site was rated as having fair reclamation success. There is minimal topsoil at the site, but because of the 15-percent cover of sweet clover, the potential for reclamation success exists. This site should be visited again in 2 years.

Brighton, Big Portal Area: Despite the lack of topsoil at this site, a 40-percent cover of sweet clover has established. Pocking has prevented this steep site from

eroding. As the site currently has fair reclamation success, it should be revisited in 2002.

Lower Brighton: Minimal topsoil was backfilled onto this site. However, after 1 year of growth, the site has a 50 percent plant cover. Most (45 percent) of the cover is composed of sweet clover, and the remainder is composed of weedy species. Reclamation success was rated as fair. This site should be reevaluated in 2 years.

Park: Despite the presence of topsoil at this site, only 10 percent plant cover was achieved after 1 year of growth. However, plant diversity was relatively high, and few weedy species were present, which resulted in a fair rating for reclamation success. The pocks are effectively controlling erosion. This site should be evaluated again in 2 years.

Tomboy: Vegetation at this site was dominated by sweet clover (10-30 percent cover), but several seeded grasses were also present. Reclamation success was rated as fair. At the time of the inspection in June, a portion of the site had been washed out from an upstream pond overflow. The wash-out was repaired in July 2000. Another area of the site had subsided and should be inspected next year. Photo P-11 shows site conditions.

Mercantile North: No topsoil was available for backfill at this site. However, plant cover was 40 percent, 35 percent of which was sweet clover. Several different grass species also were present. Reclamation success was rated as fair. Photos of site conditions are in Appendix B as P-12, P-13, and P-14. This site should be reevaluated in 2002.

Mercantile South: After 1 year of growth, this site is considered to be successfully restored. The portal area, which has deep, dark topsoil, is in excellent condition, and the reclaimed road, which has less topsoil, is in fair condition. Plant cover is diverse and composed of several perennial grasses and forbs. Photos P-15 and P-16 show site conditions. This site does not need to be revisited.

Emma Lou: Reclamation success was rated as good for this site due to the 45 percent plant cover, diversity of species, and stable condition of the topsoil. Photo P-17 shows site conditions. This site does not have to be revisited, but it would be interesting, from a plant succession point of view, to visit the site in 2002 to determine if the cheatgrass cover (15 percent) has decreased.

C-SR-11A: The portal area in the northeast corner of this lease tract was reclaimed and seeded in May 1997. At the time of the July 1998 inspection, after two growing seasons, the area had 10 percent plant cover and very little erosion. Reclamation success was considered poor on the top and fair on the sideslopes of the portal area.

In November 1998, the site was reseeded by DOE-GJO, and about 50 pounds of Biosol was spread throughout the area. The July 1999 reclamation assessment indicated that plant cover had increased from 10 to 30 percent. Reclamation success was considered fair on the top and good on the sideslopes.

In June 2000, total plant cover was 25 percent and reclamation success was rated as good throughout the site. Perennial seeded grasses had increased from 3 to 7 percent from 1999 to 2000, and weedy species had decreased from 10 to 5 percent. Photos P-8 and P-9 show plant establishment at the site and can be compared to the photos taken in 1998 and 1999 (see 1998 and 1999 Reclamation Success Trip Reports [MACTEC-ERS 1998 and 1999]). This site is considered successfully restored.

C-SR-12, Vent and Subsidence Area: These areas were backfilled, recontoured, and seeded in September 1998 by DOE-GJO. After one growing season, the plant cover was rated as very good on the vent area and good on the subsidence area. Plant cover was 50 percent on the vent area and was composed primarily of seeded grasses; plant cover was 65 percent on the subsidence area, 25 percent of which was cheatgrass.

In June 2000, the 50-percent plant cover was maintained in the vent area and was more diverse. In the subsidence area, the percentage of cheatgrass decreased to a trace amount, and seeded grasses dominated the site. Both areas are in excellent condition and are considered successfully restored. Photos P-18 and P-19 show site conditions.

C-SR-16: Three mine sites on this lease tract were reclaimed by DOE-GJO in June 1999. Minimal topsoil was available for backfill. They were visited in June 2000 to assess first-year reclamation success.

Fraction #5: With an 8 percent plant cover, this mine site was considered in fair condition, primarily because a diversity of seeded grasses was observed, and the site was free of weeds. Although erosion is occurring within the pocks themselves, soil is not actively eroding off site. Photo P-20 shows conditions at the site. This site should be revisited next year to determine if vegetative cover has improved enough to allow its relinquishment to BLM.

Charles T SW, Pit and Waste Rock Dump: Vegetation at this site showed signs of heavy grazing by cattle and elk. Total plant cover was 30 percent, of which 10 percent was cheatgrass and 7 percent was Regreen, the seeded annual covercrop. Erosion is not a concern at this site, as slopes are no greater than 3-5 percent. Although reclamation success was rated as good at this site, it should be revisited in 2001 to determine if cheatgrass cover has decreased. Photo P-21 shows site conditions.

Charles T SW, Big Pit: The 35-percent plant cover at this site is composed almost entirely of cheatgrass and Regreen. Erosion is not a problem, and reclamation success is rated as fair. Photo P–22 shows site conditions. This site should be revisited in 2001 to determine if perennial seeded species have increased.

Charles T SW, North Incline Trench: Like the Big Pit area, this site's 30-percent plant cover is composed almost entirely of cheatgrass and Regreen and is rated as fair. Photo P–23 shows site conditions. This site should also be reevaluated in 2001.

C–SM–18: The mine-water storage pond on this lease tract was reclaimed in fall 1995. In July 1997, the site was composed of 15-20 percent bare ground, 50 percent Russian thistle, 10 percent cheatgrass, and 3-8 percent seeded grasses. In July 1998, the site was composed of 20 percent bare ground, 15 percent Russian thistle, 40 percent cheatgrass, and 5-9 percent seeded grasses.

Because of the predominance of undesirable weedy species, this site was broadcast-seeded again in October/November 1998 by the lessee. In July 1999, the site was composed of 30 percent bare ground, 20 percent Russian thistle, 30 percent cheatgrass, and 10 percent seeded grasses—not significantly different from 1998. However, the vegetation surveys showed much higher plant diversity at the site in 1999 than in 1998. Traces of desirable grasses, forbs, and shrubs were present in 1999 that were not present in 1998.

In July 2000, there was evidence of heavy grazing by cattle and elk, which may be partly responsible for the increase in bare ground to 40 percent. However, Russian thistle decreased to 11 percent, and cheatgrass decreased to 3 percent, a significant, positive change from earlier years. Crested wheatgrass composed 20 percent of the cover, and traces of several more perennial grass species were present. Photo P–24 shows site conditions. This site should be visited in 2001 to determine if the Russian thistle cover continues to decrease.

C–AM–19, Vent Hole #2: This former vent site was backfilled in 1996 and seeded in fall 1998 by UMETCO. After one season of growth, it had a fair plant cover comprised of 10-15 percent seeded grasses and 10-15 percent Russian thistle. After two seasons of growth, it had a plant cover comprised of 20 percent seeded grasses and 3 percent Russian thistle, a significant improvement. Site conditions are shown in photo P–25. This site is considered successfully reclaimed and does not need to be revisited.

C–AM–19, Vent Hole #3: This vent site was reclaimed and seeded in fall 1998 by UMETCO. After one season of growth, it had a fair plant cover comprised of 5-10 percent seeded grasses and 5-15 percent Russian thistle. In July 2000, it had a plant cover comprised of 20 percent seeded grasses and 2 percent Russian

thistle, a significant improvement. Site conditions are shown in photo P–26. This site is considered successfully reclaimed and does not need to be revisited.

C–AM–19 Cliff Dweller Waste Rock Dumps: The two reclaimed waste rock dumps at this site were inspected in July 1999 and July 2000. One reclaimed dump has a relatively flat topography and is south of the access road, and one has steep slopes and is north of the access road. Both dumps were recontoured, pocked, and seeded in December 1998 by UMETCO.

In 1999, the reclaimed dump on the south side of the access road had a variable plant cover, ranging from 10 to 20 percent, that was composed primarily of immature seeded grasses, Russian thistle, and sweet clover. As expected, most of the plant growth had occurred in the bottom of the pocks where moisture collected. In 2000, plant cover had increased to 30 percent, and was composed of 15 percent seeded grasses, 10 percent sweet clover, 3 percent Russian thistle, and traces of other forbs and shrubs. Site conditions, shown in photos P–27 and P–28, were rated as fair to good. This site should be evaluated again in 2001 to determine if reclamation success improves.

As in 1999, the reclaimed dump on the north side of the access road contained variable plant cover. Where topsoil had been placed, reclamation success was rated as good. Where topsoil had not been placed, reclamation success was rated as poor. Overall, percent plant cover increased from 20 to 25 percent cover from 1999 to 2000. The percentage of Russian thistle stayed about the same in 2000, but the seeded grasses increased from 3 percent in 1999 to 10 percent in 2000. Because of the pocking, soil erosion is not a problem at this site despite its steepness. Photos P–29 through P–32 show site conditions.

The areas lacking topsoil are unlikely to improve without soil amendments and reseeding. It is recommended that, where accessible, these areas be amended with Biosol (at 2000 pounds per acre) and granular humate (at 1000 pounds per acre) and reseeded. Because the ground in these areas is hard and crusted, it should be scarified in some way (re-pocked or ripped) immediately before application of the amendments and seed. Reseeding should take place in fall 2000 or fall 2001. This site should be evaluated again in 2001.

Twenty-four shrubs were planted by DOE–GJO personnel on the reclaimed areas in May 1999 as part of a shrub survival study. Results of that study will be in a separate report.

Small areas of Russian knapweed were found along the access road to these sites where large areas used to exist. Weed control efforts have obviously been helpful in reducing the number of plants and should be continued until this noxious weed is eradicated from the lease tract.

C–AM–19, Golden Cycle Mine: This site was first reclaimed and seeded in 1978. Because of the harsh site conditions (no topsoil; 60 percent rock), the seeding was unsuccessful, even by 1998. In an attempt to improve grass cover, DOE–GJO pocked and reseeded the site in November 1998. In July 1999, after one growing season, a 5 percent cover had developed in the bottom of the pocks. These conditions were rated as poor.

In 2000, conditions were rated as fair. Plant cover had increased to 15 percent and was composed primarily of wheatgrasses, sweet clover, and four-wing saltbush. Site conditions are shown in photos P–33 and P–34. This site should be evaluated again in 2001 to determine if conditions continue to improve.

Twelve shrubs also were planted by DOE–GJO on this reclaimed mine site in May 1999 as part of a shrub survival study. Results of that study will be in a separate report.

C–AM–19, King Solomon Waste Rock Dump: This waste rock dump was recontoured, pocked, and seeded by UMETCO in December 1998. Some areas were topsoiled, and others were not. In July 1999, after one growing season, the areas that had been topsoiled were obviously better-vegetated than those that were not topsoiled. Overall, the site had 10-15 percent plant cover, primarily composed of Russian thistle. Reclamation success was considered poor.

In July 2000, the difference between the topsoiled and non-topsoiled areas became more stark. Average plant cover in topsoiled areas was 20 percent, and conditions were rated as fair. Plant cover in non-topsoiled areas was essentially nonexistent and was rated as very poor. Photos P–36 through P–38 show site conditions.

Because of the poor success of revegetation in the non-topsoiled areas, BLM is unlikely to accept this site for return to public domain. It is recommended that the poor areas be hydroseeded with the normal seed mix, 2000 pounds per acre of Biosol, and 1000 pounds per acre of granular humate. Because the ground in these areas is hard and crusted, it should be scarified (re-pocked or ripped) immediately before application of the amendments and seed. It may be difficult to access some of the poor areas, but ULMP personnel, one guy in particular, will figure out a way to accomplish this. Reseeding should take place in fall 2000 or fall 2001. This site should be evaluated again in 2001.

Twenty-seven shrubs were planted by DOE–GJO on this site in May 1999 as part of a shrub survival study. Results of that study will be in a separate report.

C–AM–19, Worcester Shaft: This area was recontoured, pocked, and seeded by DOE–GJO in spring 1999. No topsoil was available. As an experiment, two types of cover crop were seeded in addition to the regular seed mix to determine if cover crop affects ultimate success of the seeding. The south half of the pocked slope

was seeded with annual sunflower and Rocky Mountain beeplant at a rate of 8 pounds per acre, and the north half was seeded with Regreen at a rate of 30 pounds per acre.

In July 2000, no significant difference in total plant cover was visually apparent between the two halves, although germination of Regreen was much more successful that that of sunflower and Rocky Mountain beeplant. Total plant cover was 20 percent, and site conditions were rated as fair. Sweet clover composed 10 percent of the cover, and seeded grasses composed 6 percent of the cover. Erosion is not a problem at the site. The two halves should be evaluated again in 2001 for differences. Photos P-39 and P-40 show sites conditions on the south and north halves, respectively.

C-LP-22A: Three mine sites on this lease tract were reclaimed in 1999 by Cotter Corporation for DOE-GJO. All sites were covered with topsoil and pocked. In June 2000, they were assessed for reclamation success. TNT #1 and TNT #2 were in good condition, although much of the plant cover was composed of sweet clover (30 percent and 6 percent, respectively). Four-wing saltbush composed 10 percent of the cover at both sites, and traces of several seeded grasses were present. One plant believed to be musk thistle was found on TNT #1, but could not be positively identified due to the absence of a flower or seed head. During the next inspection, this plant should be positively identified.

Plant cover on TNT #3 was 30 percent, but 9 percent of the total was Russian thistle. Because of the weed percentage, this site was rated as fair.

All three of the mine sites were stable and not expected to erode. They should be reevaluated in 2002 for improvement.

C-LP-23: The waste rock dump on this lease tract was recontoured, pocked, and seeded in fall 1998 by DOE-GJO. Approximately 8 inches of topsoil, borrowed from the bottom of a nearby stock pond, was backfilled onto the site. After one season of growth, the site had a fair plant cover comprised primarily of lambsquarter, cheatgrass, seeded wheatgrasses, and Russian thistle.

The site was evaluated again in June 2000. Plentiful elk sign indicated heavy use by this species at the site. Plant cover, which totaled 20 percent, was comprised primarily of seeded grasses (10 percent), sweet clover (4 percent), Russian thistle (3 percent), and fourwing saltbush (3 percent). A trace of rattlesnake was present. Reclamation success was considered fair. Conditions at the site are shown in photos P-41 and P-42.

Several areas of noxious weed infestation were noted during the July 1998 site visit. A 30' x 50' patch of Russian knapweed was noted, and many solitary plants and one 10' x 30' patch of musk thistle were noted. The knapweed was sprayed with herbicide in fall 1998, and the musk thistle was sprayed in early July 1999.

Because several scattered patches remained by fall 1999, a second spraying was conducted at the time of the June 2000 inspection by the San Miguel County weed control agent. The site should be evaluated again in 2001 to determine if additional weed control is necessary.

C–G–26: Three mine sites on this lease tract were reclaimed in spring and summer 1999. Reclamation of the Blunder and Lucky Boy mines was conducted by UMETCO under direction of the BLM. DOE–GJO directed reclamation of the Calamity #2 mine. The sites were visited in July 2000 to assess reclamation efforts.

Blunder: The surface pit and waste rock dump at this mine site were recontoured, topsoiled, pocked, and seeded. Topsoil from stockpiles at the mine site was used to reclaim these areas. During excavation of the stockpiles, however, no topsoil material was left in place at the stockpile locations, and bedrock was exposed on the surface. As a result, the former stockpile areas had poor vegetative cover after one growing season. In contrast, the former pit and waste rock dump areas where topsoil was used had fair vegetative cover. It is recommended that, during reclamation, all areas of a mine site be left in a condition that will promote maximum vegetative growth. Revegetation would have been more successful throughout the site if a small amount of topsoil had been left in the former stockpile areas.

The 15-percent vegetative cover at the former pit and waste rock dump areas was composed primarily of galleta grass and wheatgrasses. Traces of forbs and shrubs also were present. The site was stable, and erosion potential was low. Site conditions are shown in photo P–48. Before it is proposed for relinquishment to BLM, this site should be revisited to confirm that conditions have improved.

Lucky Boy: The incline trench and waste rock dump at this mine site were recontoured, pocked, and seeded. A small amount of topsoil from the site itself was available for backfill. At the time of the July 2000 inspection, plant cover was 25 percent and was composed primarily of pubescent wheatgrass (15 percent), sweet clover (3 percent), annual bursage (3 percent), and traces of forbs and shrubs. The site was in stable condition and has good potential for success. Current site conditions are shown in photo P–49. Before it is proposed for relinquishment to BLM, this site should be revisited to confirm that conditions have improved.

Calamity #2: The incline trench and waste rock dump at this mine site were recontoured, pocked, and seeded. No topsoil was available for backfill. At the time of the inspection, the 20-percent plant cover was composed of galleta grass, Regreen, and wheatgrasses. Reclamation success was rated as good, and the site was in stable condition. Before it is proposed for relinquishment to BLM, this site should be revisited to confirm that conditions have improved.

C–G–26A: Five mine sites on this lease tract were reclaimed by DOE–GJO in May 1999. They were assessed in July 2000 for reclamation success.

Queen of Hills, Portals 1-5: Five portals were closed, and an access road was closed and pocked to control erosion. Considering that no topsoil was available for backfill, the site had fair success. The 15-percent plant cover was composed entirely of seeded grasses. Soils were stable despite the site's steepness. This site should be evaluated again in 2001 to determine if conditions are improved enough to warrant its relinquishment to BLM.

Matchless: This waste rock dump was recontoured, covered with approximately 6 inches of topsoil from a nearby stock pond, and ripped to create surface roughness. A Regreen cover crop was applied along with the regular seed mix.

At the time of the inspection in July 2000, Regreen had been so heavily grazed by cattle and elk that only the base of the plants remained. At the next inspection, inspectors should determine if the heavy grazing of Regreen in 2000 helped or hurt the establishment of the perennial seeded species. Total plant cover was 25 percent, most of it composed of Regreen "stubs." Reclamation success was considered fair because of the lack of perennial species. Site conditions are shown in photo P–44. This site should be evaluated again in 2001 to determine if conditions are improved enough to warrant its relinquishment to BLM.

Small Spot: This former portal and waste rock dump area was recontoured, covered with approximately 6 inches of topsoil, ripped, and seeded. A sunflower cover crop was seeded along with the regular seed mix.

At the time of the inspection in July 2000, it was evident that the site had been moderately grazed. Inspectors also noted that a crop of cocklebur plants had germinated and died, probably in fall 1999 as a result of the wetter-than-normal weather. Cocklebur seeds most likely had been in the topsoil borrow source. This weedy species typically is found in riparian areas and is not expected to be a problem in the future at this dry, upland site.

The 30-percent total plant cover was composed primarily of sunflower (15 percent), galleta grass (5 percent), and sweet clover (5 percent). In contrast to the Worcester Shaft area on the C–AM–19 lease tract, the sunflower cover crop at this site was successful. Site conditions, which are rated as fair, are shown in photo P–45. This site should be evaluated again in 2001 to determine if conditions are improved enough to warrant its relinquishment to BLM.

Hummer: The numerous waste rock dumps at this mine site were recontoured and seeded. No topsoil other than that present on the site was used in reclamation. Despite the rocky conditions, the site is considered successfully reclaimed. After one growing season, plant cover was composed of 20 percent galleta grass and traces of other grasses and forbs. Very few weeds were present. Because of the

50 percent cover by rock and relatively flat slopes, this site has little or no potential for erosion and is considered stable. Site conditions are shown in photo P-46.

Sunflower: The trench and waste rock dumps at this mine site were recontoured, pocked, and seeded. No topsoil other than that present on the site was available for reclamation. After one year of growth, plant cover was composed of 20 percent galleta grass, 7 percent Regreen, 2 percent wheatgrass, and traces of forbs and shrubs. This site is stable and is considered successfully reclaimed; site conditions are shown in photo P-47.

The road to this site does not access any other site and could have been reclaimed. When possible, roads should be reclaimed to decrease traffic to the former mine site and to reduce soil erosion on the road itself. Ripping, pocking, or recontouring of access roads would reduce water runoff and allow the area to revegetate.

C-G-27: Four sites on this lease tract were reclaimed by DOE-GJO in July 1999. Topsoil was available for each site, and all sites were pocked and/or ripped. All sites were in stable condition at the time of the inspection in July 2000.

G-1/G-1A: A Regreen cover crop was seeded along with the regular seed mix at this site. The resulting first-year cover consisted of 20 percent Regreen, 5 percent sweet clover, 4 percent Russian thistle, and traces of seeded grasses, shrubs, and forbs. Because of the predominance of annual species, reclamation success was rated as fair at the time of the inspection. The site should be visited again in 2001 to determine if perennial grass species have replaced the Regreen.

Ronnie #1: Like the G-1/G-1A site, a Regreen cover crop was planted. The resulting first-year cover consisted of 20 percent Regreen, 2 percent sweet clover, and traces of seeded grasses, shrubs, and forbs. Because of the predominance of annual species, reclamation success was rated as fair at the time of the inspection. The site should be reevaluated in 2001 to determine if perennial species have replaced the Regreen.

BLM Subsidence: Reclamation success at this site was similar to that at G-1/G-1A and Ronnie #1. Of the 30 percent total cover, Regreen comprised 12 percent, seeded perennial grasses comprised 10 percent, and Russian thistle comprised 5 percent. Traces of other grasses, shrubs, and forbs were present. The site should be reevaluated in 2001.

Neglected: At this site, a Rocky Mountain beeplant and sunflower cover crop was planted along with the regular seed mix. The 30-percent plant cover consisted of beeplant (12 percent), seeded perennial grasses (8 percent), cheatgrass (5 percent), and traces of other species. Reclamation success was considered fair, and the site should be reevaluated in 2001.

C–G–27A, G–2 Mine: The vertical shaft and waste rock dump at this mine site were reclaimed in July 1999 by DOE–GJO. Topsoil was obtained from a local stock pond and backfilled on the site. Sideslopes were pocked, and the top was ripped to provide surface roughness. Along with the regular seed mix, a cover crop of sunflower and Rocky Mountain beeplant was seeded.

The site was in excellent condition at the time of the inspection and does not need to be revisited. Plant cover, which totaled 45 percent, was diverse and consisted of several seeded grasses, sweet clover, Rocky Mountain beeplant, and several forbs and shrubs.

C–G–27A, Hansen Claim: The waste rock dump at this mine site was recontoured, covered with topsoil borrowed from a local stock pond, ripped, and seeded with the regular seed mix. A sunflower and Rocky Mountain beeplant cover crop also was seeded.

At the time of the inspection, the site was in good condition and had a diverse plant mix. The 30-percent plant cover consisted of numerous grasses and forbs, including Rocky Mountain beeplant (5 percent) and sunflower (3 percent). The site is in stable condition and has excellent revegetation potential. Before it is relinquished, it should be visited to confirm that conditions have improved.

3.0 Summary

Although precipitation in 2000, to date, has been lower than normal, many of the reclaimed mine sites have successfully revegetated. Much of this success can be attributed to the wetter-than-normal late summer/early fall of 1999. For reasons that are unclear (possibly the drought or the presence of Regreen), many of the reclaimed sites were more heavily grazed by livestock and wildlife in 2000 than in past years. Whether this heavier grazing will be detrimental to the long-term success of DOE's reclamation efforts remains to be seen. Next year's assessment will help determine if the heavy grazing was damaging or helpful to revegetation efforts.

Table 3 summarizes the status of mine site reclamation as of August 2000. Successfully reclaimed sites are suitable for relinquishment to BLM. Sites that require reevaluation but no action at this time are not yet considered successfully reclaimed but have good potential for success over time. The table lists the year (in parentheses) that the site should be reevaluated. Sites requiring some type of action are unlikely to revegetate unless action is taken to improve site conditions. Recommendations for action are provided in Section 2.0 of this report.

DOE–GJO continues to successfully reclaim mine sites because of two important practices: roughening surface soil and covering sites with topsoil. The pocking of steep hillsides and ripping of more gentle terrain have had a tremendously positive

Table 3. Status of Uranium Lease Tract Sites

Site	Successfully Reclaimed	Needs Reevaluation (No Action at this Time)	Additional Action Needed
C-JD-5, Mineral Joe 4, Portal Area	X		
C-JD-5, Mineral Joe 4, Dump Area		X (2002)	
C-JD-7, Drill Holes 98-1, 98-2, 98-3, 98-4	X		
C-JD-7, Oversight Mine		X (2001)	
C-JD-9, Land Slump Area			Spray Noxious Weeds
C-SR-10, Sam Mine, Flat Area	X		
C-SR-10, Sam Mine, Steep Area			Develop Method for Pocking Steep Slopes
C-SR-11, Ike #1		X (2002)	
C-SR-11, Ike #2	X		
C-SR-11, Ike #3		X (2002)	
C-SR-11, Ike #4, Waste Rock Dump		X (2002)	
C-SR-11, Ike #4, Portal & Trench		X (2002)	
C-SR-11, Brighton, Waste Rock Dump		X (2001)	
C-SR-11, Brighton, West Portal Area		X (2002)	
C-SR-11, Brighton, Big Portal		X (2002)	
C-SR-11, Lower Brighton		X (2002)	
C-SR-11, Park		X (2002)	
C-SR-11, Tomboy		X (2001)	
C-SR-11, Mercantile North		X (2002)	
C-SR-11, Mercantile South	X		
C-SR-11, Emma Lou	X	X (2002)	
C-SR-11A	X		
C-SR-12, Vent and Subsidence Areas	X		
C-SR-16, Fraction #5		X (2001)	
C-SR-16, Charles T SW, Pit and Waste Rock Dumps		X (2001)	
C-SR-16, Charles T SW, Big Pit		X (2001)	
C-SR-16, Charles T SW, North Incline Trench		X (2001)	

Site	Successfully Reclaimed	Needs Reevaluation (No Action at this Time)	Additional Action Needed
C-SM-18, Pond Area		X (2001)	
C-AM-19, Vent Hole #2	X		
C-AM-19, Vent Hole #3	X		
C-AM-19, Cliff Dweller, Flat Area		X (2001)	Spray Noxious Weeds
C-AM-19, Cliff Dweller, Steep Area, Topsoiled Areas		X (2001)	Spray Noxious Weeds
C-AM-19, Cliff Dweller, Steep Area, Non-Topsoiled Areas			Scarify/Amend Soil and Reseed
C-AM-19, Golden Cycle		X (2001)	
C-AM-19, King Solomon, Topsoiled Areas		X (2001)	
C-AM-19, King Solomon, Non-Topsoiled Areas			Scarify/Amend Soil and Reseed
C-AM-Worcester Shaft		X (2001)	
C-LP-22A, TNT #1		X (2002)	
C-L:P-22A, TNT #2		X (2002)	
C-LP-22A, TNT #3		X (2002)	
C-LP-23		X (2001)	
C-G-26, Blunder		X (2001)	
C-G-26, Lucky Boy		X (2001)	
C-G-26, Calamity #2		X (2001)	
C-G-26A, Queen of Hills, Portals 1,2,3,4,5		X (2001)	
C-G-26A, Matchless		X (2001)	
C-G-26A, Small Spot		X (2001)	
C-G-26A, Hummer	X		
C-G-26A, Sunflower	X		
C-G-27, G-1/G-1A		X (2001)	
C-G-27, Ronnie #1		X (2001)	
C-G-27, BLM Subsidence		X (2001)	
C-G-27, Neglected		X (2001)	
C-G-27A, G-2 Mine	X		
C-G-27A, Hansen Claim		X (2001)	

effect on soil erosion. Even the steepest sites do not show measurable soil loss or visible rilling or gullying when they have been pocked. The pocks form small basins that collect water, provide some shading, and encourage plant germination and growth.

ULMP personnel have been quite successful at finding sources of local topsoil for use in reclaiming mine sites. Often, the source is a local stock pond. At other sites, the source is from a nearby undisturbed area. The placement of topsoil over mine rock waste, even if it amounts to only a few inches, has a significant effect on vegetation growth. Sites with topsoil typically have higher plant cover and a more diverse mix of plants.

When a topsoil source is not available, reclamation success can be enhanced by amending the surface material with Biosol and Granular Humate at the time of seeding. A minimum application rate of 1800-2000 pounds per acre of Biosol and 1000 pounds per acre of Granular Humate is recommended for harsh sites.

When possible, access roads to the mine sites should be reclaimed at the time of mine site reclamation. Recontouring, ripping, or pocking are effective methods for returning roads to a natural condition and promoting vegetative growth. In addition, the placement of large rocks or pieces of woody debris on the reclaimed road helps prevent vehicles from disturbing the reclaimed area. Photo P–51, taken on C–AM–19 near Vent Hole #2, shows a good example of a successfully reclaimed road.

Weed control efforts should continue on the lease tracts, as the spraying of herbicide appears to be successful in reducing or eliminating noxious weed populations. If DOE–GJO and San Miguel County are actively attempting to control noxious weed populations, as they are, DOE–GJO should ensure that their leaseholders are doing the same. In particular, Cotter Corporation needs to make a stronger effort at controlling weeds on C–JD–9.

4.0 References

MACTEC-ERS, 1998. *1998 Reclamation Success Trip Report*, prepared by M. Kastens, Environmental Sciences Group, Grand Junction, CO, October.

MACTEC-ERS, 1999. *1999 Reclamation Success Trip Report*, prepared by M. Kastens, Environmental Sciences Group, Grand Junction, CO, August.

Rust Geotech Inc., 1995. Vegetation Survey Notes collected by M. Kastens during August 7-9, 1995, as part of Appraisal AP-95-14, "Reclamation Success on DOE Uranium Lease Tracts Under the Uranium Lease Management Program," Grand Junction, CO, September.

[redacted]

P-1
P-2

VEGETATION SURVEY

Date: 6 20 - 00 Staff: M. Kastens / D. Burns

DOE ID No.: JD-5 Mineral Gac #4

Ecological Unit:

Photos: Roll No. 1-22 looking S at Slide Nos. former portal

Site condition: 1-23 " N at former waste rock dump

Weeds:

Potential Natural Vegetation:

Site Use History:

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Portal Species	% Cover	Dump Species	% Cover
sweet clover (non native)	25	Rock	30
4-wing saltbush	5	Plant	35
[illegible]	1	Bare	35
[illegible]	1	Litter	t
Russian thistle	1		
ORHY	5	Sweetclover	30
BRTE	2	4-wing	t
Slender wheatgrass	5	[illegible]	t
		Lewis Blue Flax	t
V. Good		Russian thistle	2
		ORHY	2
Rock	30	BRTE	1
Plant	45	Slender wheatgrass	t
Bare	30	Crested wheat	t
Litter	5		
		Good	

No Erosion

would like to check area to see if [illegible]

[redacted]

VEGETATION SURVEY

Date: 6-20-00 Staff: M. Kastens / D. Burns

DOE ID No.: JD-7 Drill Holes 98-4, -1, -2, -3

Ecological Unit:

Photos: Roll No. none Slide Nos.

Site condition: fair - but OK

Weeds:

Potential Natural Vegetation:

Site Use History:

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
Russian thistle	t	plant cover is	10-30%
sweet clover			
gr. rabbitbrush		areas are sparsely	
HIJA		veg'd but annual	
ORHY		weeds have mostly	
broom snakeweed		disappeared;	
4-wing		considering topsoil,	
phlox		seems like there should	
bladderpod (spp.)		be more veg, but	
blue flax		what's there is good	
yucca		& should fill in	
Prince's plume		over time.	
		Was good to see again	
No shots			

[redacted]

VEGETATION SURVEY

Date: 6-20-00 Staff: M. Kastens / D. Burns

DOE ID No.: JD-7 Oversight Mine

Ecological Unit:

Photos: Roll No. 1-24 standing on rim, Slide Nos. bench bottom 5

1-25 " " " " looking down to NW

Site condition: Fair (poor on west facing) reclaimed in 97 by Cotter

Weeds:

Potential Natural Vegetation: no topsoil

Site Use History:

Annual Ppt | Elevation | Slope 5-30 | Aspect many

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
ORHY	2	☆ a portion of the paved sideslope	
HIJA	2	is 99% Bare/Rock, while	
sweet clover (white)	20	other portions have more	
Slender wheatgrass	t	cover (less nutrients /	
BRTE	t	poorer soil at poor site?)	
4-wing	1		
Prince's plume	t	☆ Water has been diverted	
SIHY	t	at site w/ 5-6 water	
broom snakeweed	t	bars (or drainage ditches)	
rabbitbrush	t	w/ excellent results	
juniper	t	(last year's gullies are	
Astragalus	t	filling in)	
Rock	20	☆ look at aerial, especially	
Plant	25	west facing slope	
Bare	55		
Litter	t		

No erosion problem

[redacted]

VEGETATION SURVEY

Date: 6-12-00	Staff: M. Kastens / D. Burns
DOE ID No.: SR-10 Sm	
Ecological Unit:	

Photos: Roll No.	Slide Nos.
Site condition:	
Weeds: [illegible] has [illegible] - has	
Potential Natural Vegetation:	reduced density of plant cover
Site Use History:	[illegible]

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

(1b) Top — Excellent

Species	% Cover
[illegible]	5
Russian wildrye	5
[illegible]	3
BRTE	3
[illegible]	3
[illegible]	5
[illegible]	2
[illegible] sp ? ([illegible])	1
[illegible]	t
[illegible]	5
[illegible]	t
[illegible]	t
[illegible]	t
intermediate [illegible]grass	2
[illegible]	t
	10
	[illegible]
	50
	5

(2a) 100 — Very Good

Species	% Cover
Russian [illegible]	1
[illegible]	3
[illegible]	3
[illegible]	8
[illegible]	1
intermediate [illegible]grass	3
[illegible]	1
[illegible]	t
[illegible]	t
[illegible]	2
Russian wildrye	3
[illegible]	t
Rock	10
Plant	30
Bare	55
Litter	5

[redacted]

VEGETATION SURVEY

Date: 6-12-00 Staff: M. Kastens / D. Burns

DOE ID No.: C-SR-10 Sam Mine

Ecological Unit:

Photos: Roll No. Slide Nos.

Site condition:

Weeds:

Potential Natural Vegetation:

Site Use History:

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

(2b) topsoil - fair

Species	% Cover
Same	

(1b) topsoil

Species	% Cover
Cheatgrass	6
Brome	8
Crested wheat	5
Rye	1
Slender wheat	1
Sporobolus airoides	t
intermediate wheat	2
yellow sweet clover	1
redstem filaree	1
SLHY	t
Rock	20
Plant	25
Litter	5
bare	50

[redacted]

VEGETATION SURVEY

Date: 6-12-00	Staff: M. Kastens / D. Burns
DOE ID No.: SR-10 lam	
Ecological Unit:	
Photos: Roll No. 1-4, 5, 6	Slide Nos.
Site condition: 1-5, 6, 7	
Weeds:	
Potential Natural Vegetation:	
Site Use History:	
Annual Ppt / Elevation	Slope / Aspect

Vegetation Cover (include bare areas and cryptogams)

3a Top Species	% Cover	3b side w/topsoil Species	% Cover
Western wheat	5	BRTE	10
[illegible]	[illegible]	ORHY	1
Upland sand dropseed	4	Russian thistle	1
intermediate wheatgrass	3	crested wheat	1
[illegible]	[illegible]	SILY	1
[illegible]	5	redstem filaree	2
ORHY	[illegible]	Western wheat	4
BRTE	[illegible]	Slender wheat	1
[illegible]	1	[illegible]	5
Slender wheat	2	Russian thistle	1
curlycup gumweed	[illegible]	intermediate wheat	1
		tiochia	2
		Rock	10
Rock	10	Litter	30
Plant	35	Bare	55
Bare	50		
Litter	5		

[redacted]

VEGETATION SURVEY

Date: 6-12-00 Staff: M. Kastens / D. Burns

DOE ID No.: C-Sand Dam Mine

Ecological Unit:

Photos: Roll No. Slide Nos.

Site condition: 1C, 2C & 3C same as last year

Weeds:

Potential Natural Vegetation:

Site Use History:

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
1c		2c	
wheatgrass (western)	1	Western wheat	t
Rogeen	t	ORHY	t
BRTE	t	yellow sweet clover	t
ORHY	1	slender wheat	1
slender wheat	t	BRTE	t
Russian thistle	t		
3c Western wheat	2	4 5 6	
slender wheat	1	No change	
ORHY	1		
intermediate wheat	t		
BRTE	t		
crested wheat	t		
Russian thistle	t		
yellow sweet clover	t	Erosion same everywhere	

Rock same as 1997

[redacted]

VEGETATION SURVEY

Date: 6-28-00	Staff: M. Kastens / D. Burns
DOE ID No.: SR-11	Ike #1
Ecological Unit:	

Photos: Roll No. 2-10 [illegible] ESE Slide Nos. at portal area

Site condition: fair

Weeds: Reclaimed in Summer 99

Potential Natural Vegetation: (topsoil)

Site Use History:

Annual Ppt | Elevation | Slope 5 | Aspect SE

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
Sunflower	2	Bare	60
SILY	t	Rock	10
BRTE	3	Plant	30
goldenrod	t	Litter	t
[illegible] wheatgrass	1		
[illegible]	t		
[illegible]	t		
[illegible]	t	Russian thistle	t
[illegible] sp.	t	broom snakeweed	t
hairy golden aster	t	Pondosa (scented bay)	t
annual mustard	1	gray thistle	2
[illegible]	1	[illegible]	t
intermediate wheat	3	[illegible] wheatgrass	t
[illegible]	t	prostrate knotweed	t
[illegible] clover	15	slender wheatgrass	1
Helianthus	1		
rabbitbrush	t		

no erosion problem

[redacted]

VEGETATION SURVEY

Date: 6 - 28 00	Staff: M. Kastens / D. Burns
DOE ID No.: C-SR-11	Ike #2
Ecological Unit:	

Photos: Roll No. 2-11 looking ESE ~~Slide Nos.~~ across portal and waste rock area

Site condition: good

Weeds: (topsoil) reclaimed in summer 99

Potential Natural Vegetation: (present on portal area)

Site Use History: evidence of livestock grazing

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
Penstemon (serrated sep)	t	Bare	60
Bromus inermis	t	Rock	10
Sisymbrium	t	Plant	30
Astragalus	3	Litter	t
broom snakeweed	t		
[illegible]	t	Russian thistle	t
[illegible]	1	Stickwight	t
BRTE	10	Eriogonum spp.	t
Intermediate wheatgrass	4	ARTR	t
redstem filaree	t	[illegible]	t
bluebunch wheatgrass	2	Palmer penstemon	t
sweet clover	3	annual [illegible]	t
annual mustard	t	Russian thistle	t
crested wheat	1	hairy golden aster	t
prickly lettuce	t	scarlet globemallow	t
gray thistle	1	shadscale chenopodium	5
prostrate knotweed	t	salsify	t

no erosion gullies

[redacted]

VEGETATION SURVEY

Date: 6-28-00	Staff: M. Kastens / D. Burns
DOE ID No.: SL-11	Ike #3 waste rock dump & portal
Ecological Unit:	

Photos: Roll No. 2-9 looking NW Slide Nos.

Site condition: poor / but good cover by annual weeds.

Weeds: ~~PA~~ ~~RS~~ reclaimed in 99

Potential Natural Vegetation: (topsoil) ~~[illegible]~~

Site Use History:

Annual Ppt	Elevation	Slope 5%	Aspect —

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
[illegible]	1	Rock	5
sweet clover	8	Bare	60
ORHY	t	Plant	35
Russian thistle	15	litter	+
redstem filaree	t		
prickly pepperwort	t		
sunflower	t		
BRTE	5	Salsola (russian thistle)	t
SIHY	1	[illegible]	t
Erigeron sp.	t	Salsola	t
annual ryegrass	2	[illegible]	1
prickly lettuce	t	[illegible]	t
slender wheatgrass	1		
crested wheatgrass	1		
thistle	t		
Palmer penstemon	t		
[illegible]	t		

no grass problem

[redacted]

VEGETATION SURVEY

Date: 6-28-00 Staff: M. Kastens / D. Burns

DOE ID No.: SR-11 Ike #4 Waste Rock Dump

Ecological Unit:

Photos: Roll No. 2-2 looking ~~Slide Nos.~~ E at dump

Site condition: poor Reclaimed in Summer 99

Weeds: - pocked area

Potential Natural Vegetation: topsoil on portal area only

Site Use History:

Annual Ppt	Elevation	Slope	Aspect —

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
BRTE	t	Rock	50
CHVI (very young)	t	Litter	0
wheatgrass intermediate	3	Bare Gr	45
thistle sp.	t	Plant	5
Penstemon (dwarf blue)	t		
unknown forb	t		
tall wheatgrass	1		
annual thistle	t		
crested wheatgrass	1		
bluebunch wheatgrass	t		
stickleaf	t		
Russian thistle	t		
lichen covered areas w/ no seedhead	t		
sunflower	t		
gallata	t		

pocks are silting in, no [illegible]

[redacted]

VEGETATION SURVEY

Date: 6-19-00 Staff: M. Kastens / D. Burns

DOE ID No.: C-SR-11 Ike #4 portal & trench

Ecological Unit:

Photos: Roll No. 1-21 looking SE Slide Nos.

Site condition: good for 1st year

Weeds: evidence of heavy grazing by cattle

Potential Natural Vegetation: area topsoiled (thin)

Site Use History: Cotter reclaimed 99 for DOE and pocked

Annual Ppt | Elevation | Slope 5 | Aspect —

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
BRTE	10	scarlet gilia	t
crested wheat	5	ARTR	t
BR inermis	1	ORHY	t
stick tight	2		
hairy tickseed (coreopsis)	t		
thistle	t	Rock	15
slender wheat	10	Bare	50
Green bristlegrass (Setaria viridis)	t annual weed	Plant	35
prostrate knotweed	t	Litter	t
Russian thistle	3		
yellow sweet clover	1		
salsify	t	comeback next year	
SIHY	2	to see if weeds &	
hairy golden aster	t	BRTE decrease	
tumble mustard	1		
annual sunflower	t		
or. rabbit brush	t		

No erosion (good packs)

[redacted]

VEGETATION SURVEY

Date: 6-28-00 Staff: M. Kastens / D. Burns

DOE ID No.: SR-11 Brighton - Waste Rock dump

Ecological Unit:

Photos: Roll No. 2-8 Slide Nos.

Site condition: poor reclaimed in 99

Weeds: no topsoil

Potential Natural Vegetation:

Site Use History:

Annual Ppt | Elevation | Slope 30% | Aspect S

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
sweet clover	5	Rock	80
[illegible]	t	Plant	5
[illegible]	t	Bare	15
~~slender~~ wheatgrass	t	Litter	—

pocket - no off-site erosion

[redacted]

VEGETATION SURVEY

Date: 6-28-00 Staff: M. Kastens / D. Burns

DOE ID No.: SR-11 Brighton (several portals & waste rock dump)

Ecological Unit: West Portal

Photos: Roll No. 2-6 looking at Slide Nos. wood opening

Site condition: fair 2-7 looking NE at the big portal

Weeds: 2-8 looking SE at waste rock dump

Potential Natural Vegetation:

Site Use History: minimal topsoil at site

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

West Portal - fair

Species	% Cover	Species	% Cover
[illegible] gum weed	t	Plant	20
[illegible]	1	Bare	40
[illegible] snakeweed	t	Rock	40
sweet clover (w/ fall)	15	Litter	—
[illegible]	1		
[illegible]	t		
[illegible]	t		
[illegible]	1		
BRTE	2		
annual mustard	t		
chiff weed	t		
4-wing	t		

no [illegible]

[redacted]

VEGETATION SURVEY

Date: 6-28-00 Staff: M. Kastens / D. Burns

DOE ID No.: SR-11 Brighton – Big Portal

Ecological Unit:

Photos: Roll No. 2-7 Slide Nos.

Site condition: fair

Weeds: no topsoil

Potential Natural Vegetation:

Site Use History:

Annual Ppt | Elevation | Slope 30% | Aspect S

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
ORHY	t	Rock	30
BRTE	t	Bare	30
Sweet clover	40	Plant	40
4-wing	t	Litter	—
galleta	t		
slender wheatgrass	t		
prince's plume	t		

pocked – no moisture

[redacted]

VEGETATION SURVEY

Date: 6-28-00	Staff: M. Kastens / D. Burns
DOE ID No.: SR-11	Linear Knoll top (portal area)
Ecological Unit:	
Photos: Roll No. 2-5 looking NW	Slide Nos. at portal area
Site condition: fair	
Weeds: not a problem	[illegible]
Potential Natural Vegetation:	minimal topsoil
Site Use History:	
Annual Ppt / Elevation	Slope [illegible] Aspect SE

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
white/yellow sweet clover	45	Bare	30
BRTE	2	Rock	10
Muhly sp.	t	Pebbles	50
white horehound	2	Litter	10
prince's plume	t		
4-wing	t		
yucca	t		
dwarf [illegible]	t		
OPUN	t		
SIHY	t		
rabbitbrush	1		
[illegible]	t		
Bromus inermis	t		

[illegible] picked

[redacted]

VEGETATION SURVEY

Date: 6-28-00 Staff: M. Kastens / D. Burns

DOE ID No.: C-SR-11 Park - · waste rock pile & parking

Ecological Unit:

Photos: Roll No. 2-3 looking W Slide Nos. @ waste rock pile

Site condition: fair, OK [illegible] reclaimed in '99

Weeds: 2-4 - parking area - looking N parking area

Potential Natural Vegetation:

Site Use History: (has topsoil)

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
ORMI	1	Rock	40
stick weed	t	Bare	50
tall wheatgrass	2	Litter	0
BRTE	1	Plant	10
sweet clover	3		
galleta	1		
Eriogonum sp (low growing)	t	prostrate pigeon mustard	t
SITHY	1	mustard sp	t
Colorado (growing)	t	crested wheatgrass	t
Russian thistle	t	broom snakeweed	t
young rabbitbrush	t		
curlycup gumweed	t		
Hymenoxys filifolius	t		
4 wing	1		
oakbrush	t		
Aster sp.	t		
Bluebunch wheat			

No [illegible], parking [illegible]

[redacted]

VEGETATION SURVEY

Date: 6-19-00	Staff: M. Kastens / D. Burns
DOE ID No.: C-SR-11 Tomboy (portal, waste rock dump, subsidences)	
Ecological Unit:	

Photos: Roll No. 1-20 looking east at Slide Nos. former portal

Site condition: fair

Weeds: reclaimed by Cotter for DOE spring 99; v. little deposit

Potential Natural Vegetation:

Site Use History: area has small pocks

Annual Ppt | Elevation | Slope 20-30% | Aspect S

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
sweet clover (white + yellow)	10-30	Rock	30
slender wheatgrass	5	Bare	30-50
BRTE	1	Plant	20-40
penstemon sp (w/ serrated edges)		Litter	t
Bromus inermus	1		
ORHY	1	"woolly" yarrow - Achillea lanulosa	t
small clumps of chewed grass	t	fescue (purple)	t
SIHY	1	clasping leaf pepperweed	t
broom snakeweed	t	sand aster (Lowesdene ericoides)	t
Sandberg bluegrass?	t	☆ site washed out when	
stickticht	t	upstream pond overflowed	
heliomerus	t	- will be fixed 2000 by Cotter	
crested wheat	1		
hairy golden aster	t		
Evidence of erosion off of hillside (mud deposits, [illegible])			

☆ Subsidence is opening up (holes in ground)

[redacted]

VEGETATION SURVEY

Date: 6-19-00 Staff: M. Kastens / D. Burns

DOE ID No.: C-SR-11 Mercantile North

Ecological Unit:

Photos: Roll No. 1-17 looking N at ~~Slide Nos.~~ former portal

Site condition: fair reclaimed in 99 by Cotter

Weeds: 1-18 looking N at [illegible] for DOE; no topsoil

Potential Natural Vegetation: 1-19 - looking at site

Site Use History: N at road (packed)

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
Yellow sweet clover	20	Rock	30
Slender wheatgrass	5	Bare	30
White sweet clover	15	Plant	40
BRTE	t	Litter	t
ORHY	t		
Crested wheat	t		
SIHY	t	sweet clover is	
Yucca	t	providing good cover	
Sideoats grama	t	(binding) for perennial	
		grasses	
No Erosion			
look at next year to see if sweet clover is			
less dominant			

[redacted]

VEGETATION SURVEY

Date: 6-19-00	Staff: M. Kastens / D. Burns
DOE ID No.: C-SR-11	Mercantile South
Ecological Unit:	(Road & mine portal)
Photos: Roll No. 1-15 looking SW at former portal	Slide Nos.
Site condition: 1-16 " SE at pocked road	Road is pocked w/ good results
~~Weeds~~: V. good	Cotter reclaimed area in
Potential Natural Vegetation:	Spring 99 for DOE (Cotter's
Site Use History:	seed mix) minimal topsoil

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
ORHY	4	Rock	25
slender wheatgrass	12	Bare	45
yellow sweet clover	3	Litter	5
crested wheatgrass	2	Plant	25
SIHY	3		
penstemon sp (w/ serrated leaf)	t		
BRTE	1		
broom snakeweed	t		
Lewis blue flax	t		
gaillardia	t		
Rabbitbrush	t		
No Erosion Problem		don't need to see again!	

portal area is in Excellent condition (deep dark topsoil) Road is in fair (lots of new grasses coming up)

[redacted]

VEGETATION SURVEY

Date: 6-19-02	Staff: M. Kastens / D. Burns
DOE ID No.: C-SR-11	Emma Lou
Ecological Unit:	incline portal & waste rock dump

Photos: Roll No. 1-14 -standing over Slide Nos.

Site condition: good previous portal, leaching S/W

Weeds: Reclaimed in spring 99 by Cotter for DOE

Potential Natural Vegetation: (seed provided by Cotter) good topsoil off site

Site Use History:

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
dwarf rabbitbrush	t	mustard sp. (tansy mustard)	2
slender and/or intermediate wheatgrass	10	prostrate verbain	t
BRTE	15	green rabbitbrush	1
SPCO	t	redstem filaree	2
crested wheatgrass	5	Lewis flax	1
SIHY	2	stalk tansymustard	t
tall wheatgrass	2	Hymenopappus filifolius	t
Bromus inermis	t	Setaria viridis (annual) green foxtail grass	t
Tr Cirsium sp.	1	ORHY	1
scarlet gilia	t	gilia lira	t
yellow sweetclover	1	Rock	10
Canada thistle	1	Bare	40
curlycup gumweed	t	Plant	45
stick tight	1	Litter	5
very sticky fuzzy forbing small white daisies (5 petals)			t
Southern Mugwort?	t		
thistle	t		
yarrow	t		

no erosion

[redacted]

VEGETATION SURVEY

Date: 6-19-00 Staff: M. Kastens / D. Burns

DOE ID No.: C-SR-11A

Ecological Unit:

Photos: Roll No. 1-12, 1-13 Slide Nos.

Site condition: good

Weeds:

Potential Natural Vegetation:

Site Use History: site has been grazed

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
Bladderpod (Grisc.)	t	Rock	25
Palmer penstemon	t	Bare	45
Bracken fern	5	Plant	25
Hymenopappus filifolius		Litter	5
ORHY	t		
GRAS (mostly dichanthelium)	t		
white horehound	5	salsify	t
juniper	t	helianthus	t
ARTR	3	SIHY	t
chewed-on grasses (small ruminants)	3		
gallota	1		
Penage	t		
other penstemon w/ serrated leaves	t		
tree (plum family)	1		
simple [illegible] (Astrag.)	1		
Blue flax	t		
Slender wheatgrass	3		

No erosion problem

[redacted]

VEGETATION SURVEY

Date: 6-13-00 Staff: M. Kastens / D. Burns

DOE ID No.: SR-12 Vent area

Ecological Unit:

Photos: Roll No. 1-10 looking W Slide Nos.

Site condition: Excellent

Weeds:

Potential Natural Vegetation:

Site Use History:

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
penstemon sp (sample)	t	yellow sweet clover	t
Lewis blue flax	1	Western wheat	1
Palmer penstemon	t	PUTR	t
scarlet globemallow	2		
wild onion	t		
musk thistle	t	Rock	t
serviceberry	t	Plant	50
crested wheatgrass	23	Bare	50
needle & thread grass	5	Litter	t
astragalus sp (sample)	2		
ARTR	1		
smooth brome	5		
salsify	t		
bluebd wheatgrass	1		
clover (sample)	t		
broom snakeweed	t		
ORHY	5		

[redacted]

VEGETATION SURVEY

Date: 6-13 - Staff: M. Kastens / D. Burns

DOE ID No.: SR-12 Subsidence Area

Ecological Unit:

Photos: Roll No. 1-11 Caption E Slide Nos.

Site condition: Excellent

Weeds:

Potential Natural Vegetation:

Site Use History:

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
Smooth Brome	3	Plant	50
Crested wheat	20	Bare	50
ARTR	1	Litter	t
Astragalus sp	1	Rock	t
lupine	t		
Western wheat	2		
scarlet globemallow	t		
sewanee honey	1		
BRTE	t		
dwarf rabbitbrush	1		
CHNA	10		
yellow sweet clover	1		
sego lily	t		
ORHY	2		
CHNA	t		
blue flax	1		
POSA	t		

[redacted]

VEGETATION SURVEY

Date: 6-[illegible]-[illegible] Staff: M. Kastens / D. Burns

DOE ID No.: C-SR-16 Fraction # 5

Ecological Unit:

Photos: Roll No. [illegible] looking ~NE Slide Nos.

Site condition: [illegible] - Fair

Weeds: none

Potential Natural Vegetation: reclaimed & seeded June 99 by DOE (Dirt & Iron)

Site Use History:

Annual Ppt | Elevation | Slope 5-10 | Aspect E

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
wheatgrass	1	Rock	50
Kochia	5	Bare	40
Gilletia	1	Litter	2
other young grasses	1	plant	8
Indian ricegrass	t		
dryland sunflower	t		
blue flax	t		
Eriophyllum sp	t		
Erosion - low to moderate			
some pocks are filling in of sediment			

[redacted]

VEGETATION SURVEY

Date: 6-12-00 Staff: M. Kastens / D. Burns

DOE ID No.: CSR-16 chemlot SW

Ecological Unit:

Photos: Roll No. 1-1 looking ESE ~~Slide Nos.~~ from NNW side

Site condition: site has been heavily grazed (cows & elk)

Weeds: Good

Potential Natural Vegetation:

Site Use History: reclaimed & seeded June 99 (by DOE - brome)

Annual Ppt | Elevation | Slope 3% | Aspect S

Vegetation Cover (include bare areas and cryptogams)

Pit Area / Waste rock Dump

Species	% Cover	Species	% Cover
Rgreen	7	total plant	30
Blue flax	t	rock	30
BOTE	10	bare ground	35
gilleda grass (rimose)	8	litter	5
sticktight	t	[photo 1-2]	
redstem filarree	t	(Pg 5-2) redstem filaree	t
hairy golden aster	t	BOTE	20
brown snakeweed	t	Rgreen	10
salsify	t	annual mustard	1
Indian ricegrass	2	Wheatgrass	1-5
[illegible]	t	Stipa sp	1-5
penstemon sp	t	sticktight	t
[illegible]	3	brown snakeweed	t
green rabbitbrush	t	[illegible]	t
prior	t	Rock	30
forage	t	litter	5
		[illegible]	30
no erosion		no erosion	

[redacted]

VEGETATION SURVEY

Date: 6-12-00 Staff: M. Kastens / D. Burns

DOE ID No.: SR-16 Chemical T SW N. Incline Trench

Ecological Unit:

Photos: Roll No. 1-3 looking NW Slide Nos.

Site condition: fair reclaimed Crane 79 by DOE (Dirt & Iron)

Weeds:

Potential Natural Vegetation:

Site Use History:

Annual Ppt | Elevation | Slope 2-3 | Aspect W

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
BRTE	14	Rock	35
Ragweed	10	bare gr	30
pentstemon	t	plant	30
wheatgrass	1	litter	t
gallita	5		
stickright	t		
blue flax	t		
broom snakeweed	t		

[redacted]

VEGETATION SURVEY

Date: 7-19-00 Staff: M. Kastens / D. Burns

DOE ID No.: C-AM-18 Pond area

Ecological Unit:

Photos: Roll No. 4-17 Slide Nos.

Site condition: fair - good (good cover but still lots of weeds)

Weeds: grazed by elk & livestock

Potential Natural Vegetation:

Site Use History:

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
gallata	t	Plant	35
crested wheat (2 kinds)	20	Rock	10
slender wheatgrass	t	Bare	40
ORHY	t	Litter	10
BRTE	3		
4 wing	1		
Russian thistle	11		
broom snakeweed	t	pubescent wheatgrass	t
sweet clover	t	alkali sacaton	t
redstem filaree	t	SPCO	t
astragalus sp.	t		
rabbitbrush	t		
various annual mustards	t		
[illegible] weed	t		
curly cup gumweed	t		
[illegible]	t		
prickly lettuce	t		

no erosion problem (evidence of erosion onto the site)

[redacted]

VEGETATION SURVEY

Date: 7-26-00 Staff: M. Kastens / D. Burns

DOE ID No.: C-AM-19 Vent #2

Ecological Unit:

Photos: Roll No. #4-19 reclaimed vent Slide Nos.

Site condition: #4-20 - reclaimed road (* shows good practice)

Weeds: Good (don't need to revisit) site is fairly heavily grazed

Potential Natural Vegetation:

Site Use History:

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
Euphorbia sp (spurge)	t	Rock	30
Palmer penstemon	1	Bare	40
ORHY		Plant	25
wheatgrasses	20	Litter	5
SIHY			
galleta			
Russian thistle	3		
4-wing	t		
broom snakeweed	1		
rabbitbrush	t		
blue flax	t		
SPCO	1		
annual mustard	t		
winterfat	t		
ARTR	t		
BRTE	t		
piñon	t		

no erosion

* excellent job of road reclamation (placement of timber ripped & seeded)

[redacted]

VEGETATION SURVEY

Date: 7-26-00 Staff: M. Kastens / D. Burns

DOE ID No.: C-AM-19 Vent #3

Ecological Unit:

Photos: Roll No. 4-18 Slide Nos.

Site condition: Good (don't need to come back)

Weeds: minimal

Potential Natural Vegetation:

Site Use History:

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
Russian thistle	2	Rock	30
ORHY	↘	Bare	40
ultratgrasses	↘	Plant	25
annual sunflower	t	Litter	5
A-wira	t		
broom snakeweed	2		
SPCO	1		
blue flax	t		
Salsola crystalmax	t	all Grasses combined	20
? horsebrush (fuzzy one)	t		
Eriogonum sp.	t		
Yucca	t		
Borage sp.	t		
Stipa sp gallata	→		
SIHY	→		
winterfat	t		
Euphorbia sp.	t		

juniper t

(no cryptogam ... mixed Grass)

7-18-00 ☆ still have some knapweed on road, but much less than last yr; spraying again

Cliff Dweller - Plant Plots

CD-1 BB-B H 4.5' W 6"
fairly healthy; many leaves have yellow/brown tips

-2 MM-G H 9 W 8
healthy & vigorous

-3 SB-G dead

-4 BB-G gone

-5 MM-B H 4.5 W 2
healthy

-6 SB-G H 7 W 6
healthy

-7 BB-G H 12 W 12
healthy & vigorous

-8 MM-G H 6 W 4
fairly healthy; some leaves are brown

-9 SB-B H 9 W 3.5
fairly healthy; leaves a little dry

-10 BB-B gone

-11 MM-G gone

-12 SB-G H 12 W 12
healthy

-13 BB-G H 8.5 W 11.5
healthy & vigorous

-14 MM-B H 8 W 3
healthy

7-18-00, cont.

CD-15 SB-G H 10 W 8
healthy
-16 BB-G dead

-17 MM-G H 10.5" W 4"
healthy (few leaves brown)
-18 SB-B H 9.5 W 4.5
fairly healthy (leaves look dry)
-19 BB-B gone

-20 MM-G H 8 W 6
healthy
-21 SB-G H 9" W 11"
struggling (½ plant is brown & dying)
-22 BB-G H 3 W 4
OK - several leaves brown
-23 MM-B
appears to be almost dead or is dead
-24 SB-G H 19 W 7
OK, several leaves chewed on by bugs & brown
-25 PP-G H 6" W 6"
new leaves are healthy
-26 PP-B H 5 W 3.5
new leaves are healthy
-27 PP-G gone

CDb-28 PP-G H 4 W 2.5
healthy

C-AM-19

7-18-00 Golden Cycle Mine - Plant Plots

GC-1 BB-G H 10.0" W 6.0"
looks OK

-2 SB-B H 10.5" W 130"
vigorous & healthy

-3 mmG dead

-4 BB-B H 2.5" W 6.5" probably grazed
1/4 of leaves are yellow; otherwise healthy

-5 SB-G H 17.5 W 10.5"
healthy, leaves beginning to have slight curl (from drought?)

-6 mm-G H 7.5" W 10.0"
healthy & vigorous

-7 BB-G H 5.5" W 8.0"
healthy & vigorous

-8 SB-G H 19.5" W 9.0"
healthy (leaves chewed on by bugs)

-9 MM-B H 9.0" W 4.5"
healthy & vigorous (shaded by rocks)

-10 BB-G gone

-11 SB-B H 11" W 10" Photo # 4-3 from GC-11
healthy

-12 MM-G H 7.5 W 4" photo # 4.4 from SW corner
healthy; a few leaves are yellow w/ brown tips

-13 PP-B H 5.5" W 6"
healthy

-14 PP-G H 7" W 3"
healthy

Golden Cycle cont.

GC-15 PP-G H — W —
Gone

-16 PP-B H 5" W 2.5"
old leaves are brown & dead; new leaves at top are healthy

Plant Cover / Erosion

Vege		t	Cover
	Lewis blue flax		
Slender	western wheat wheatgrass or Salina wild rye		8
hairy golden aster		t	
sweet clover			2
4-wing			2
Russian thistle			1
Kochia			1
bitterbrush		t	
Service berry		t	
pinon		t	
ORHY		t	
juniper		t	
whorled milkweed		t	
winterfat		t	
salsify		t	
# v. sticky forb w/ yellow flowers			1
Astragalus sp		t	
~~Other wildrye~~ SIHY		t	
crested wheat		t	
Stipa sp.		t	
Bare 45	Rabbitbrush	t	fair condition
Rock 40%	gulleta	t	no topsoil
Plant 15			no erosion

7-19-00

King Solomon- plant Plots

KS-1 BB-B H dead W

-2 MM-G H 7" W 7"
OK - ½ the leaves are brown

-3 SB-G H 5.5" W 4"
OK - most leaves are brown-tipped

-4 BB-G H 9 W 3.5
healthy, a few leaves are yellow

-5 MM-B dead

-6 SB-G H 14.5" W 9.5"
healthy

-7 BB-G dead

-8 MM-G H 8 W3
healthy

-9 SB-B dead

-10 BB-B dead

-11 MM-G H 5.5" W 6.5"
healthy, portion has been buried, but plant OK

-12 SB-G dead

-13 BB-G H 3 W 6.5
healthy;

-14 MM-B H 6.5 W 4.5
healthy

KS- 15 SB-G H 9 W 8
healthy & vigorous
-16 BB-G dead

15
-17 MM-G H 11.5 W 4 ☆ Photo 4-15
looking at KS-18
healthy
-18 SB-B H 10 W 6.5
healthy
-19 BB-B H 3 W 7
base of plant covered by sediments
-20 MM-G H 6 W 6.5
OK - many leaves are brown
-21 SB-G H 9.5 W 4.5
looks stressed, but OK
-22 BB-G H 6 W 12
OK, several leaves brown
-23 MM-B H 7 W 6
healthy & vigorous
-24 SB-G H 5.5 W 5
healthy
-25 BB-G gone

-26 MM-G H 12 W 3
healthy
-27 SB-B dead

-28 BB-B dead

KS-29 mm-G H 7 W 3
healthy
-30 SB-G H 7 W 5.5 Photo 4-16 looking W from KS-30
healthy
-31 PP-G dead

-32 ~~PP~~ G H 6.5" W 3.5"
☆ GPS-32b is correct location healthy & vigorous
-33 PP-B H 7 W 3.5
new leaves healthy; old leaves a little dry
-34 PP-G H 7 W 5
new leaves healthy; old leaves a little dry
-35 PP-G H 3 W 2.5
healthy
-36 PP-B gone

-37 PP-G gone

-38 PP-G H 4.5 W 2.5
OK, some leaves are brown
-39 PP-B gone

7-19-00, cont.

King Solomon, cont.

Vege

Winterfat	1
Lewis blue flax	t
BRTE	t
Russian thistle	10
intermed. wheat / Sahara wild rye	7
slender wheat	
SIHY	
gallleta	
sweet clover	2
4-wing	t
tamarisk	t
redstem filaree	t

topsoil areas		barren areas	
Rock	20	Rock	70
Bare	60	Bare	30
Plant	20	Plant	t

top of pile - no topsoil - no vege, very poor

Photo 4-13,14 looking NW at top of pile w/ no topsoil

tops need biosol & reseeding

7-18-00

Worcester Shaft Plant Plots

WS-1 BB-B plant missing

-2 MM-G plant missing

-3 SB-G dead

-4 BB-G gone

-5 MM-B H 6.0 W 4.5" photo #4-5 standing @ WS-15 looking S
healthy; few leaves are brown

-6 SB-G H 8" W 2"
barely holding on

-7 BB-G H 6" W 8"
healthy (probably grazed)

-8 MM-G H 1" W 2"
original plant chewed off; new leaves

-9 SB-B H 17" W 10' photo #4-6 standing @ WS-10 looking SW
healthy; several leaves dried up or colored

-10 BB-B H 6 W 6
healthy (but not vigorous)

-11 MM-G H 7 W 5.5
very healthy

-12 SB-G gone

-13 PP-G H 7.0" W 4"
healthy & vigorous

-14 PP-G H 0.5" W 0.5
original plant buried by sediment; few healthy leaves poking through

WS- 15 PP-B H 5" W 2.5"
healthy; leaves are brown at tips
-16 PP-G H 2" W 4"
healthy (old leaves dry; new leaves healthy)

Plant Cover

Veg	
juniper	t
sweet clover	10
ORHY	2
BRTE	t
broom snakeweed	2
galleta	t
western wheat	2
* yellow sticky plant	2 Blazing Star
BM bee plant	t
Pcqueen	2
Russian thistle	t

See MK's Field Book (Vol 2) - 4-30-99 about seeding
no topsoil (W-facing) tough site
deep pucks; erosion not a problem

Rock	45	(fair condition)
Bare	[illegible]	
Plant	20	
Litter	52	

[redacted]

Reclaimed 2y

VEGETATION SURVEY

Current erosion _ Topsoil?
Noxious weeds? Eros m control treatment
Current mowing

Date: 6-29-00	Staff: M. Kastens / D. Burns
DOE ID No.: LP-22A	JNT # 1
Ecological Unit:	

Photos: Roll No. 2-13 looking SE ~~Slide Nos.~~

Site condition: good

Weeds: 1 musk thistle? (check next year) reclaimed in 99

~~Potential Natural Vegetation:~~ v. light cover w/ topsoil

Site Use History: sparsely grazing by elk

Annual Ppt | Elevation | Slope 10-25 | Aspect SE

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
Sweet clover (w&y)	30	Bare	35
ORHY	2	Rock	20
4-wing	10	Plant	45
prickly pear	t	Litter	t
Bromus inermis	t		
BRTE	t		
pallida	2		
SIHY	t		
Borage sp.	t		
slender wheatgrass	1		
musk(?) thistle	t		
☆ W. F. Scabup? sample	t		
needle & thread grass	t		
Aotin sp.	t		
broom snakeweed	t		
stickleaf weed	t		
☆ forb (fuzzy leaves)	t		

packed area - no erosion problem

[redacted]

VEGETATION SURVEY

Date: 6-29-00	Staff: M. Kastens / D. Burns
DOE ID No.: LP-22A TNT #2	
Ecological Unit:	

Photos: Roll No. 2-12: looking SE Slide Nos. at mine dump

Site condition: good

Weeds: reclaimed by Cotton in summer '99

Potential Natural Vegetation:

Site Use History: area topsoiled w/ local pond seds

Annual Ppt	Elevation	Slope 5-25	Aspect SE

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
SIHY	2	Bare	65
~~eucalyptus gunnii~~	3	Rock	10
broom snakeweed	t	Plant	25
ORHY	t	Litter	t
U. urens	10		
sweet clover (yellow)	6		
rabbit brush	t	Ind. cottonwood	t
Russian thistle	t	prickly lettuce	t
galletta	2	slender wheatgrass	t
Astragalus sp.	1	Polygonum aviculare	t
skeletonweed	t	shadscale	t
prickly pear	t	tamarisk	t
redstem filaree	t		
Erigeron sp. (blue flowered)	t		
prickly globemallow	t		
BRTE	t		
prince's plume	1		

poded, no erosion problem

[redacted]

VEGETATION SURVEY

Date: 6-29-00 Staff: M. Kastens / D. Burns

DOE ID No.: LP-22A TNT #3

Ecological Unit:

Photos: Roll No. 2-14 looking SW ~~Slide Nos.~~

Site condition: fair - low weeds, reclaimed w/ topsoil available

Weeds:

Potential Natural Vegetation:

Site Use History:

Annual Ppt | Elevation | Slope 25% | Aspect S

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
sweet clover	8		
4-wing	8	Rock	10
prairie clume	t	Bare	55
gumweed, like thing (same as TNT 2)	2	Plant	30
BRTE	1	Litter	5
Russian thistle	9		
gallota	1		
Astragalus sp.	t		
slender wheatgrass	1		
winterfat	t		
SIHY	t		
prickly pear	t		

pocked area: no erosion problem

[redacted]

VEGETATION SURVEY

Date: 6-13-00 Staff: M. Kastens / D. Burns

DOE ID No.: C-LP-23 Reclaimed mine dump

Ecological Unit:

Photos: Roll No. 1-8 looking west ~~Slide Nos.~~ 1-9 looking east

Site condition: Fair area has been heavily grazed by elk

Weeds:

Potential Natural Vegetation:

Site Use History:

Annual Ppt	Elevation	Slope 8	Aspect E

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
Yellow sweet clover	4	Rock	t
Russian thistle	3	plant	20
Palmer penstemon	1	Bare	80
Astragalus sp.	1	Litter	t
ARHY	2		
4-wing saltbush	3	Rattlesnake	t
Sideroats grama	t		
Western wallflower	4		
Green needlegrass	2	Shiny G-head	
Skeletonweed	t	spraying weeds	
Yellow sweetclover	t	Sisyrinchium	
BRTE	t	musk thistle	
CHVI	t	& R. tragana!	
Halogeton	t		
Kochia	t		
SIHY	t		
purple 3-awn	t		
gallota	t		

[redacted]

VEGETATION SURVEY

Date: 7-6-00	Staff: M. Kastens / D. Burns
DOE ID No.: C-6-76	Blurdee mine
Ecological Unit:	Dunton mill & waste rock dumps
Photos: Roll No. 3-12 lookers 5	Slide Nos.
Site condition: fair - not bad	reclaimed by UMETCO in
Weeds: [illegible] (good [illegible])	summer 99 (under BLM direction)
Potential Natural Vegetation:	no topsoil to speak of (rock [illegible])
Site Use History:	no [illegible]

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
galleta	15	Rock	50
wheatgrass (crested)		Bare	35
pubescent wheatgrass		Litter	t
		Plant	15
[illegible]	t		
[illegible]	t		
mustard sp.	t		
rabbitbrush	t		
tumble mustard	t		
Astragalus	t		
[illegible] (invasive)	t	* areas that were	
Dimorphocarpa	t	[illegible] (former location	
yarrow	t	& [illegible]) was scraped	
BRTE	t	down to [illegible] - left	
pinon pine	t	flat [illegible] very little	
		[illegible] should have some	
		natural [illegible] of [illegible]	

surface pocked; no [illegible] problem rough

[redacted]

VEGETATION SURVEY

Date: 7-6-00 Staff: M. Kastens / D. Burns

DOE ID No.: C-G-26 Lucky Boy

Ecological Unit: incline trench & waste rock dump

Photos: Roll No. 4-1 looking S Slide Nos.

Site condition: fair UMETCO reclaimed under

Weeds: (but good potential) direction of BLM Summer 99

Potential Natural Vegetation:

Site Use History:

Annual Ppt | Elevation | Slope 8-10 | Aspect S

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
broom snakeweed	t	Bare	40
annual sunflower	1	Rock	35
sweet clover	3	Litter	t
Palmerium virulare	1	Plant	25
Western tansy	t		
Ambrosia (annual bur sage)	3		
4-wing	1		
tumbleweed	t		
tumble mustard	t		
mustard sp.	t		
rabbitbrush	t		
RRTE	1		
Russian thistle	t		
pubescent wheat grass	15		
pinon pine	t		

pitted surface [illegible]

[redacted]

VEGETATION SURVEY

Date: 7-6-00 Staff: M. Kastens / D. Burns

DOE ID No.: C-0-76 Calamity #2

Ecological Unit: incline [illegible] waste rock pile

Photos: Roll No. 4-2 looking NNW Slide Nos.

Site condition: good (no weeds) reclaimed in May 99

Weeds: no topsoil, [illegible]

Potential Natural Vegetation:

Site Use History: site moderately mined

Annual Ppt | Elevation | Slope | Aspect S

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
Pogogon	5	Rock	40
gallieta	10	Bare	40
wheatgrass (no seed head)	5	Litter	t
		Plant	20
annual mustard	t		
hairy golden aster	t		
redstem filarree	t		
globemallow (parvifolia)	t		
Lewis blue flax	t		
penstemon sp ([illegible])	t		
[illegible]	t		
thistle sp.			

no erosion problem
steep pocked

VEGETATION SURVEY

Staff: M. Kastens / D. Burns

Queen of H2Os

Portals 1, 2, 3, 4 & 5

Slide Nos.

pocked = closed road

closed 5 portals

no topsoil, reclaimed

Slope Aspect

eas and cryptogams)

	% Cover	Species	% Cover
		Rock	50
P		Bare	40
		Plant	15
	t	Lichen	t
	t		
	t		
	t	total	
	t		
	t		
		most of the grasses	
		don't have seed for 6	
	t		
	t		

. Burns

n snap

ay 99

stock pond

heavily by cattle

ect elk

pecies	% Cover
	10
	65
	25
	t

[redacted]

VEGETATION SURVEY

Date: 7-5-00	Staff: M. Kastens / D. Burns
DOE ID No.: C-G-20A	Small Spot
Ecological Unit:	

Photos: Roll No. ~~2-25~~ 3-10 looking NNE Slide Nos.

Site condition: fair Reclaimed May 99 [illegible] pond; sunflower cover crop

Weeds:

Potential Natural Vegetation: site has been moderately grazed

Site Use History: ripping helped create favorable niches for plant growth

Annual Ppt | Elevation | Slope 5-15 | Aspect 5

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
annual sunflower OR cocklebur	15	Bare	55
Astragalus sp.	1	Rock	10
galleta	5	Litter	5
whorlgrass	2	Plant	30
Koeleria	t		
sweet clover	5		
Polygonum aviculare	2		
Palmer penstemon	t		
Penstemon sp. [illegible]	t		
4-wing	t		
lambsquarter	t		
[illegible]	t		
[illegible] (possible)	t		

site ripped; no erosion problem

[redacted]

VEGETATION SURVEY

Date: 7-6-00 Staff: M. Kastens / D. Burns

DOE ID No.: C-G-26A Hummer

Ecological Unit:

Photos: Roll No. 3-9 looking SSE Slide Nos.

Site condition: good reclaimed in May 99

Weeds: no topsoil, no cover crop

Potential Natural Vegetation:

Site Use History:

Annual Ppt | Elevation | Slope 3-8 | Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
galleta grass	20	Rock	50
Euphorbia	t	Bare	30
broom snakeweed	t	Litter	t
aster sp.	t	Plant	20%
wheatgrass	t		

considering the amount of rock on surface, the galleta has formed a good cover here for a 1st-year seeding. No weeds. looks fine, no need to rip rock (actually small rock)

no erosion (may too rocky)

[redacted]

VEGETATION SURVEY

Date: 7-6-00	Staff: M. Kastens / D. Burns
DOE ID No.: C-G-26A	Sunflower
Ecological Unit:	

Photos: Roll No. 3-11 looking W Slide Nos.

Site condition: good reclaimed in 90 by DOE sub.

Weeds: no topsoil; Reagan cover crop

Potential Natural Vegetation:

Site Use History:

Annual Ppt | Elevation | Slope 5-25 | Aspect E

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
Reagan	7	Rock	30
galleta	20	Bare	45
slender wheat	2	Plant litter	50
Umbrellawort (Cryptantha nyctagineus)	t		t
SITY	t		
globemallow (cover sho	t		
[illegible]	1		
4-wing	t		
redstem filaree	1	* only bare [illegible]	
[illegible]	2	[illegible]	
winterfat	t	bad [illegible]	
Astragalus sp.	t		
		probably don't need to	
		see again;	
no weeds;		good grass cover	

Sideslopes pick up; tops roughened

[redacted]

VEGETATION SURVEY

Date: 7-5-00	Staff: M. Kastens / D. Burns
DOE ID No.: C-G-27	G-1 / G-1A
Ecological Unit:	waste rock pile
Photos: Roll No. 2-19 from topsoil area ~~Slide Nos.~~ looking SW	
Site condition: ~~fair~~ good	reclaimed in summer 99
Weeds:	Regreen cover crop
Potential Natural Vegetation:	topsoil from a stockpile
Site Use History:	
Annual Ppt / Elevation	Slope 5-20 / Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
Regreen	20	Bare	45
Russian thistle	4	Litter	t
sweet clover	5	Rock	20
intermediate wheatgrass	4	Fine	35
BRTE	2		
annual sunflower	t		
tumble mustard	t	Utah juniper	t
Polygonum aviculare	t	SIHY	t
kochia	t	ORHY	t
prickly lettuce	t	globemallow (gaillardia)	t
blue flax	t	broomsnakeweed	t
red-stem filaree	t	prickly pear	t
lambsquarter	t		
Palmer penstemon	t		
small lin. leaved buckwheat	t		
4-wing	t		
galleta	t		

packed on side; ripped on top

[redacted]

VEGETATION SURVEY

Date: 7-5-00	Staff: M. Kastens / D. Burns
DOE ID No.: G-27	Henric #1 waste rock pile
Ecological Unit:	

Photos: Roll No. 2-20 from access rd. ~~Slide Nos.~~ looking E

Site condition: fair reclaimed in summer 99

Weeds: topsoil from G-1/G-1A stockpile

Potential Natural Vegetation: Pegram cover crop

Site Use History: previously grazed

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
Pegram	20	Bare	50
crested wheatgrass	t	Rock	25
[illegible]	t	Litter	t
smooth brome	t	Plant	25
[illegible]	t		
bluebunch	t		
galleta	t	annual sunflower	t
Russian thistle	1	small unknown forb	1
sweet clover	2	4-wing	t
slender wheatgrass	t	winterfat	t
(Shadscale, Gardner's)			
rabbitbrush	t		
Lambsquarters	t		
intermediate wheatgrass	1		
Lewis blue flax	t		
Penstemon sp (broad leaf)	t		
Sphaeralcea coccinea	t		

pocked surface from [illegible] operation

[redacted]

VEGETATION SURVEY

Date: 7-5-00 Staff: M. Kastens / D. Burns

DOE ID No.: C-G-27 BLM Subsidence (on BLM)

Ecological Unit:

Photos: Roll No. 2-21 (Kastens 2000) ~~Slide Nos.~~ (2) pile & drainage

Site condition: fair restored summer 99

Weeds: topsoil from G-1/G-A stockpile

Potential Natural Vegetation: Regreen cover crop

Site Use History:

Annual Ppt | Elevation | Slope 5-20 | Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
slender wheatgrass	2	Bare	40
Regreen	12	litter	25
Sphaeralcea (parvifolia?)	t	[illegible]	5
Artemisia tridentata	t	[illegible]	30
Pinyon Pine	5		
[illegible]	t		
[illegible]	t	Lion's tail	t
Penstemon	t	annual sunflower	t
Sweet clover	3		
[illegible]	t		
small bluegrass	8		
ORHY	t		
gambel oak	t		
thistle sp.	t		
[illegible]	[illegible]		
4-wing	t		

p dried surface

[redacted]

VEGETATION SURVEY

Date: 7-5-00	Staff: M. Kastens / D. Burns
DOE ID No.: G-27	Neglected - waste rock dump
Ecological Unit:	

Photos: Roll No. 2-22 - looking W ~~Slide Nos.~~ at dump

Site condition: fair Dam reclaimed summer 99

Weeds: topsoil (from gully near 2 cm bare plant cover up south)

Potential Natural Vegetation:

Site Use History:

Annual Ppt	Elevation	Slope	Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
BRTE	5	Rock	25
Sea blight	12	Bare	40
western tansy	3	Litter	5
sweet clover	2	Plant	30
small scabbed bunch grass	8		
[illegible]	t		
annual ryegrass	t		
aster	t		
[illegible]	t		
dyssemaltow [illegible]	t		
annual sunflower	t		
winterfat	t		
thistle	t		

surface reclaimed w/ dozer
no erosion problem

[redacted]

VEGETATION SURVEY

Date: 7-5-00	Staff: M. Kastens / D. Burns
DOE ID No.: C-G-27A G-2 mine (vertical shaft / waste rock dump)	
Ecological Unit:	
Photos: Roll No. 2-18 (from Pond looking W) ~~Slide Nos.~~	
Site condition: excellent	reclaimed in July 99
Weeds:	cover crop of bee plant & sunflower
Potential Natural Vegetation:	topsoil from local pond
Site Use History:	moderate grazing
Annual Ppt / Elevation	Slope 3-20 Aspect NE (50)

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
~~Atriplex canescens~~		Bare	40
gallleta	2	Rock	15
ORHY	1	Litter	t
globemallow (cowania)	3	Plant	45
bee plant	5		
Lewis blue flax	2		
sunflower	t	unknown short (scored)	12
SIHY	1	bindweed t	bunch grass
Mormon tea / ground ivy	t	red stem filaree	t
4-wing	t	Lambsquarters	t
Thistle sp.	t	[illegible]	t
prickly pear	t	blue grama	t
BRTE	t	[illegible]	t
sweet clover	15	prickly lettuce	t
winterfat	1	★ indeterminate weed?	5
rabbitbrush	t	looks like [illegible]	
needle & thread grass	t	(slightly [illegible])	

sides packed, top reproofed (no erosion problem)

[redacted]

VEGETATION SURVEY

Date: 7-5-00 Staff: M. Kastens / D. Burns

DOE ID No.: G-27A Hansen Claim

Ecological Unit:

Photos: Roll No. 2-17 Slide Nos. waste rock dump

Site condition: good reclaimed in summer '99 by [illegible]

Weeds: topsoil from local stock pond

Potential Natural Vegetation: area grazed by livestock & elk

Site Use History: only reason to come back next year is to see how the [illegible] grass & [illegible]

Annual Ppt | Elevation | ~~Slope~~ | Aspect

Vegetation Cover (include bare areas and cryptogams)

Species	% Cover	Species	% Cover
Lewis blue flax	3	Rock	20
RM bee plant	5	Litter	t
~~[illegible]~~	~~[illegible]~~	Bare Ground	50
gallota	3	Plant	30
scarlet globemallow (Sphaeralcea)	3		
annual grass	2		
annual sunflower	3		
[illegible]	1	4-wing	t
needle & thread grass	1	Japanese brome	t
red stem filaree	3	[illegible]	t
tall tumble mustard	t	[illegible]	t
gray thistle	1	Astragalus sp	t
broom snakeweed	t	Sleeping [illegible]	5
prickly lettuce	t	Dracocephalum parviflorum	
annual mustard	t		
Hymenoxys filifolius	t		
BRTE	t		

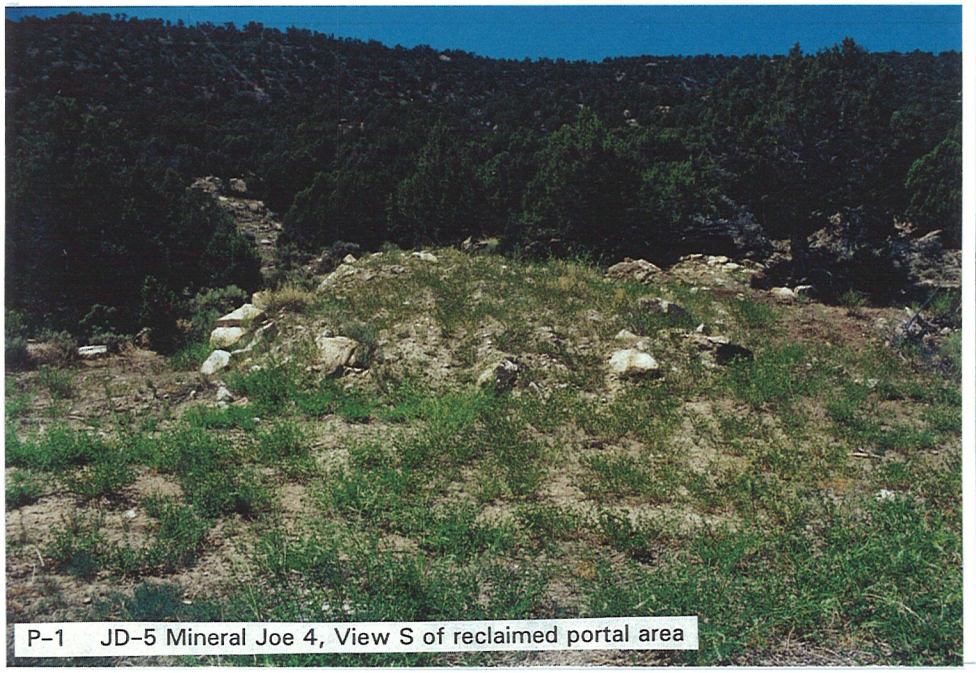
no [illegible] pollution - site was ripped

Appendix B, Photograph Log

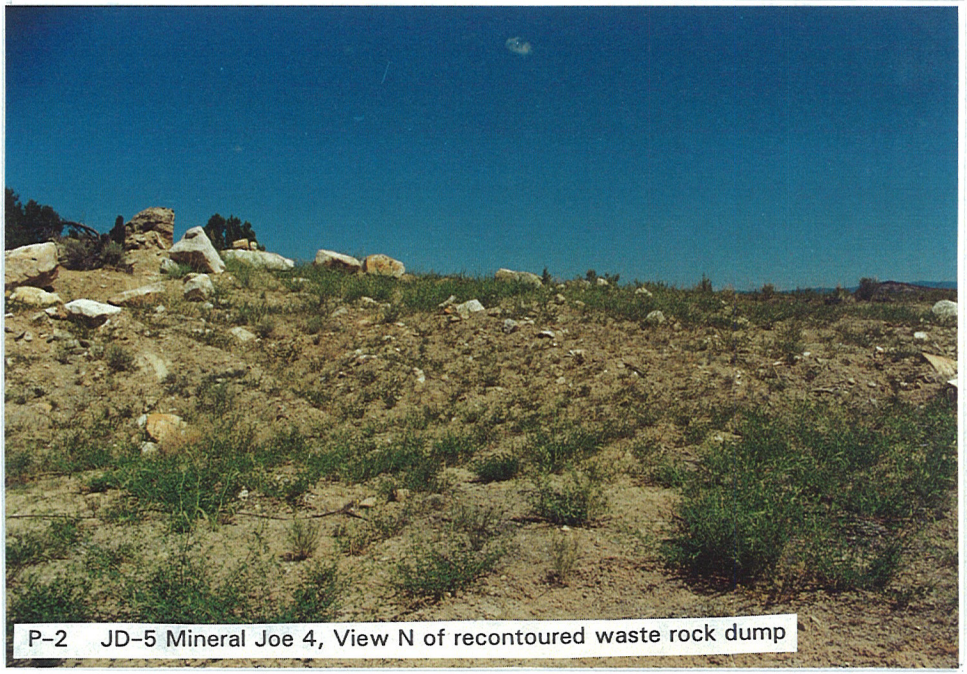
Photograph Number	Photograph Description[a]
P–1	JD–5 Mineral Joe 4, View S of reclaimed portal area
P–2	JD–5 Mineral Joe 4, View N of recontoured waste rock dump
P–3	JD–7 Oversight Mine, View S from middle bench
P–4	JD–7 Oversight Mine, View NW from middle bench
P–5	SR–10, View W across top area from E fence post
P–6	SR–10, View W across sideslope
P–7	SR–10, View WSW at sideslope from E fence post
P–8	SR–11A, View ESE of reclaimed portal area (top)
P–9	SR–11A, View WSW of reclaimed portal area (sideslope)
P–10	SR–11 Ike #4, View SE of reclaimed portal and trench
P–11	SR–11 Tomboy, View E of reclaimed portal area
P–12	SR–11 Mercantile North, View W of northern reclaimed portal area
P–13	SR–11 Mercantile North, View W of southern reclaimed portal area
P–14	SR–11 Mercantile North, View N of reclaimed road
P–15	SR–11 Mercantile South, View SW of reclaimed portal area
P–16	SR–11 Mercantile South, View SE of reclaimed road
P–17	SR–11 Emma Lou, View SW from reclaimed portal area
P–18	SR–12, View W of reclaimed vent area
P–19	SR–12, View E of reclaimed subsidence area
P–20	SR–16 Fraction #5, View NE of reclaimed road and portal areas
P–21	SR–16 Charles T SW, View ESE of reclaimed pit area and waste rock dump
P–22	SR–16 Charles T SW, View of reclaimed "big pit" area
P–23	SR–16 Charles T SW, View NW of N incline trench
P–24	SM–18, View W of reclaimed water storage pond
P–25	AM–19 Vent #2, View of reclaimed vent
P–26	AM–19 Vent #3, View of reclaimed vent
P–27	AM–19 Cliff Dweller, View E of reclaimed waste rock dump (from middle of flat)
P–28	AM–19 Cliff Dweller, View W of reclaimed waste rock dump (from middle of flat)
P–29	AM–19 Cliff Dweller, View N of S-facing hillslope

Photograph Number	Photograph Description[a]
P–30	AM–19 Cliff Dweller, View SE of NW portion of reclaimed area
P–31	AM–19 Cliff Dweller, View SE of N portion of reclaimed area
P–32	AM–19 Cliff Dweller, View E of W portion of reclaimed area
P–33	AM–19 Golden Cycle, View NW from GC–11 shrub site
P–34	AM–19 Golden Cycle, View N from SW corner of reclaimed area
P–35	AM–19 King Solomon, View of KS–18 shrub site from KS–17
P–36	AM–19 King Solomon, View W from KS–30 shrub site
P–37	AM–19 King Solomon, View NW of top area with no topsoil
P–38	AM–19 King Solomon, View NW of top area with no topsoil
P–39	AM–19 Worcester Shaft, View S from WS–15 shrub site
P–40	AM–19 Worcester Shaft, View SW from WS–10 shrub site
P–41	LP–23, View W at reclaimed waste rock dump (from E edge)
P–42	LP–23, View E at reclaimed waste rock dump (from W edge)
P–43	G–26A Queen of Hills, View uphill of reclaimed road
P–44	G–26A Matchless, View S of reclaimed waste rock dump
P–45	G–26A Small Spot, View NNE of reclaimed portal area
P–46	G–26A Hummer, View SSE of reclaimed mine workings
P–47	G–26A Sunflower, View W of reclaimed portal area
P–48	G–26 Blunder Mine, View S of reclaimed pit and waste rock dump
P–49	G–26 Lucky Boy, View S of reclaimed trench and waste rock dump
P–50	G–26 Calamity #2, View NNW of reclaimed incline and waste rock dump
P–51	Example of reclaimed road

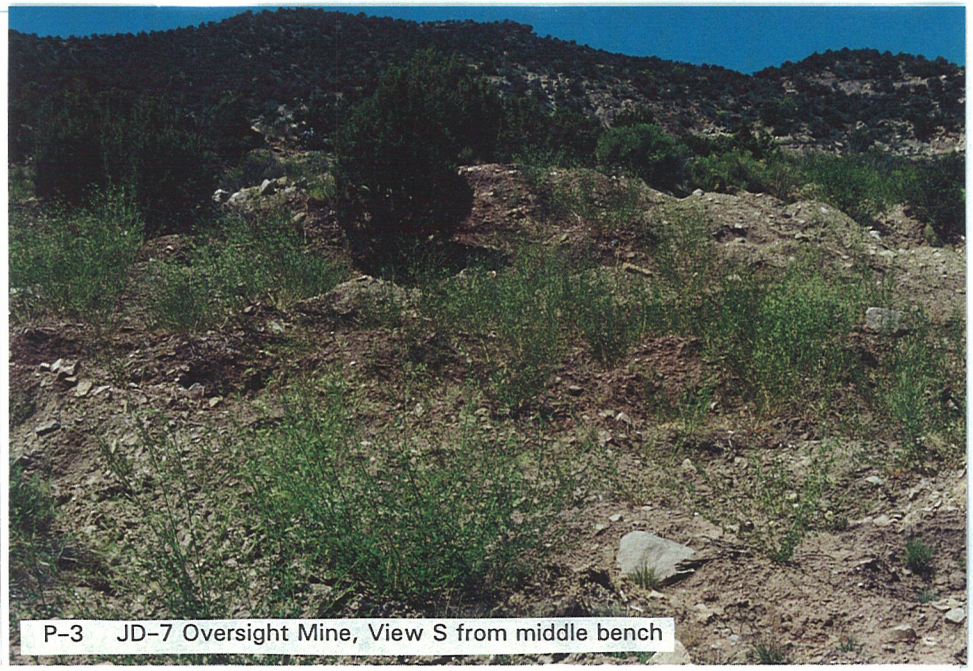
[a]Abbreviations used in table include: W = west; N = north; S = south; E = east; GC = Golden Cycle Mine; KS = King Solomon Mine, WS = Worcester Shaft.



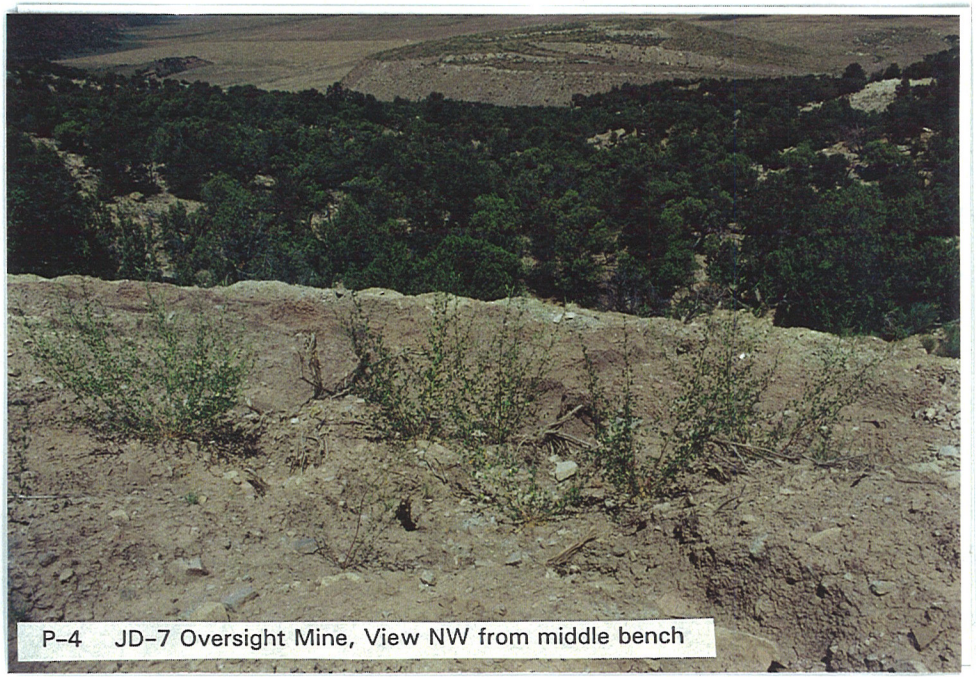
P-1 JD-5 Mineral Joe 4, View S of reclaimed portal area



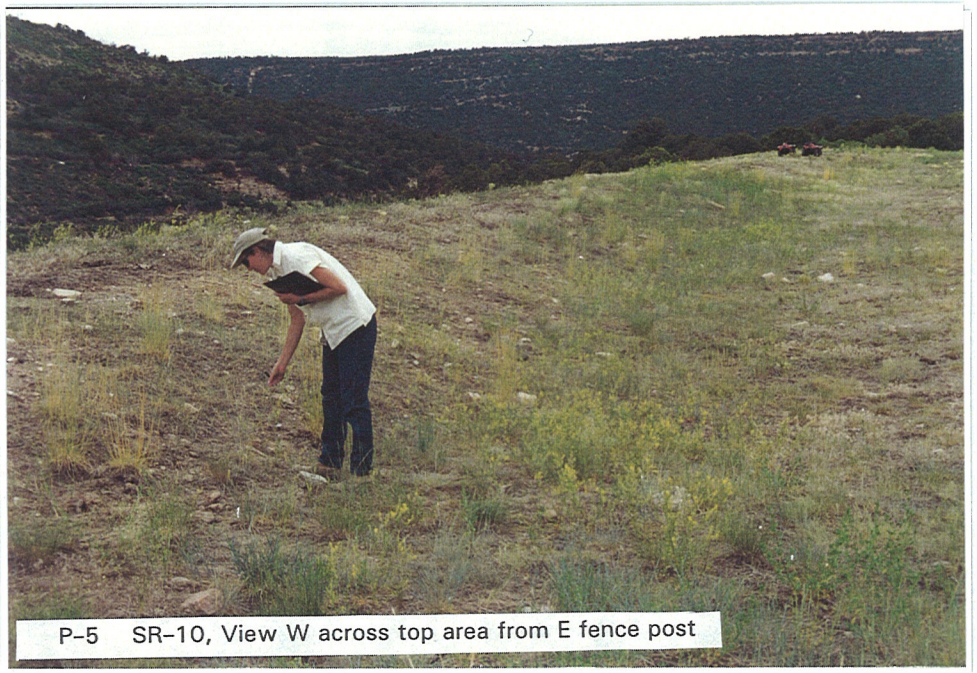
P-2 JD-5 Mineral Joe 4, View N of recontoured waste rock dump



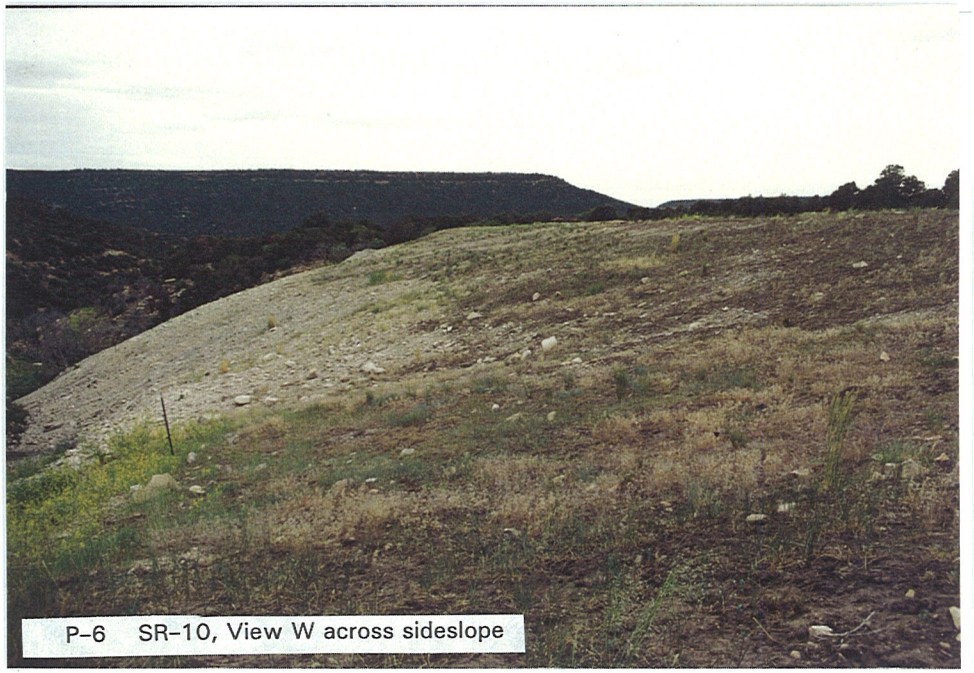
P-3 JD-7 Oversight Mine, View S from middle bench



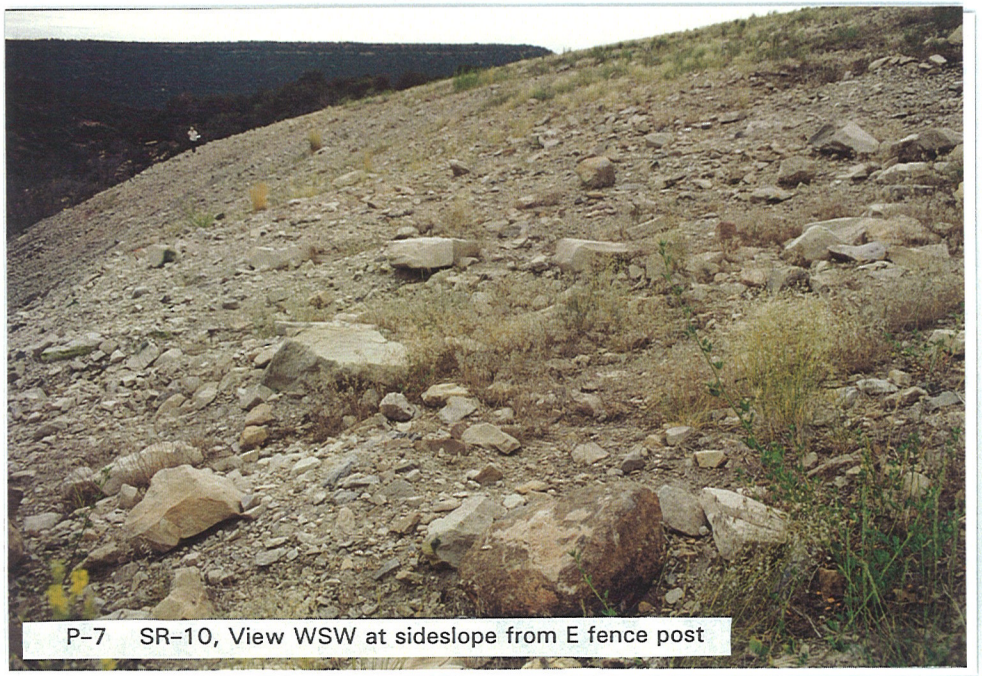
P-4 JD-7 Oversight Mine, View NW from middle bench



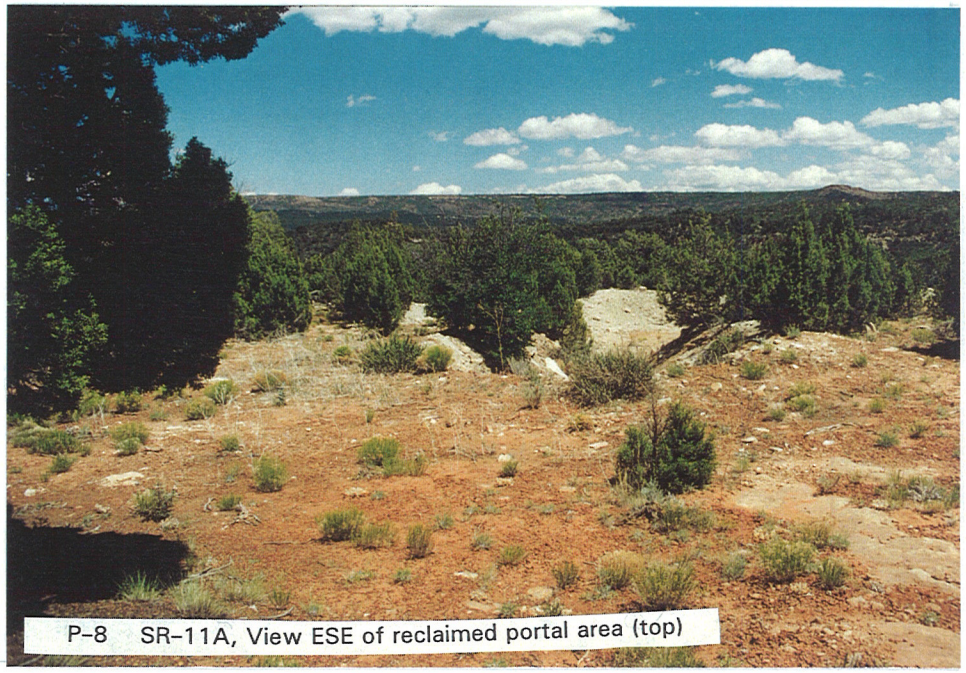
P-5 SR-10, View W across top area from E fence post



P-6 SR-10, View W across sideslope

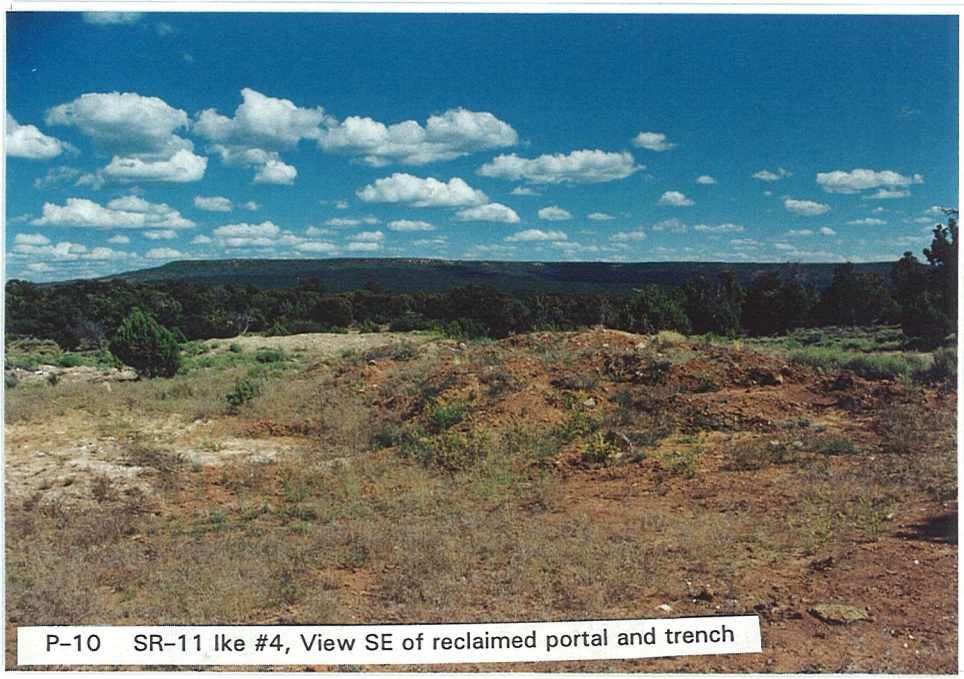


P-7 SR-10, View WSW at sideslope from E fence post

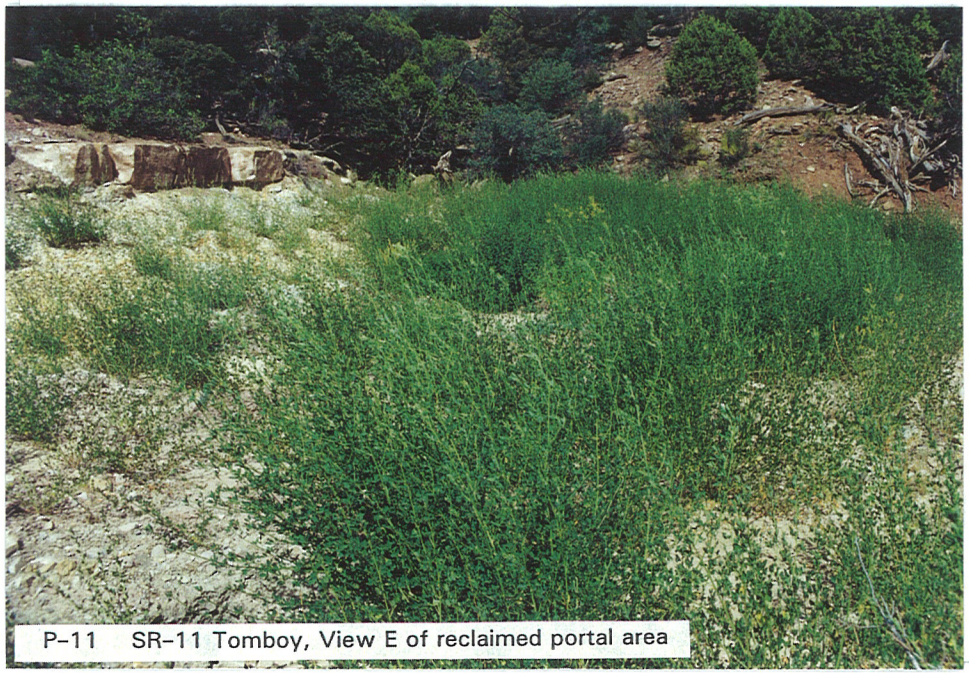


P-8 SR-11A, View ESE of reclaimed portal area (top)

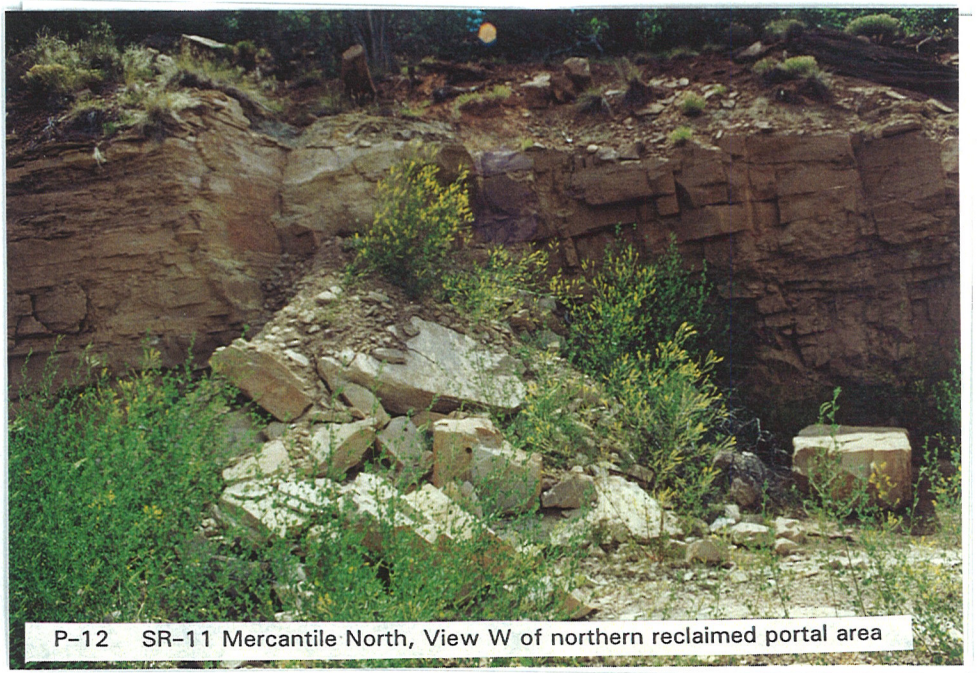
P-9 SR-11A, View WSW of reclaimed portal area (sideslope)



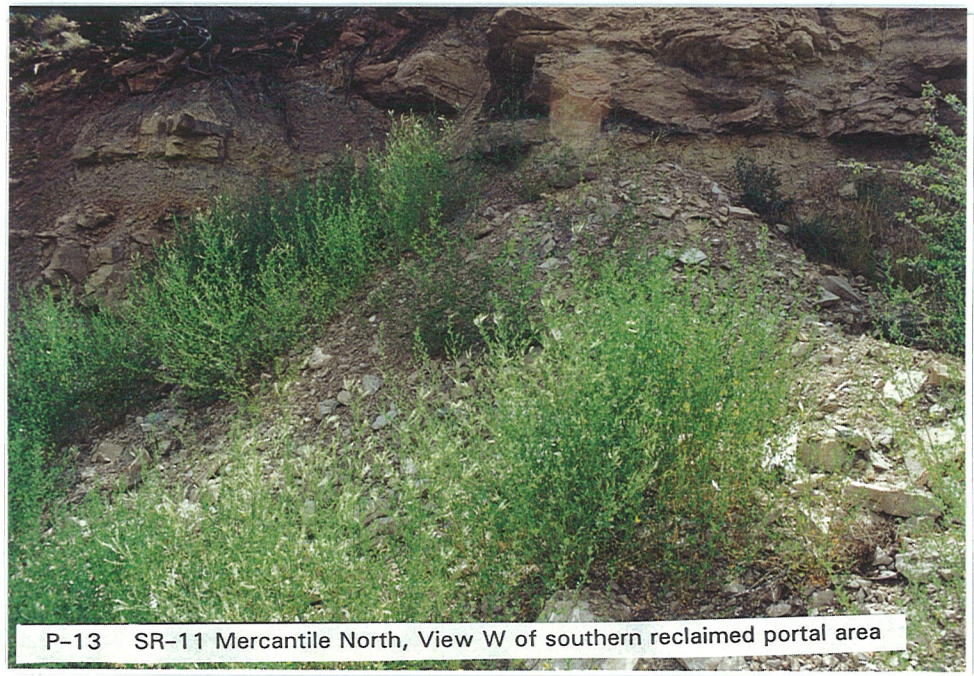
P-10 SR-11 Ike #4, View SE of reclaimed portal and trench



P-11 SR-11 Tomboy, View E of reclaimed portal area

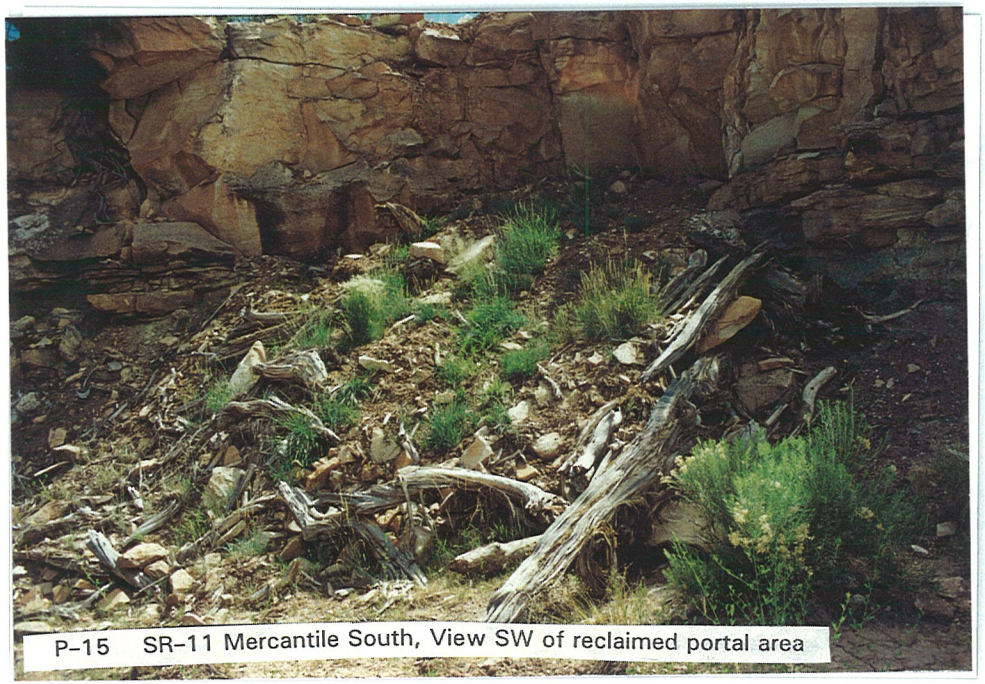


P-12 SR-11 Mercantile North, View W of northern reclaimed portal area



P-13 SR-11 Mercantile North, View W of southern reclaimed portal area

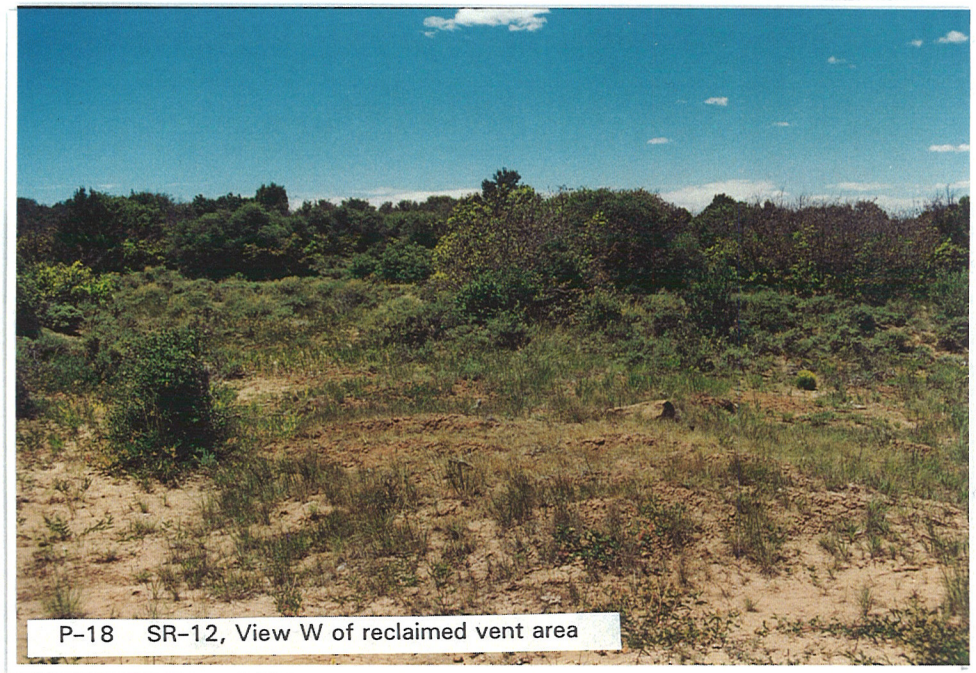
P-14 SR-11 Mercantile North, View N of reclaimed road



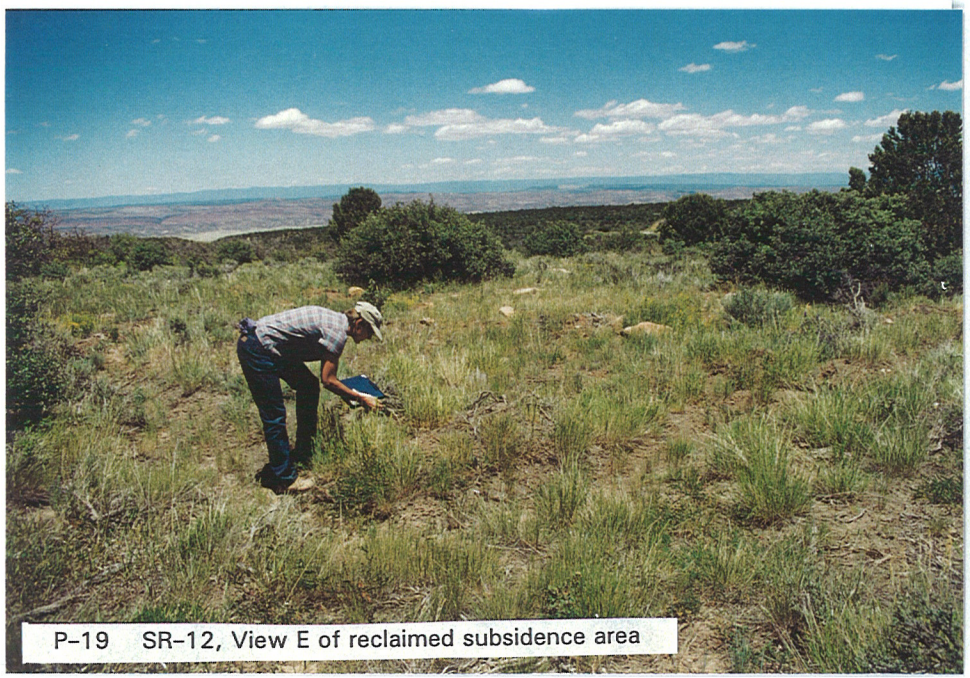
P-15 SR-11 Mercantile South, View SW of reclaimed portal area

P-16 SR-11 Mercantile South, View SE of reclaimed road

P-17 SR-11 Emma Lou, View SW from reclaimed portal area



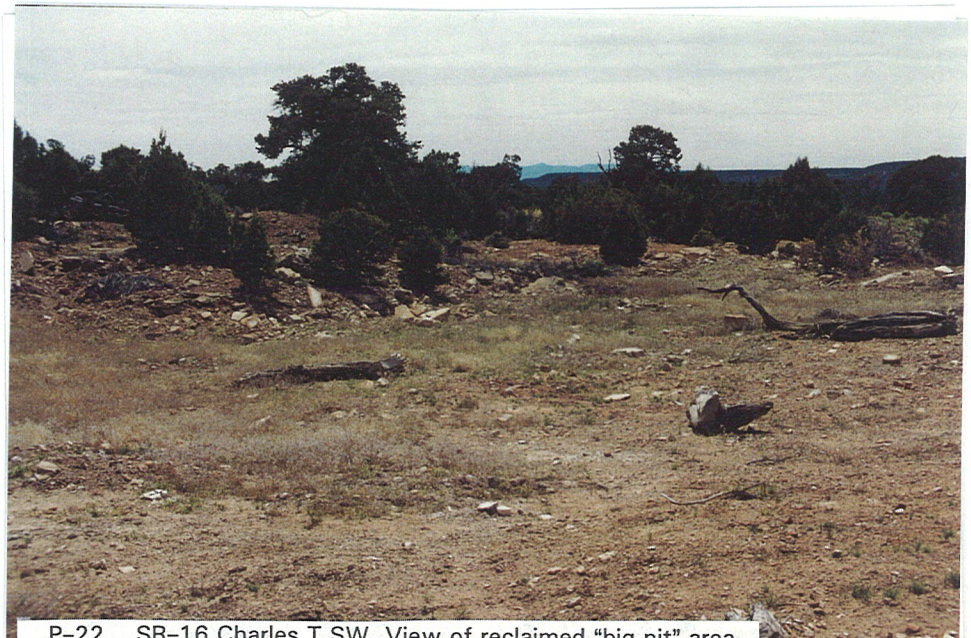
P-18 SR-12, View W of reclaimed vent area



P-19 SR-12, View E of reclaimed subsidence area

P-20 SR-16 Fraction #5, View NE of reclaimed road and portal areas

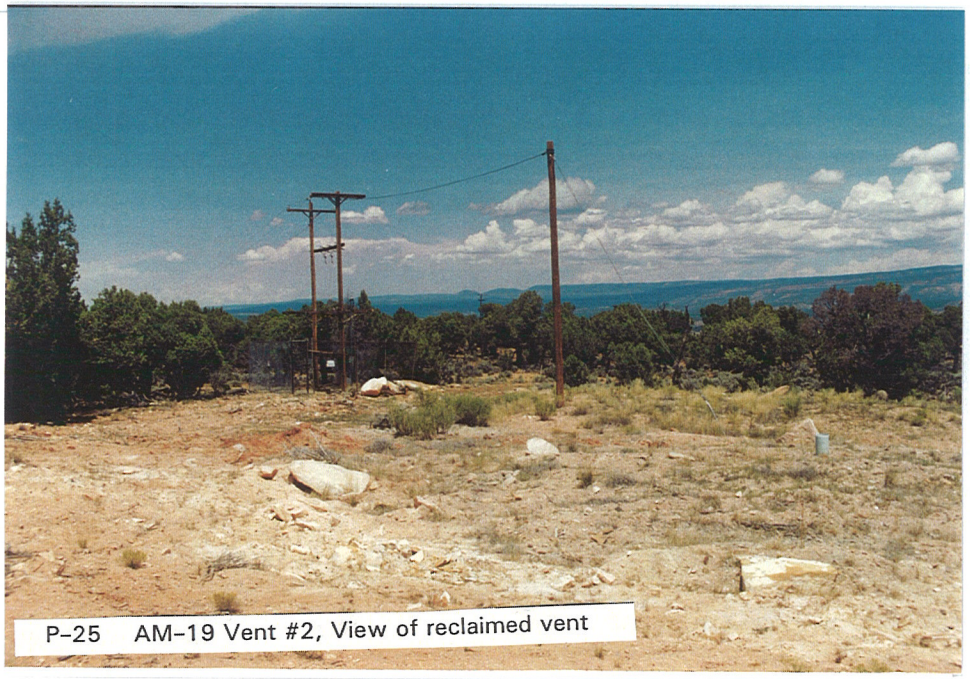
P-21 SR-16 Charles T SW, View ESE of reclaimed pit area and waste rock dump



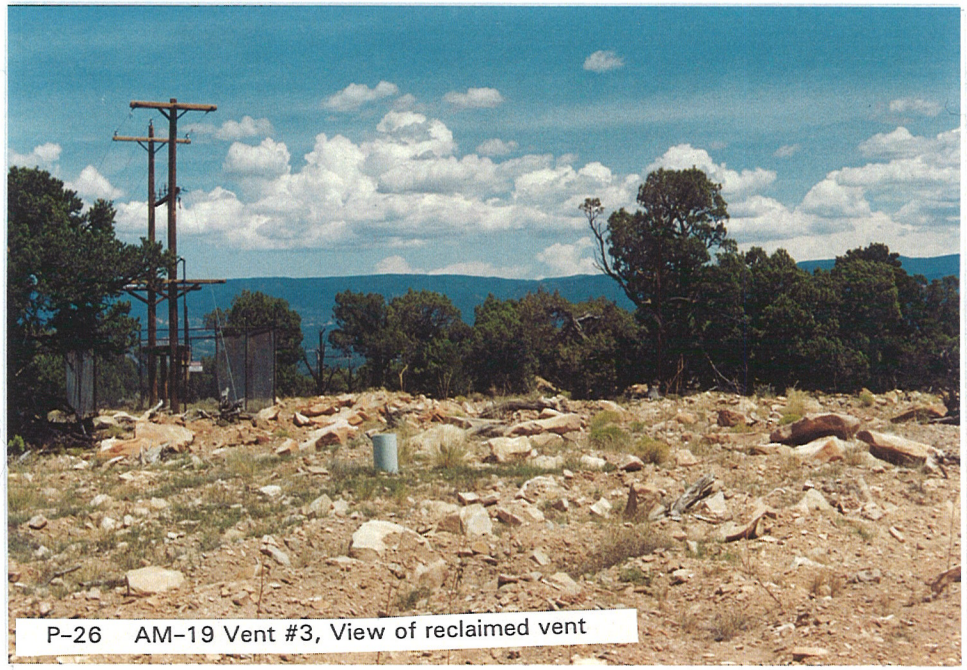
P-22 SR-16 Charles T SW, View of reclaimed "big pit" area

P-23 SR-16 Charles T SW, View NW of N incline trench

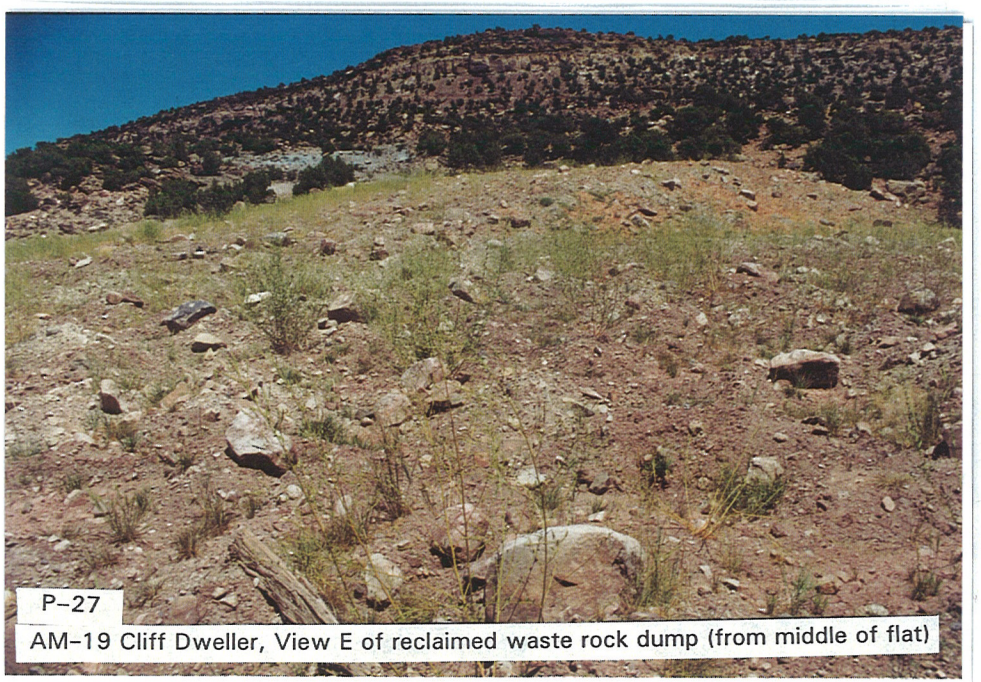
P-24 SM-18, View W of reclaimed water storage pond



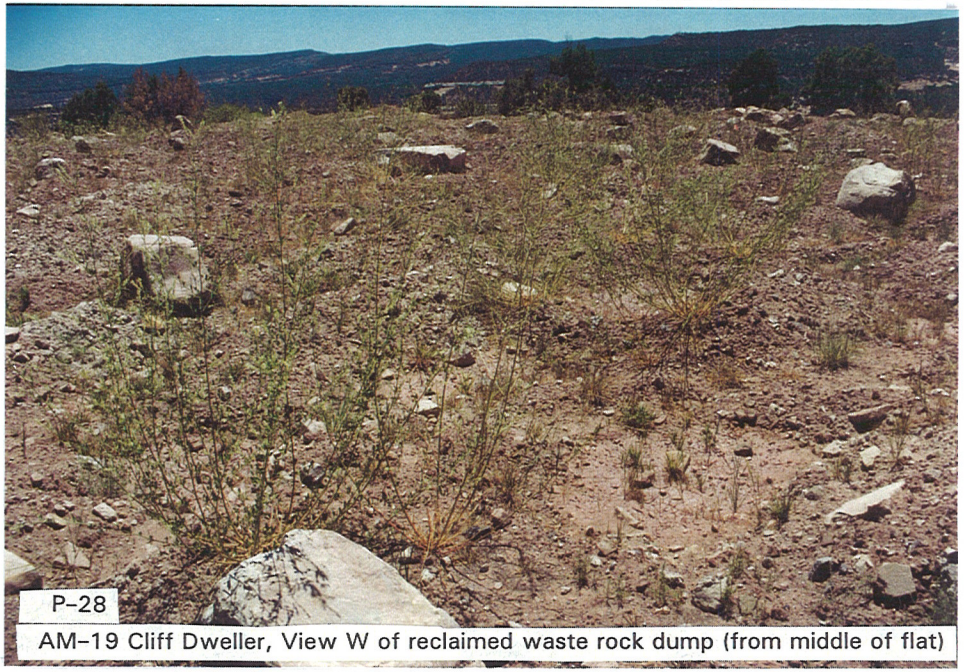
P-25 AM-19 Vent #2, View of reclaimed vent



P-26 AM-19 Vent #3, View of reclaimed vent

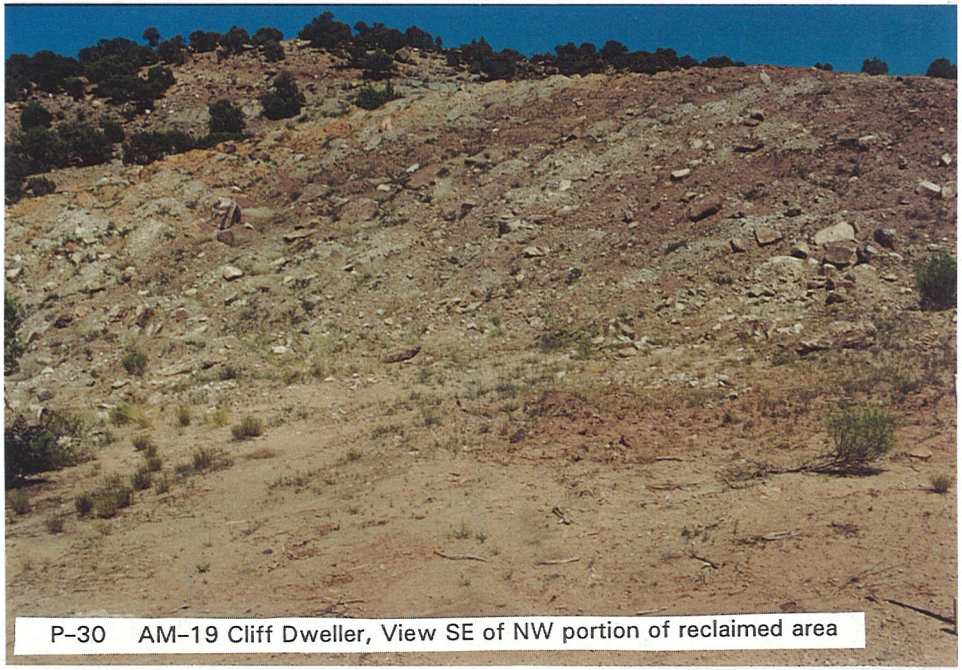


P-27
AM-19 Cliff Dweller, View E of reclaimed waste rock dump (from middle of flat)

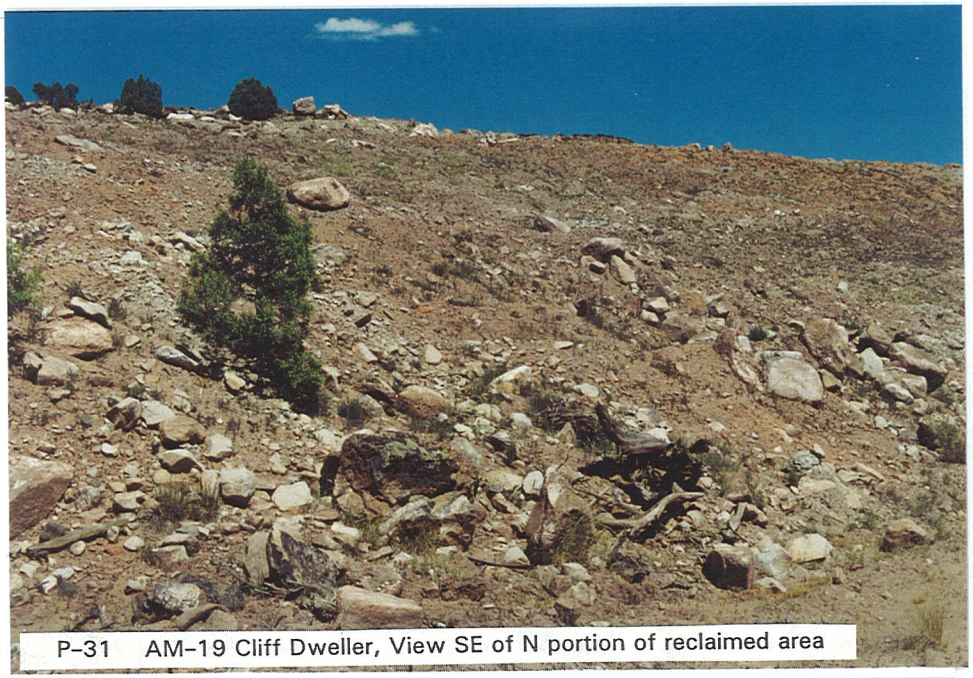


P-28
AM-19 Cliff Dweller, View W of reclaimed waste rock dump (from middle of flat)

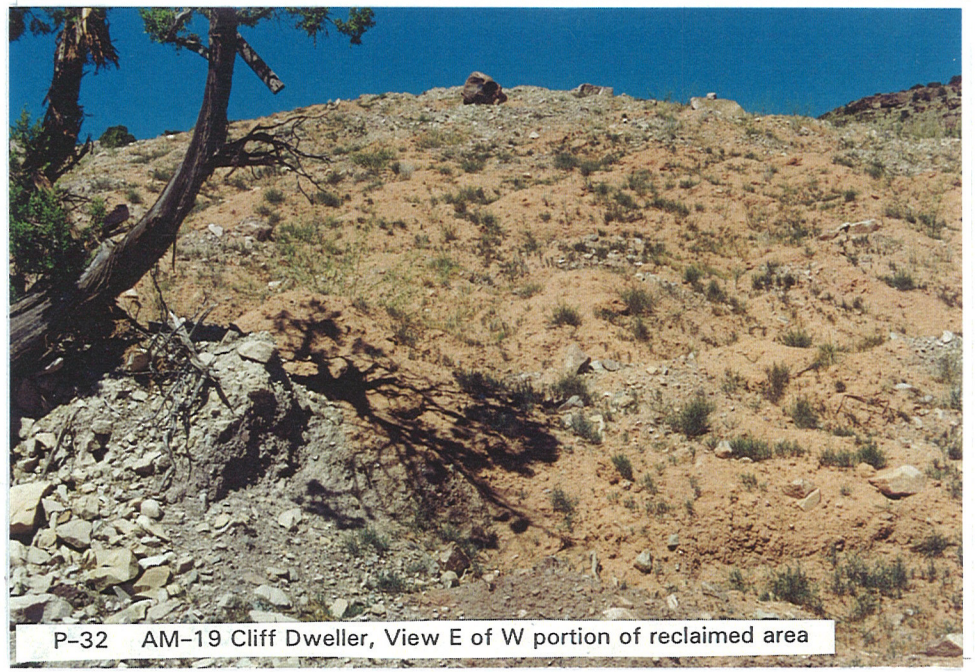
P-29 AM-19 Cliff Dweller, View N of S-facing hillslope



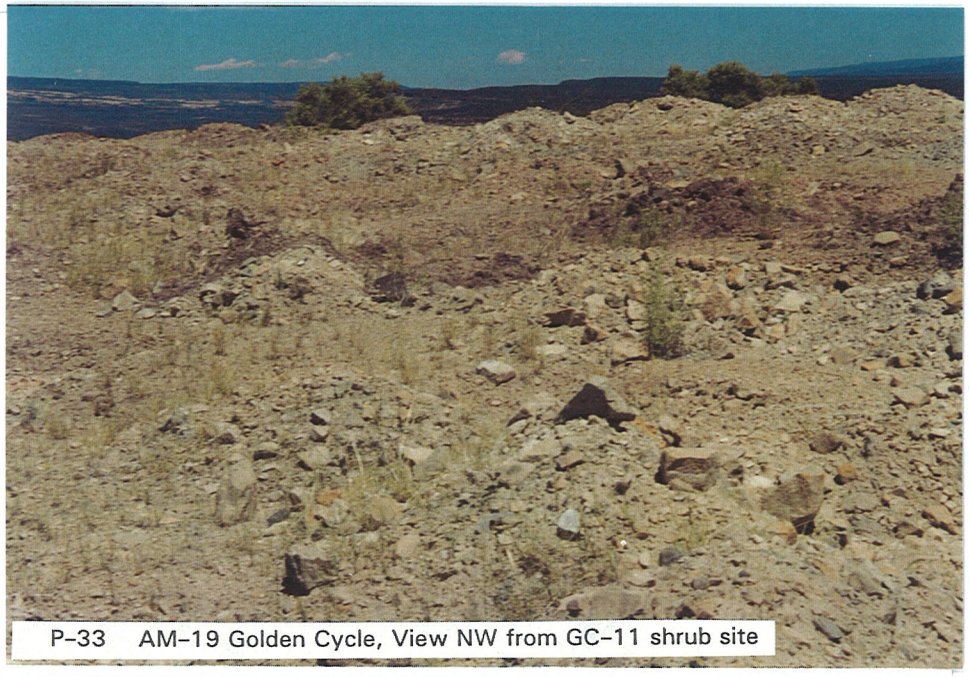
P-30 AM-19 Cliff Dweller, View SE of NW portion of reclaimed area



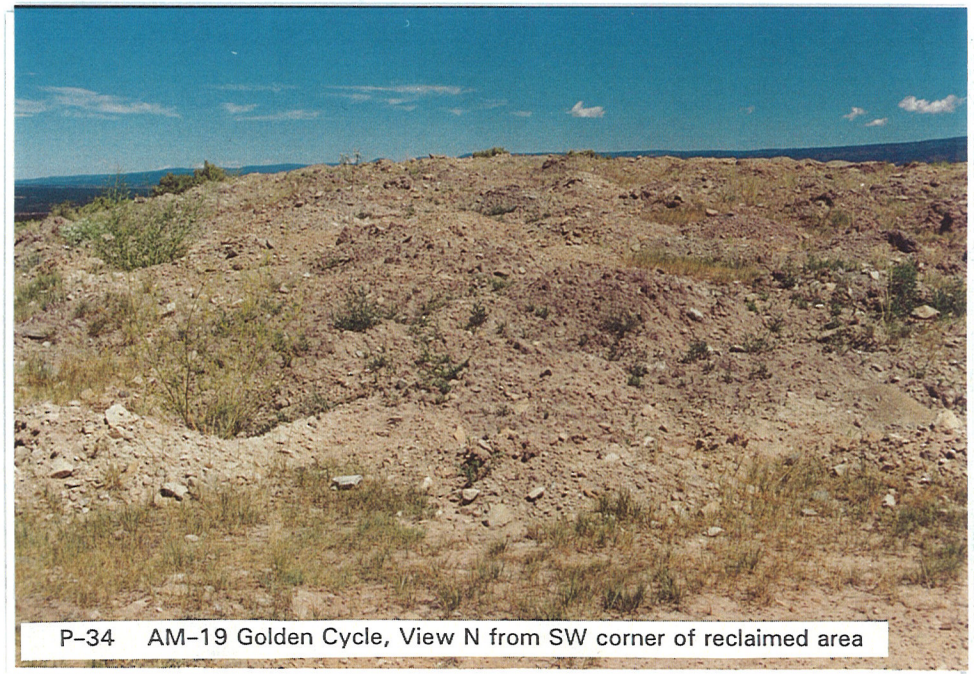
P-31 AM-19 Cliff Dweller, View SE of N portion of reclaimed area



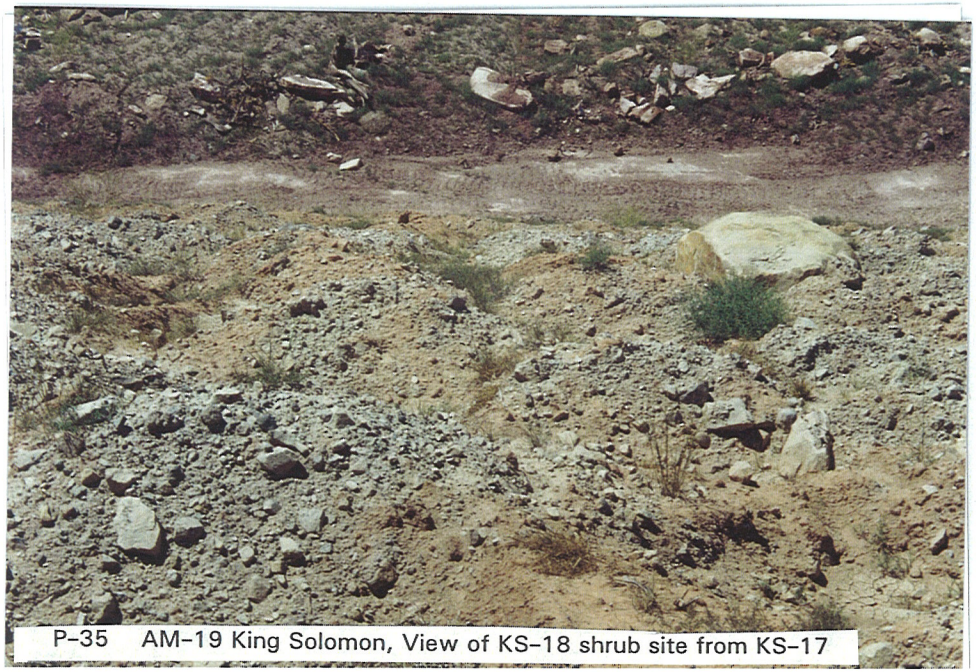
P-32 AM-19 Cliff Dweller, View E of W portion of reclaimed area



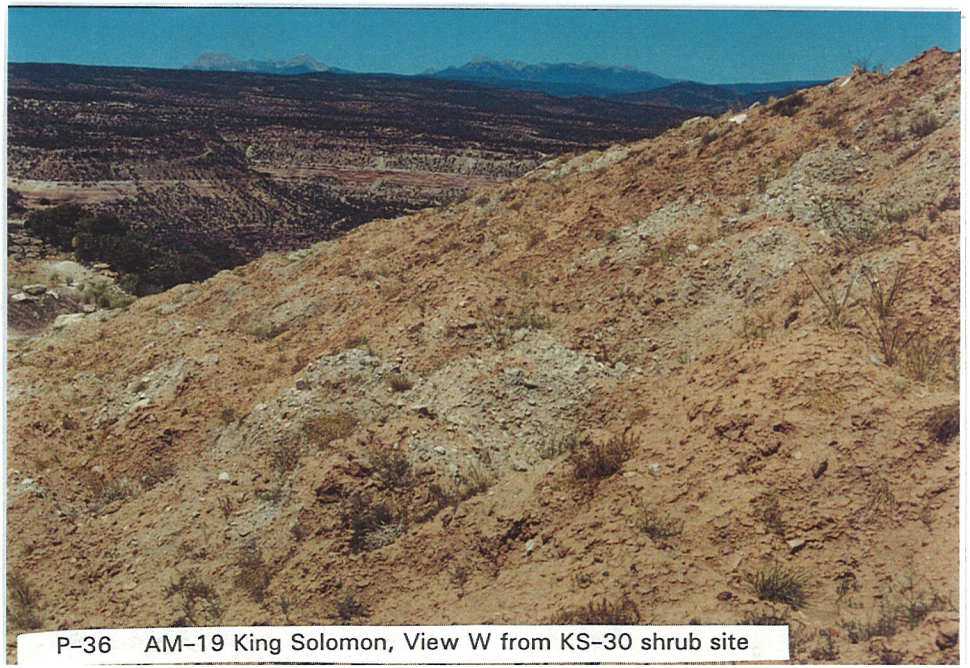
P-33 AM-19 Golden Cycle, View NW from GC-11 shrub site



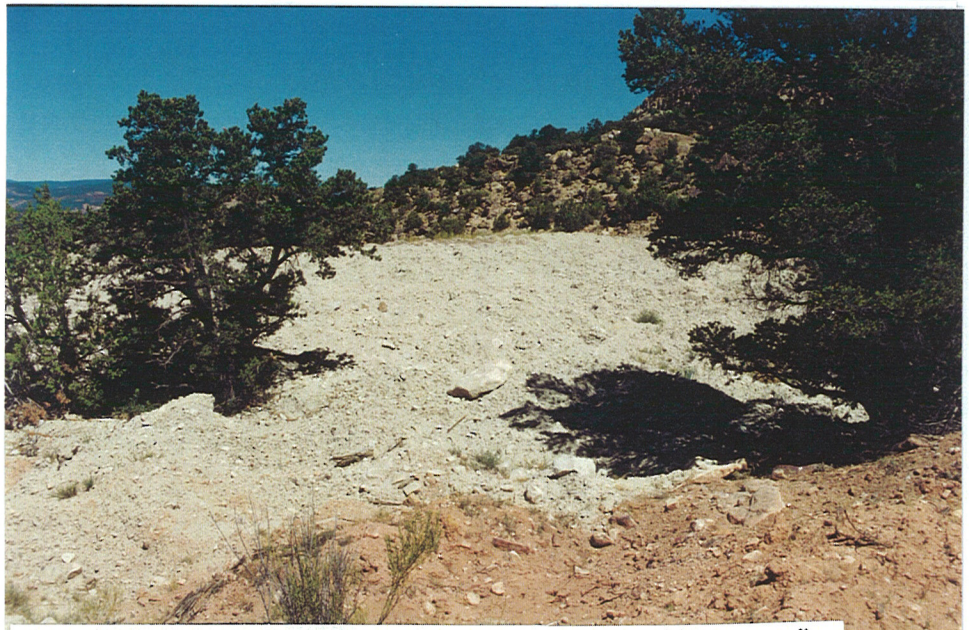
P-34 AM-19 Golden Cycle, View N from SW corner of reclaimed area



P-35 AM-19 King Solomon, View of KS-18 shrub site from KS-17



P-36 AM-19 King Solomon, View W from KS-30 shrub site

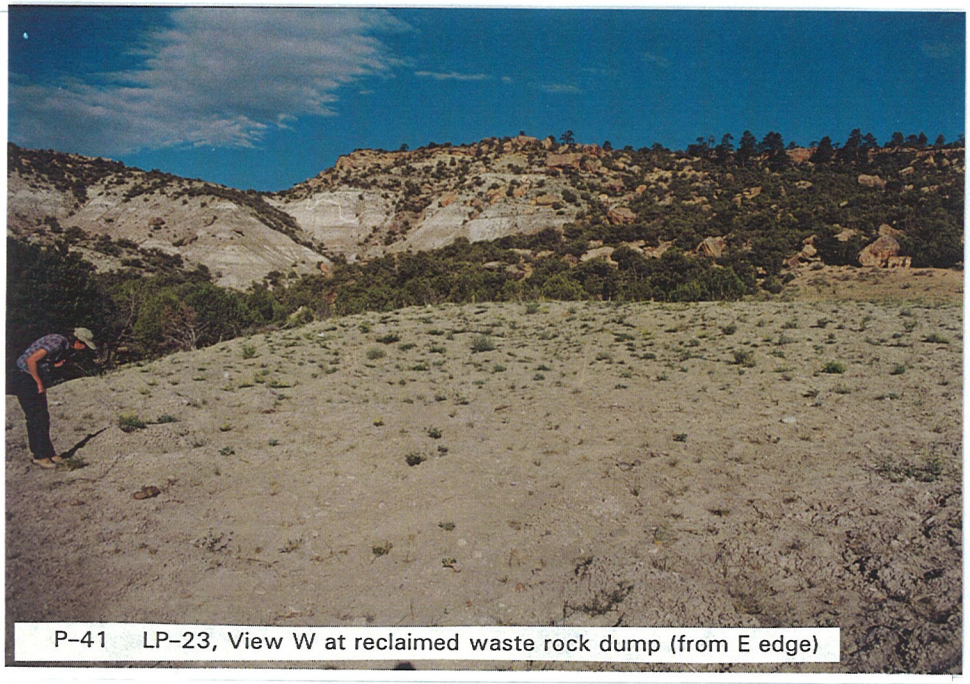


P-37 AM-19 King Solomon, View NW of top area with no topsoil

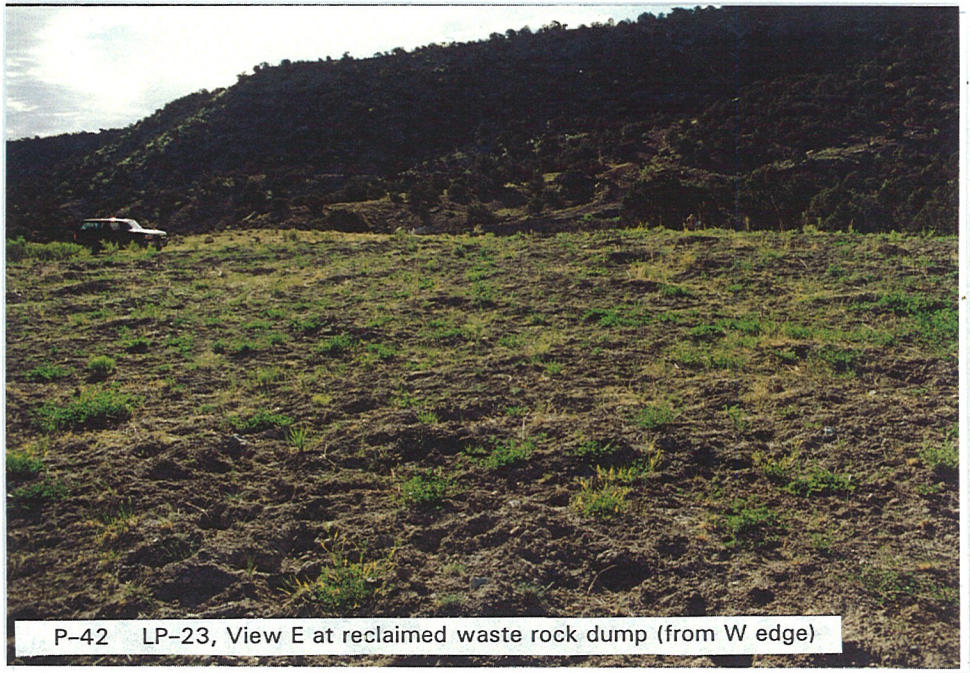
P-38 AM-19 King Solomon, View NW of top area with no topsoil

P-39 AM-19 Worcester Shaft, View S from WS-15 shrub site

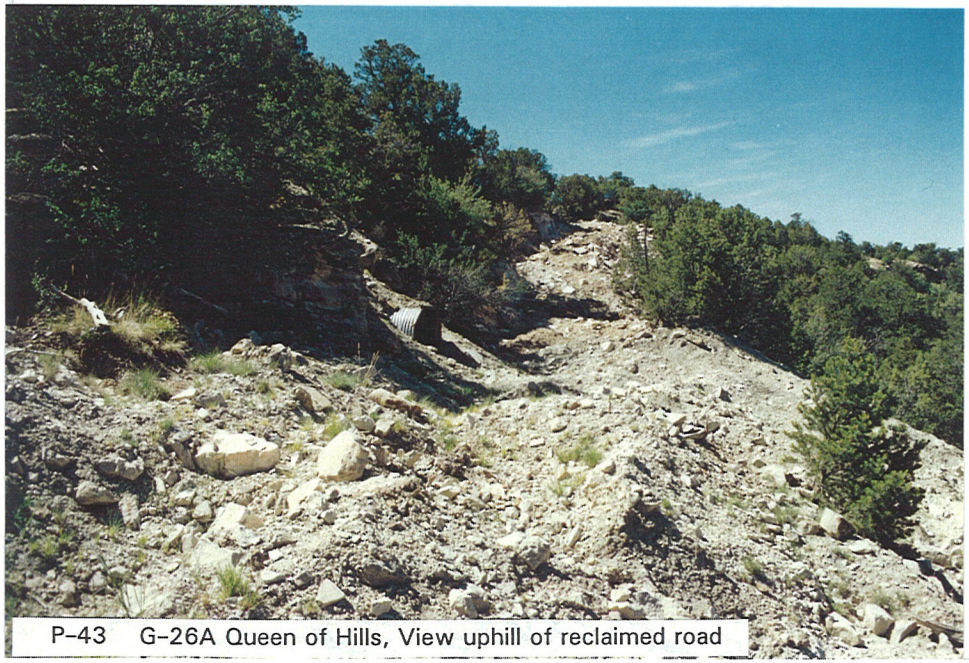
P-40 AM-19 Worcester Shaft, View SW from WS-10 shrub site



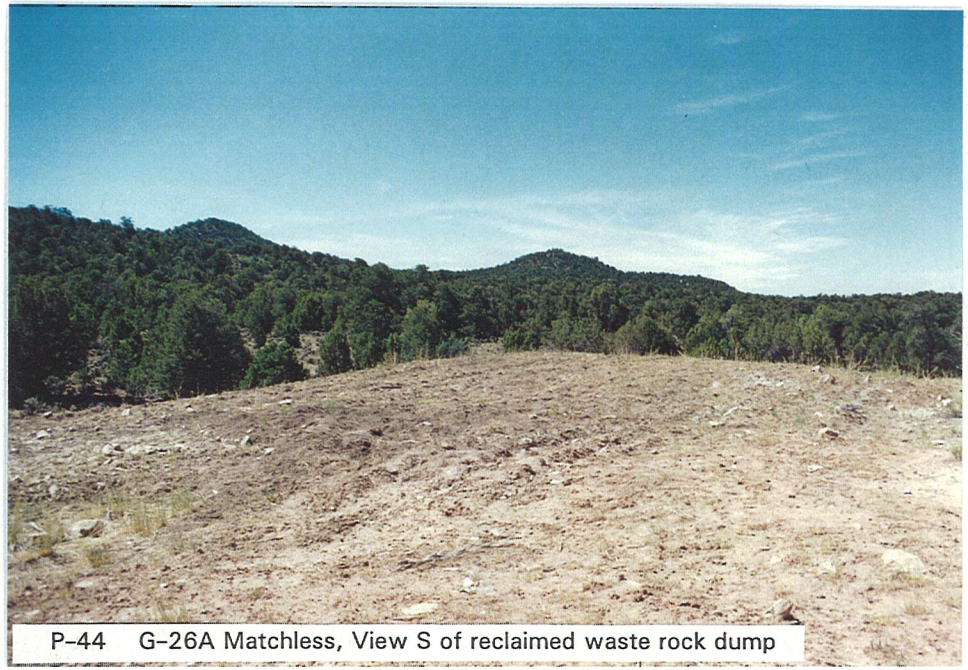
P-41 LP-23, View W at reclaimed waste rock dump (from E edge)



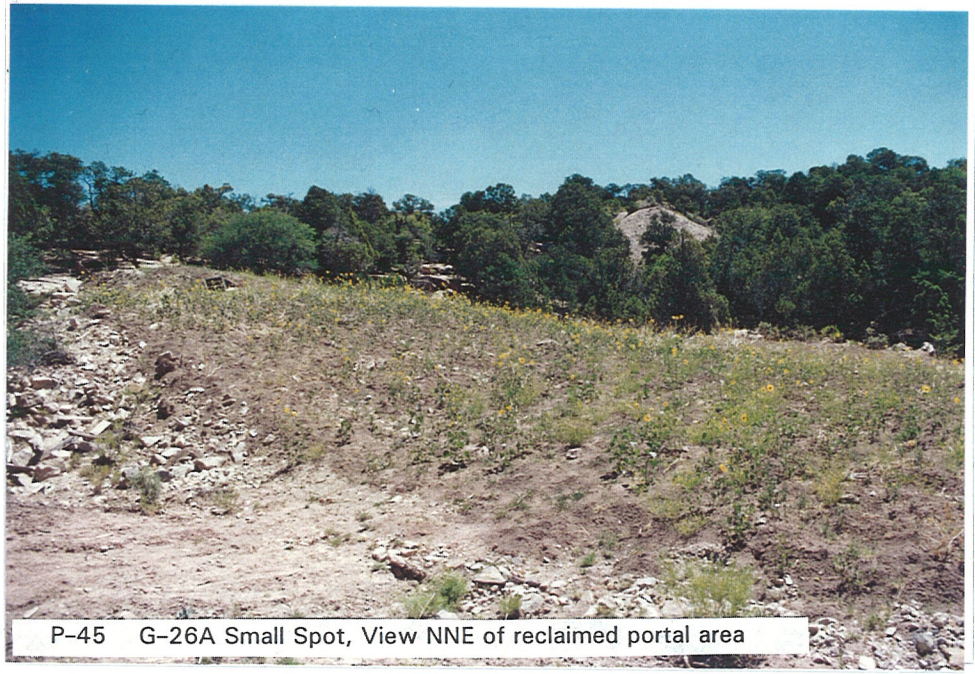
P-42 LP-23, View E at reclaimed waste rock dump (from W edge)



P-43 G-26A Queen of Hills, View uphill of reclaimed road



P-44 G-26A Matchless, View S of reclaimed waste rock dump

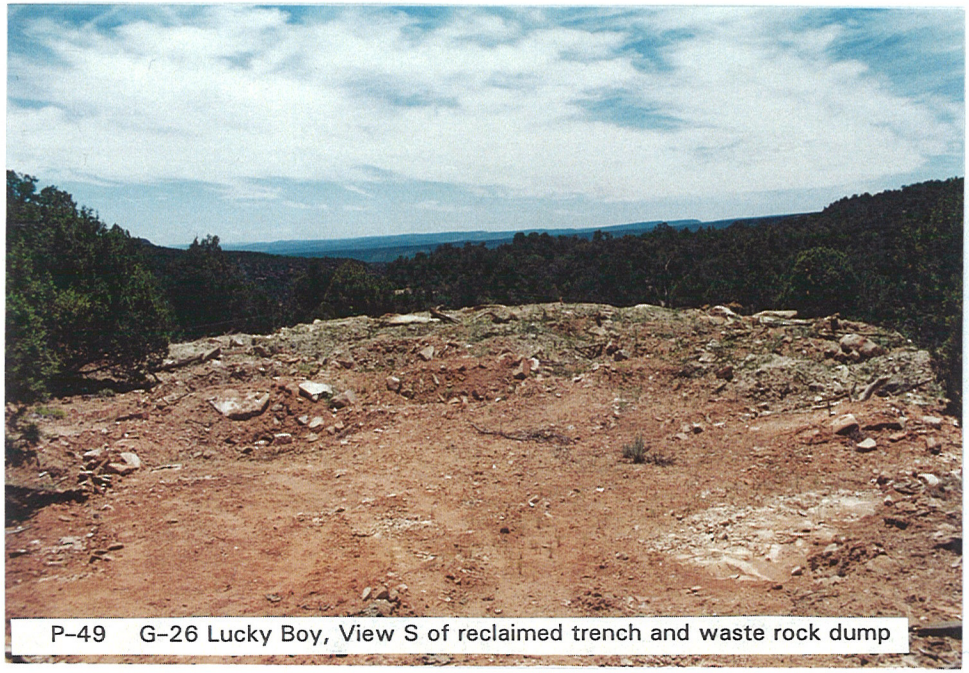


P-45 G-26A Small Spot, View NNE of reclaimed portal area

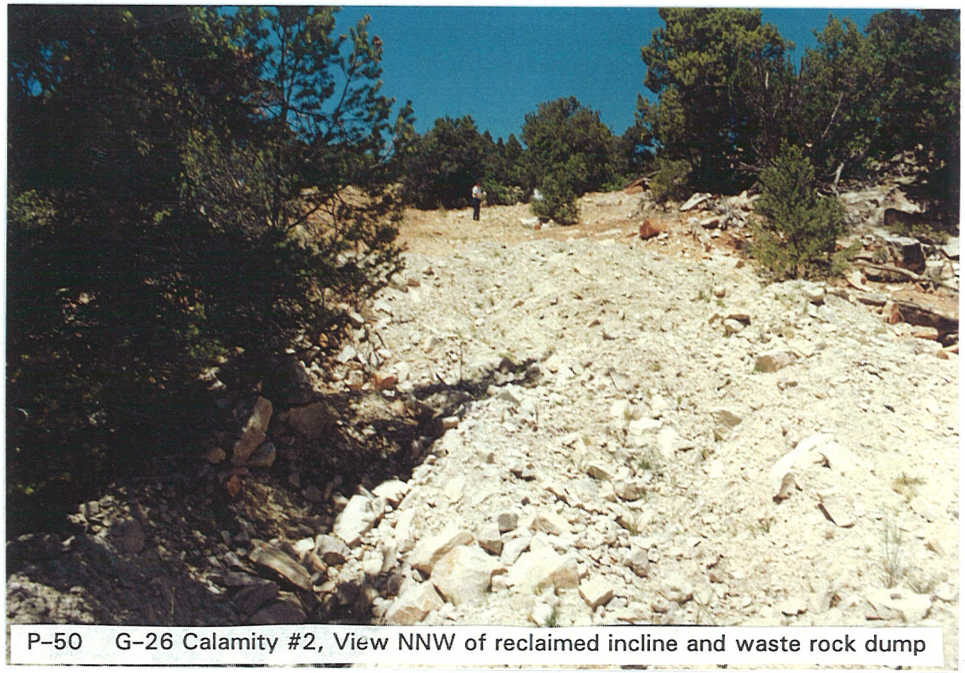
P-46 G-26A Hummer, View SSE of reclaimed mine workings

P-47 G-26A Sunflower, View W of reclaimed portal area

P-48 G-26 Blunder Mine, View S of reclaimed pit and waste rock dump



P-49 G-26 Lucky Boy, View S of reclaimed trench and waste rock dump



P-50 G-26 Calamity #2, View NNW of reclaimed incline and waste rock dump

P-51 Example of reclaimed road

2001 Reclamation Success Trip Report

Uranium Lease Management Program

September 2001

Prepared by Environmental Services Group
MACTEC–ERS

Document Number: Y0008400

1.0 Overview

Between late-May and late-July 2001, 55 sites on 16 U.S. Department of Energy (DOE) uranium lease tracts were assessed for reclamation success. The purpose of the assessment was to inspect vegetation establishment and soil stability to determine if the site had been successfully reclaimed. Once a lease tract is considered successfully reclaimed, it may be proposed for relinquishment to the U.S. Bureau of Land Management (BLM), upon which it may be returned to public domain. This trip report summarizes the results of the reclamation assessments.

To determine reclamation success, the following parameters were recorded at each site: 1) percent plant cover, 2) percent litter cover, 3) percent rock cover, 4) percent bare ground, and 5) erosion condition. Percent covers for plants, litter, rock, and bare ground were determined by ocular estimate. Erosion condition was determined by observing gullying; rilling; depth of soil removal around rocks, plants, or debris; pedestaling of stones or plants; and presence of flow patterns. On the basis of these observations, the site was then subjectively rated as stable, slightly eroding, moderately eroding, or severely eroding.

After conditions at the reclaimed sites were observed and recorded, they were compared with the conditions on adjacent, relatively undisturbed lands. Conditions that compared favorably were given a "reclamation success" descriptor of good, very good, or excellent, and conditions that compared unfavorably were given a descriptor of fair, poor, or very poor. The overall soil stability of the sites also was factored into the assessment. Table 1 summarizes the rankings and observations at each of the reclaimed sites. Copies of the field sheets are in Appendix A, and photographs of the reclaimed areas are in Appendix B. Section 2.0 provides details of the plant cover observed at each of the reclaimed mine sites, and Section 3.0 summarizes results of the reclamation assessments. Also in Section 3.0 is a table that summarizes the status of each of the evaluated mine sites.

2.0 Results and Recommendations

C–JD–5, Mineral Joe 4 Mine: Cotter Corporation recontoured and reclaimed the portal area and waste rock dump at the Mineral Joe 4 Mine in summer 1998. In July 1999, the portal area had 50 percent plant cover, and the reclaimed waste rock dump had 25 percent plant cover. Both areas were dominated by sweet clover and annual weeds such as lambsquarter and Russian thistle. The dominance of these species, typical of a first-year seeding, gave both areas a fair rating for reclamation success.

At the time of the June 2000 assessment, the reclaimed portal area and waste rock dump were still covered primarily by sweet clover, but the number and variety of perennial grasses had increased significantly. Reclamation success was considered very good at the portal area and good at the waste rock dump area.

Table 1. Summary of Site Conditions on Uranium Lease Tracts

Reclaimed Site	Date Reclaimed	Plant Cover (%)	Litter Cover (%)	Rock Cover (%)	Bare Ground (%)	Erosion Condition	Reclamation Success
C–JD–5, Mineral Joe 4	Summer 1998 by lessee	~50	~5	20	~25	Stable	Good
C–JD–7, Oversight Mine	1999 by Cotter for DOE	5–30	trace	20	50–75	Stable	Poor-Very Good
C–SR–10, Sam Mine	July 1996 by lessee Fall 1998 by DOE	30	5	10	55	Stable	Poor-Excellent
C–SR–11, Upper Brighton (waste rock dump & portal areas)	Summer 1999 by Cotter for DOE	15	2	30	53	Slight	Fair
C–SR–11, Lower Brighton	Summer 1999 by Cotter for DOE	20	10	10	60	Stable	Very Good
C–SR–11, Tomboy	Spring 1999 by Cotter for DOE	25	10	30	35	Slight	Good
C–SR–11, Dawson Incline	2000	~10–20	0	?	?	Stable	Fair
C–SR–13, various sites	June 2000 by lessee	10–20	0–10	20–35	50–70	Moderate	Fair
C–SR–14, Portal & Waste Rock Dump	October 2000 by DOE	15–20	0	20–35	50–60	Slight	Fair-Good
C–SR–16, Fraction #5	June 1999 by DOE	?	?	?	?	Stable	Good
C–SR–16, Charles T SW	June 1999 by DOE	40	10	30	20	Stable	Very Good
C–SR–16, Charles T SW north incline trench	June 1999 by DOE	40	5	35	20	Stable	Very Good
C–SR–16, Hawk Mine, P1 Site	June 2000 by Cotter for DOE	10	5	20	65	Stable	Fair
C–SR–16, Hawk Mine, P2 Site	June 2000 by Cotter for DOE	12	trace	20	68	Stable	Fair
C–SR–16, Hawk Mine, P3 Site	June 2000 by Cotter for DOE	10	5	30	55	Stable	Fair
C–SR–16, Hawk Mine, P4 Site	June 2000 by Cotter for DOE	20	5	5	70	Stable	Fair
C–SR–16, Hawk Mine, P5 Site	June 2000 by Cotter for DOE	20	2	15	63	Stable	Fair
C–SR–16, Hawk Mine, P6 Site	June 2000 by Cotter for DOE	15	5	10	70	Stable	Good

Table 1 (continued). Summary of Site conditions on Uranium Lease Tracts

Reclaimed Site	Date Reclaimed	Plant Cover (%)	Litter Cover (%)	Rock Cover (%)	Bare Ground (%)	Erosion Condition	Reclamation Success
C–SR–16, Hawk Mine, P7 Site	June 2000 by Cotter for DOE	15	5	5	75	Stable	Fair
C–SR–16, Hawk Mine, P8 Site	June 2000 by Cotter for DOE	10–20	2	15	63–73	Stable	Good
C–SM–18 pond area	Fall 1995 by lessee Fall 1998 by lessee	35	10	10	40	Stable	Fair-Good
C–AM–19, Golden Cycle Mine	1978 by lessee Nov 1998 by DOE	25	5	40	30	Stable	Good
C–AM–19, Worcester Shaft	Spring 1999 by DOE	25	trace	40	35	Stable	Fair
C–AM–19, Cliff Dweller waste rock dump, flat area	Dec 1998 by lessee	35	trace	20	45	Stable	Good
C–AM–19, Cliff Dweller waste rock dump, hillside area	Dec 1998 by lessee	30	trace	40	30	Stable	Poor-Fair; Poor in newly topsoiled area
C–AM–19, King Solomon	Dec 1998 by lessee	25	trace	20	55	Stable	Fair; Poor on newly topsoiled area
C–LP–22A, TNT #1	Summer 1999 by Cotter for DOE	?	?	?	?	Stable	Very Good
C–LP–22A, TNT #2	Summer 1999 by Cotter for DOE	?	?	?	?	Stable	Good
C–LP–22A, TNT #3	Summer 1999 by Cotter for DOE	?	?	?	?	Stable	Fair
C–LP–23	Fall 1998 by DOE	?	?	?	?	Stable	Good
C–CM–25, O.S. Shaft	Summer 1999 by Cotter for DOE	45	5	10	40	Stable	Good
C–CM–25, Shadduck Den Shaft	Summer 1999 by Cotter for DOE	25	10	25	40	Stable	Fair
C–CM–25, Borrow Area	Summer 1999 by Cotter for DOE	40	5	20	35	Stable	Good
C–G–26, Blunder Mine	Summer 1999 by UMETCO for BLM	35	trace	35	30	Stable	Excellent
C–G–26, Lucky Boy Mine	Summer 1999 by UMETCO for BLM	45	trace	35	20	Stable	Very Good

Table 1 (continued). Summary of Site conditions on Uranium Lease Tracts

Reclaimed Site	Date Reclaimed	Plant Cover (%)	Litter Cover (%)	Rock Cover (%)	Bare Ground (%)	Erosion Condition	Reclamation Success
C–G–26, Calamity #2 Portal & Waste Rock Dump	May 1999 by DOE	25–30	trace	30–60	15–40	Stable	Very Good
C–G–26, Calamity #13 South	Summer 2000 by DOE	15	trace	35	50	Stable	Fair
C–G–26, Calamity #13 Center East	Summer 2000 by DOE	18	trace	40	42	Stable	Fair
C–G–26, Calamity #17 South	Summer 2000 by DOE	15	trace	35	50	Stable	Fair
C–G–26, Calamity #17 North	Summer 2000 by DOE	15	trace	40	45	Stable	Fair
C–G–26, Calamity #18	Summer 2000 by DOE	25	trace	15	60	Stable	Fair
C–G–26, Calamity #21	Summer 2000 by DOE	25	trace	30	45	Stable	Fair
C–G–26, Calamity #25	Summer 2000 by DOE	25	trace	25	50	Stable	Fair
C–G–26, Calamity #28	Summer 2000 by DOE	20	trace	?	?	Stable	Fair
C–G–26, Stock Pond Borrow Area	Summer 2000 by DOE	40–50	trace	trace	50–60	Stable	Very Poor
C–G–26/26A, Topsoil Borrow Area	Summer 2000 by DOE	40	trace	trace	60	Stable	Poor
C–G–26A, Queen of Hills, Portals 1,2,3,4,5	May 1999 by DOE	28	trace	50	22	Stable	Very Good
C–G–26A, Small Spot	May 1999 by DOE	50	trace	10	40	Stable	Fair
C–G–26A, Matchless	May 1999 by DOE	40	trace	10	50	Stable	Fair
C–G–27, Ronnie #1	July 1999 by DOE	45	10	10	35	Stable	Fair
C–G–27, G–1/G–1A	July 1999 by DOE	35	15	10	40	Stable	Fair
C–G–27, BLM Subsidence at Climax Camp	July 1999 by DOE	--	--	--	--	Stable	Very Good
C–G–27, Neglected Claim	July 1999 by DOE	--	--	--	--	Stable	Good
C–G–27, Mesa #5	Summer 2000 by Cotter for BLM	25	trace	10	65	Stable	Poor
C–G–27A, G-2 Mine	July 1999 by DOE	50	3	10	37	Stable	Excellent
C–G–27A, Hansen Claim	July 1999 by DOE	30	5	10	55	Stable	Very Good

By the time of the June 2001 assessment, cover by sweet clover had dramatically decreased, and cover by seeded species and cheatgrass had increased. Both areas are now considered successfully restored.

C–JD–7, Oversight Mine: This area was reclaimed by Cotter Corporation in spring 1999. In June 1999, the lower bench of the Oversight Mine was visited to look at Cotter Corporation's reclamation effort. Inspectors noted that surface water runoff above the reclaimed, pocked sideslope was collecting, channelizing, and then flowing down the pocked sideslope, creating gullies in the process.

In spring 2000, DOE–GJO rerouted surface runoff away from the pocked sideslope by constructing diversion ditches and water bars on the reclaimed areas above the mine site. Another diversion ditch was constructed across the lower bench to divert on-site water to an undisturbed area of the mine site. At the time of the June 2000 inspection, the diversions appeared to be functioning well, as no new erosion was observed, and the pre-existing gullies were filling in.

In 2000, vegetative cover on the pocked sideslope was dominated by sweet clover and rated as fair. The west-facing portion of the sideslope was 99-percent bare and rated as poor. This area likely consists of poorer soils than the more vegetated areas. In June 2001, vegetative cover on this west-facing slope continued to be rated as poor. Vegetative cover and species diversity were rated as very good on the extreme west end of the slope and rated as fair on the east end of the slope. Photo P–1 in Appendix B shows site conditions. This site should be evaluated again in 2002 to determine if corrective action is needed on the west-facing portion.

C–JD–9: This lease tract was visited during the reclamation assessment to assess the success of Cotter Corporation's noxious weed control efforts on in the land slump area and on the top side of the lease tract by the shed and pond. Russian knapweed, Canada thistle, and musk thistle were located in the land slump area, and musk thistle was located by the shed and pond in 1999. At the land sump area, no musk thistle was found, only one plant of Canada thistle was found in the hill-side riparian area, and several small patches of Russian knapweed were found on the lower east portion of the slump. On the top side of the lease tract, one musk thistle was found on the corner of the pond nearest the sheds. In addition to these weeds, inspectors noted that the number of tamarisk plants on the slump area has increased in the last several years. Tamarisk is now on the San Miguel Basin noxious weed list. It is recommended that Cotter Corporation spray the infested areas, including the tamarisk area, in 2001 and that another compliance visit be made in 2002.

C–SR–10, Sam Mine, Waste Rock Dump: This site, originally seeded in 1993, was composed of 90–98 percent bare ground in August 1995 (Rust Geotech Inc. 1995). In July 1996, the lessee backfilled the top area with 3–4 inches of soil borrowed from a local sediment pond and reseeded. At the time of the July 1997 inspection, the top area contained 20–30 percent bare ground and had a vegetative cover of approximately 65 percent cheatgrass in addition to traces of other weeds and seeded species. It was hypothesized that the backfilled soil contained a significant amount of cheatgrass seed.

At the time of the July 1998 inspection, the amount of seeded grass species had increased from 3 to 15 percent, and the amount of cheatgrass had decreased from 65 to 45 percent.

In November 1998, DOE–GJO reseeded the mine site and divided the site into six test plots, with the intent to casually observe the differences in reclamation success over time from the application of different reclamation treatments. Results of that study are in the *2000 Reclamation Success Trip Report* (MACTEC–ERS 2000).

The top, flat portion of this site is considered successfully restored. The upper portion of the sideslope has had limited success—total vegetative cover is good (30 percent), but cheatgrass composes 10 percent of the cover. As has occurred on the top portion, this percentage is likely to decrease over time as the perennial seeded grasses become established. Photo P–2 shows vegetative cover on the upper portion of the sideslope. This area also is considered successfully restored.

The lower sideslope of the mine site has never successfully revegetated. In summer 2001, Cotter Corporation, in lieu of paying royalties to DOE, pocked and reseeded the slope. Because this area continues to be composed primarily of rock, the potential for revegetation success is low. However, the pocking will serve to stabilize the surface material and prevent future gullying. It is recommended that this site be considered successfully restored, but that inspectors visit the site from time to time to monitor vegetative growth on the lower sideslope.

C–SR–11: Several mine sites on this lease tract were reclaimed in spring and summer 1999 by Cotter Corporation in lieu of paying royalties to DOE. They were visited in June 2000 and again in June 2001. Following are descriptions of those mine sites.

Upper Brighton: No topsoil was available for this steep site and as a result, plant cover has been considered poor in 2000 and 2001. Eighty percent of the cover is composed of rock. Photo P–3 shows site conditions in June 2001. In August 2001, DOE–GJO began new reclamation efforts at the site—topsoil was imported and the site was re-pocked. This site should be visited in 2002 to observe the results of the new reclamation efforts.

Lower Brighton: Minimal topsoil was backfilled onto this site. However, after 1 year of growth, the site had a 50 percent plant cover. Most (45 percent) of the cover was composed of sweet clover, and the remainder was composed of weedy species. Reclamation success was rated as fair. When the site was revisited in June 2001, the percentage of sweet clover and annual weeds was significantly less, and the percentage of seeded species was significantly greater; reclamation success was rated as very good. This site is considered successfully reclaimed and does not need to be revisited. Photo P–4 shows site conditions.

Tomboy: In June 2000, this site was dominated by sweet clover (10–30 percent cover) and reclamation success was rated as fair. At the time of the 2000 inspection, a portion of the site had been washed out from an upstream pond overflow. The wash-out was repaired in July 2000. The June 2001 visit confirmed that the erosion repair was successful. Vegetative cover had also improved—the percentage of sweet clover had decreased to 7 percent, and the diversity and number of desirable species had increased significantly. This site is now considered successfully reclaimed and does not need to be revisited. Site conditions are shown in photo P–5.

C–SR–11: Numerous other mine sites on this lease tract were reclaimed at the same time as the Brightons and Tomboy. They were visited in June 2000 to assess first-year vegetative growth and erosion condition and were deemed "not yet successfully reclaimed" but successful enough to not visit again until 2002. Following are short descriptions of these mine sites ***as described in 2000***.

Ike #1: Half the total plant cover (15 percent) was composed of sweet clover, and the other half was composed of seeded grasses, cheatgrass, and annual forbs. Although reclamation success was rated as fair after 1 year of growth, the site has excellent potential because of the presence of topsoil. The site is stable and should be evaluated again in 2002 to confirm that it has successfully revegetated.

Ike #3: This site was considered in poor condition because of the predominance of annual weedy species such as Russian thistle, gray thistle, mustards, kochia, and cheatgrass. They composed approximately half of the 35-percent cover; the other half was composed of sweet clover. These weedy species will help protect the site from erosion and will provide a good cover for the establishing seeded grasses. Because of the presence of topsoil, this site has excellent potential for successful revegetation. It should be reevaluated in 2002.

Ike #4: When the former waste rock dump, portal, and trench were reclaimed and pocked, topsoil was available for the portal and trench areas only. A significant difference in first-year vegetation was noted because of this difference. The waste rock dump area had 5 percent total cover, whereas the portal and trench areas had 35 percent cover. None of the areas had an erosion problem. All of these sites should be reevaluated in 2002.

Park: Despite the presence of topsoil at this site, only 10 percent plant cover was achieved after 1 year of growth. However, plant diversity was relatively high, and few weedy species were present, which resulted in a fair rating for reclamation success. The pocks are effectively controlling erosion. This site should be evaluated again in 2002.

Mercantile North: No topsoil was available for backfill at this site. However, plant cover was 40 percent, 35 percent of which was sweet clover. Several different grass species also were present. Reclamation success was rated as fair. This site should be reevaluated in 2002.

Emma Lou: Reclamation success was rated as good for this site due to the 45 percent plant cover, diversity of species, and stable condition of the topsoil. This site did not have to be revisited, as it was considered successfully reclaimed in 2000. However, it would be interesting, from a plant succession point of view, to visit the site in 2002 to determine if the cheatgrass cover (15 percent) has decreased.

C–SR–11, Dawson Incline: This mine site was reclaimed in 2000 by Cotter Corporation. After 1 year of growth, this site contained a good diversity of vegetation but had a total cover of only 10–20 percent, which included cover by annual weeds. No erosion was noted. This site should be visited again in 2002.

C–SR–13: A number of mine sites on this lease tract were reclaimed by the lessee, Don Coram, in June 2000. A particularly brave and skilled trackhoe operator assisted the lessee in the reclamation work and contributed significantly to the success of the regrading effort at these sites. He probably should be awarded another gold star for his 4-wheeler helmet, which, by the

way, he wears continually—even off the 4-wheeler—in order to set a good example for other employees. Reclamation success was rated as fair at all the newly reclaimed sites and, with the exception of one area, erosion was not a problem. A few rills have developed near the first mine site where water is channeled down a steep slope. Photos P–6 through P–8 show site conditions. These areas should be visited again in 2002 to determine if they are successfully reclaimed.

C–SR–14: The waste rock dump and portal on this lease tract were reclaimed in October 2000 by DOE–GJO. After 1 growing season, reclamation success was rated as fair on the waste rock dump and good on the portal area. Although soil has eroded on site into small basin areas, no off-site erosion has occurred. Site conditions are shown in photos P–9 and P–10. These areas should be visited again in 2002 to determine if they are successfully reclaimed.

C–SR–16: Three mine sites on this lease tract were reclaimed by DOE–GJO in June 1999. Minimal topsoil was available for backfill. They were visited in June 2000 and again in June 2001 to assess reclamation success. Following are descriptions of each mine site.

Fraction #5: In June 2000, with an 8 percent plant cover, this mine site was considered to be in fair condition, primarily because a diversity of seeded grasses was observed, and the site was free of weeds. Although erosion was occurring within the pocks themselves, soil was not actively eroding off site. By June 2001, plant cover and species diversity had increased, and the site was considered successfully reclaimed. This site does not need to be revisited.

Charles T SW: In 2000, total plant cover was 30–35 percent, most of which was cheatgrass and Regreen, the seeded annual cover crop. In June 2001, total cover had increased to 40 percent. Although cheatgrass remained dominant at the site, numerous other desirable species had become established to warrant a reclamation success rating of good. Erosion is not a concern at this site, as slopes are no greater than 3–5 percent. This site is considered successfully reclaimed and does not need to be revisited.

Charles T SW, North Incline Trench: Like the preceding mine site, this site's 30-percent plant cover in 2000 was composed almost entirely of cheatgrass and Regreen. Reclamation success was rated as fair. By 2001, total plant cover had increased to 40 percent, and species diversity had significantly increased. This site is considered successfully reclaimed and does not need to be revisited.

C–SM–16, Hawk Mine: Numerous portals, shafts, and waste rock dumps on this mine site were reclaimed in June 2000 by Cotter Corporation in lieu of paying royalties to DOE. For construction and tracking purposes, individual features on this mine site were labeled as Sites P1 through P8. After one season of growth, reclamation success on Sites P6 and P8 was rated as good, and reclamation success on all the other sites was rated as fair. Total vegetative cover ranged from 10 to 20 percent. Because all sites were backfilled with topsoil, the potential for future reclamation success is excellent. These sites should be visited again in 2002 to confirm that they are successfully reclaimed. Current conditions at Sites P1 through P8 are shown in photos P–11 through P–18, respectively.

C–SM–18: The mine-water storage pond on this lease tract was reclaimed in fall 1995. In July 1997, the site was composed primarily of Russian thistle. In July 1998, the site was composed primarily of cheatgrass and Russian thistle.

Because of the predominance of undesirable weedy species, this site was broadcast-seeded again in October/November 1998 by the lessee. In July 1999, the site continued to be composed primarily of cheatgrass and Russian thistle. However, the vegetation surveys showed much higher plant diversity at the site in 1999 than in 1998. Traces of desirable grasses, forbs, and shrubs were present in 1999 that were not present in 1998.

By July 2000, Russian thistle had decreased to 11 percent cover, and cheatgrass had decreased to 3 percent, a significant, positive change from earlier years. Crested wheatgrass composed 20 percent of the cover, and traces of several more perennial grass species were present. By the time the site was visited again in June 2001, only a trace of Russian thistle was present, and cheatgrass continued to be a minor component of the cover. Reclamation success was rated as fair to good. Because of the positive trend in species diversity and types, this site is considered successfully reclaimed and does not need to be visited again.

C–AM–19, Golden Cycle Mine: This site was first reclaimed and seeded in 1978. Because of the harsh site conditions (no topsoil; 60 percent rock), the seeding was unsuccessful, even by 1998. In an attempt to improve grass cover, DOE–GJO pocked and reseeded the site in November 1998. In July 1999, after one growing season, a 5 percent cover had developed in the bottom of the pocks. These conditions were rated as poor.

In 2000, conditions were rated as fair. Plant cover had increased to 15 percent and was composed primarily of wheatgrasses, sweet clover, and four-wing saltbush. By the time of the July 2001 visit, vegetative cover had increased to 25 percent and was dominated by wheatgrasses (20 percent cover), kochia, Indian ricegrass, and fourwing saltbush. Reclamation success was rated as good. Site conditions are shown in photos P–19 and P–20. This site is considered successfully reclaimed and does not need to be visited again, except for monitoring shrub growth and survival as part of a long-term shrub survival study.

Sixteen shrubs were planted by DOE–GJO on this reclaimed mine site in May and October 1999 as part of a shrub survival study. By July 2001, 5 of the 16 shrubs had died (see Figure 1)—a 69-percent survival rate. A summary and explanation of study results, as of 2000, is in *Summary of Woody Plant Study on U.S. Department of Energy Uranium Lease Tract C–AM–19* (MACTEC–ERS 2001).

C–AM–19, Worcester Shaft: This area was recontoured, pocked, and seeded by DOE–GJO in spring 1999. No topsoil was available. As an experiment, two types of cover crop were seeded in addition to the regular seed mix to determine if cover crop affects ultimate success of the seeding. The south half of the pocked slope was seeded with annual sunflower and Rocky Mountain beeplant at a rate of 8 pounds per acre, and the north half was seeded with Regreen at a rate of 30 pounds per acre.

In July 2000, no significant difference in total plant cover was visually apparent between the two halves, although germination of Regreen was much more successful than that of sunflower and Rocky Mountain beeplant. Total plant cover was 20 percent, and site conditions were rated as fair. Sweet clover composed 10 percent of the cover, and seeded grasses composed 6 percent of the cover. Erosion was not a problem at the site.

In July 2001, total plant cover increased to 25 percent, and was dominated by blazing star and sweet clover, both of which are invasive species. However, the cover by seeded species such as Indian rice grass, western wheatgrass, thickspike and slender wheatgrass, Rocky Mountain beeplant, galleta grass, and blue grama increased from last year. As in 2000, no noticeable difference was apparent between the two halves, although Rocky Mountain beeplant occurred only on the southern half, and Regreen occurred primarily on the northern half. Photos P–21 and P–22 show site conditions on the north and south halves, respectively. This site should be visited again in 2002 to determine if seeded species continue to increase.

Sixteen shrubs were planted by DOE–GJO on this reclaimed mine site in May and October 1999 as part of a shrub survival study. By July 2001, 9 of the 16 shrubs had died (see Figure 2)—a 44-percent survival rate. A summary and explanation of study results, as of 2000, is in *Summary of Woody Plant Study on U.S. Department of Energy Uranium Lease Tract C–AM–19* (MACTEC–ERS 2001).

C–AM–19 Cliff Dweller Waste Rock Dumps: Two waste rock dumps at this mine site were recontoured, pocked, and seeded in December 1998 by UMETCO. One dump has a relatively flat topography and is south of the access road, and the other has steep slopes and is north of the access road.

In 1999, the reclaimed dump on the south side of the access road had a variable plant cover, ranging from 10 to 20 percent, that was composed primarily of immature seeded grasses, Russian thistle, and sweet clover. As expected, most of the plant growth had occurred in the bottom of the pocks where moisture collected. In 2000, plant cover had increased to 30 percent, and was composed primarily of seeded grasses (15 percent), and sweet clover (10 percent). By July 2001, total vegetative cover had increased to 35 percent and was considered successfully reclaimed. Site conditions, shown in photos P–23 and P–24, were rated as good. This site does not need to be visited again, except for shrub monitoring.

In 1999, the reclaimed dump on the north side of the access road contained variable plant cover. Where topsoil had been placed, reclamation success was rated as good. Where topsoil had not been placed, reclamation success was rated as poor. Overall, percent plant cover increased from 20 to 25 percent cover from 1999 to 2000. The percentage of Russian thistle composed about 10 percent of the total cover in both years, but the seeded grasses increased from 3 percent in 1999 to 10 percent in 2000.

In spring/summer 2001, UMETCO ripped the top portion of the north-side dump and imported topsoil in an attempt to improve reclamation success. In July 2001, no plants had germinated in this newly topsoiled area. Throughout the remainder of the dump, the difference between topsoiled areas and nontopsoiled areas was not as great as in previous years. Overall, total plant cover was 30 percent, but it continued to be dominated by Russian thistle (20 percent cover). Reclamation success was rated as fair. Because of the pocking, soil erosion is not a problem at this site despite its steepness. Photos P–25 through P–28 show site conditions. This site should be evaluated again in 2002.

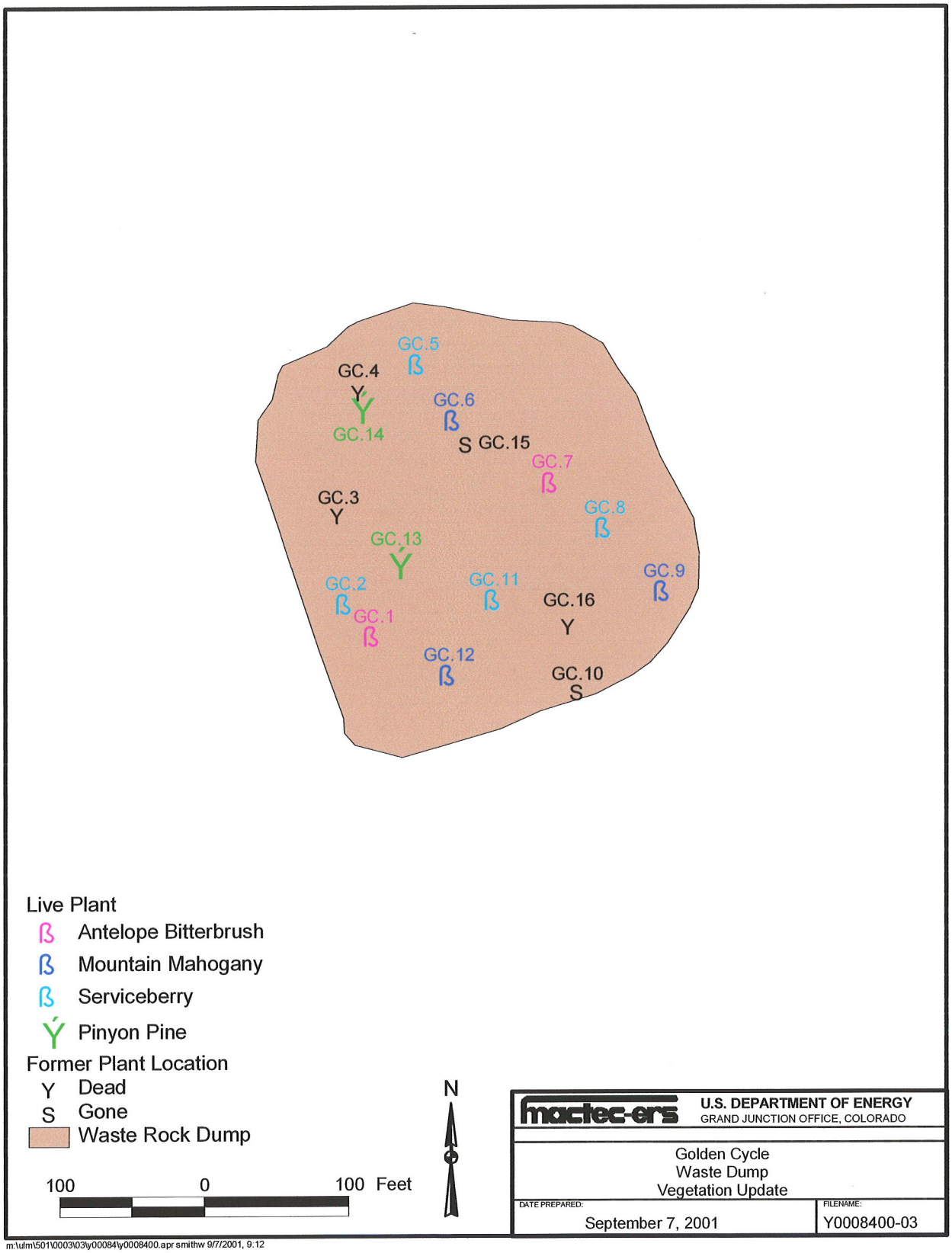


Figure 1. Shrub Survival Status at Golden Cycle Mine

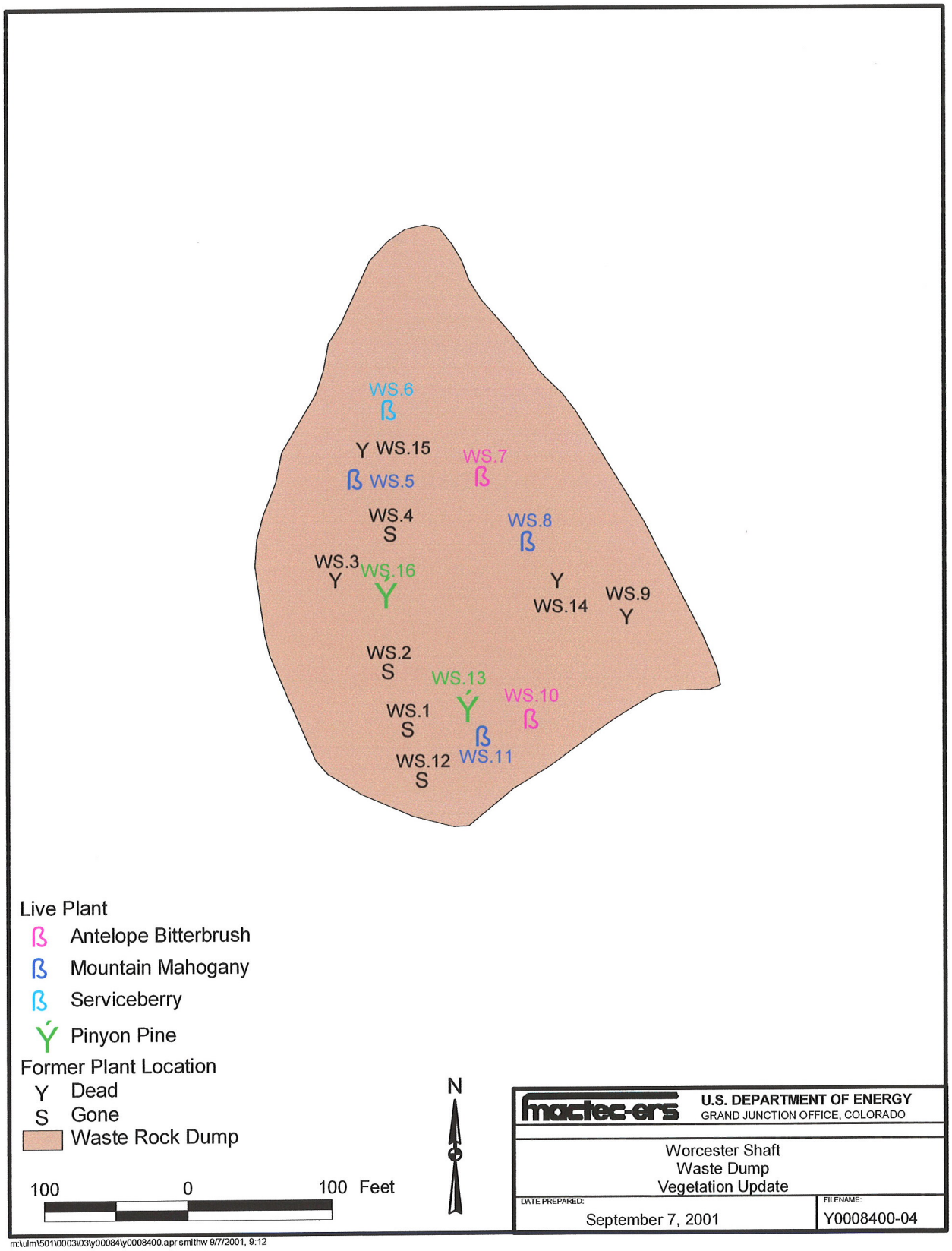


Figure 2. Shrub Survival Status at Worcester Shaft Mine

Thirty-two shrubs were planted by DOE–GJO personnel on the reclaimed areas in May and October 1999 as part of a shrub survival study. By July 2001, 16 of the 32 shrubs had died (a 50-percent survival rate), and 2 were destroyed by UMETCO's recent topsoiling (see Figure 3). A summary and explanation of study results, as of 2000, is in *Summary of Woody Plant Study on U.S. Department of Energy Uranium Lease Tract C–AM–19* (MACTEC–ERS 2001).

Small areas of Russian knapweed were found along the access road to these sites where large areas used to exist. Weed control efforts have obviously been helpful in reducing the number of plants and should be continued until this noxious weed is eradicated from the lease tract.

C–AM–19, King Solomon Waste Rock Dump: This waste rock dump was recontoured, pocked, and seeded by UMETCO in December 1998. Some areas were topsoiled, and others were not. In July 1999, after one growing season, the areas that had been topsoiled were obviously better-vegetated than those that were not topsoiled. Overall, the site had 10–15 percent plant cover, primarily composed of Russian thistle. Reclamation success was considered poor.

In July 2000, the difference between the topsoiled and non-topsoiled areas became more stark. Average plant cover in topsoiled areas was 20 percent, and conditions were rated as fair. Plant cover in non-topsoiled areas was essentially nonexistent and was rated as very poor.

In spring/summer 2001, UMETCO ripped the top portions of the dump—one on the north end and one on the southeast end—and imported topsoil in an attempt to improve reclamation success. In July 2001, no plants had germinated in these newly topsoiled areas. Throughout the remainder of the dump, average plant cover was 25 percent. Russian thistle comprised 13 percent of the total cover, and wheatgrasses composed 10 percent. Site conditions, shown in photos P–29 through P–32, were rated as fair. This site should be evaluated again in 2002.

Thirty-nine shrubs were planted by DOE–GJO on this site in May and October 1999 as part of a shrub survival study. By July 2001, 26 of the 39 shrubs had died (see Figure 4)—a 33-percent survival rate. A summary and explanation of study results, as of 2000, is in *Summary of Woody Plant Study on U.S. Department of Energy Uranium Lease Tract C–AM–19* (MACTEC–ERS 2001).

C–LP–22A: Three mine sites on this lease tract were reclaimed in 1999 by Cotter Corporation for DOE–GJO. All sites were covered with topsoil and pocked. As of June 2001, the TNT #1 and TNT #2 mine sites were considered successfully reclaimed and do not need to be revisited.

Plant cover on TNT #3 was not as high as on TNT #1 and #2, and it consisted of more weedy species, including Russian thistle, cheatgrass, and curlycup gumweed. Because of the weed percentage, this site is not considered successfully reclaimed at this time, but plant cover is sufficient to warrant the site's inclusion in a proposal for relinquishment to BLM.

C–LP–23: The waste rock dump on this lease tract was recontoured, pocked, and seeded in fall 1998 by DOE–GJO. Approximately 8 inches of topsoil, borrowed from the bottom of a nearby stock pond, was backfilled onto the site. After one season of growth, the site had a fair plant cover comprised primarily of lambsquarter, cheatgrass, seeded wheatgrasses, and Russian thistle. After two seasons of growth, plant cover totaled 20 percent and was comprised primarily of seeded grasses (10 percent), sweet clover (4 percent), Russian thistle (3 percent), and fourwing

saltbush (3 percent). Reclamation success was considered fair. By the June 2001 site visit, the percentage of seeded species had increased, and the percentage of weedy species had decreased. The site is now considered successfully reclaimed and does not need to be evaluated again.

Several areas of noxious weed infestation were noted during the July 1998 site visit. A 30' x 50' patch of Russian knapweed was noted, and many solitary plants and one 10' x 30' patch of musk thistle were noted. The knapweed was sprayed with herbicide in fall 1998, and the musk thistle was sprayed in early July 1999. Because several scattered patches remained by fall 1999, a second spraying was conducted at the time of the June 2000 inspection by the San Miguel County weed control agent. By the time of the June 2001 visit, only a few plants of Russian knapweed remained. These should be sprayed with herbicide in fall 2001, and the site should be rechecked for noxious weeds in 2002.

C–CM–25: Two mine shafts and a topsoil borrow area were reclaimed by this lease tract's lessee, Cotter Corporation in 1999. The two shafts—O.S. Shaft and Shadduck Den Shaft—and the borrow area were visited in May 2001 and all were considered successfully reclaimed. All sites were stable and had little or no potential for erosion. Conditions at the shafts and borrow area are shown in photos P–33 through P–35. These sites do not need to be revisited.

C–G–26: Three mine sites on this lease tract were reclaimed in spring and summer 1999. Reclamation of the Blunder and Lucky Boy mines was conducted by UMETCO under direction of the BLM. DOE–GJO directed reclamation of the Calamity #2 mine. The sites were visited in July 2000 and May 2001 to assess reclamation efforts.

Blunder Mine: Total vegetative cover increased from 15 percent in 2000 to 35 percent in 2001. In addition, the site is stable, and erosion potential is low. The site, shown in photo P–36, is considered successfully reclaimed and does not need to be revisited.

Lucky Boy Mine: The incline trench and waste rock dump at this mine site were recontoured, pocked, and seeded. A small amount of topsoil from the site itself was available for backfill. At the time of the July 2000 inspection, plant cover was 25 percent and was composed primarily of pubescent wheatgrass (15 percent), sweet clover (3 percent), and annual bursage (3 percent). By May 2001, plant cover had increased to 45 percent and was composed primarily of seeded species. Site conditions are shown in photo P–37. This site is considered successfully reclaimed and does not need to be revisited.

Calamity #2: The incline trench and waste rock dump at this mine site were recontoured, pocked, and seeded. No topsoil was available for backfill. At the time of the June 2000 inspection, the 20-percent plant cover was composed of galleta grass, Regreen, and wheatgrasses. By May 2001, total plant cover had increased to 25–30 percent, and reclamation success was considered very good. This site, shown in photo P–38, does not need to be revisited.

C–G–26: Numerous mine sites on this lease tract were reclaimed in summer 2000 by DOE–GJO. Most sites were covered with a thin layer of topsoil from on-site sources or from a nearby stock pond. All were pocked to reduce erosion potential. These sites—Calamity #13 South,

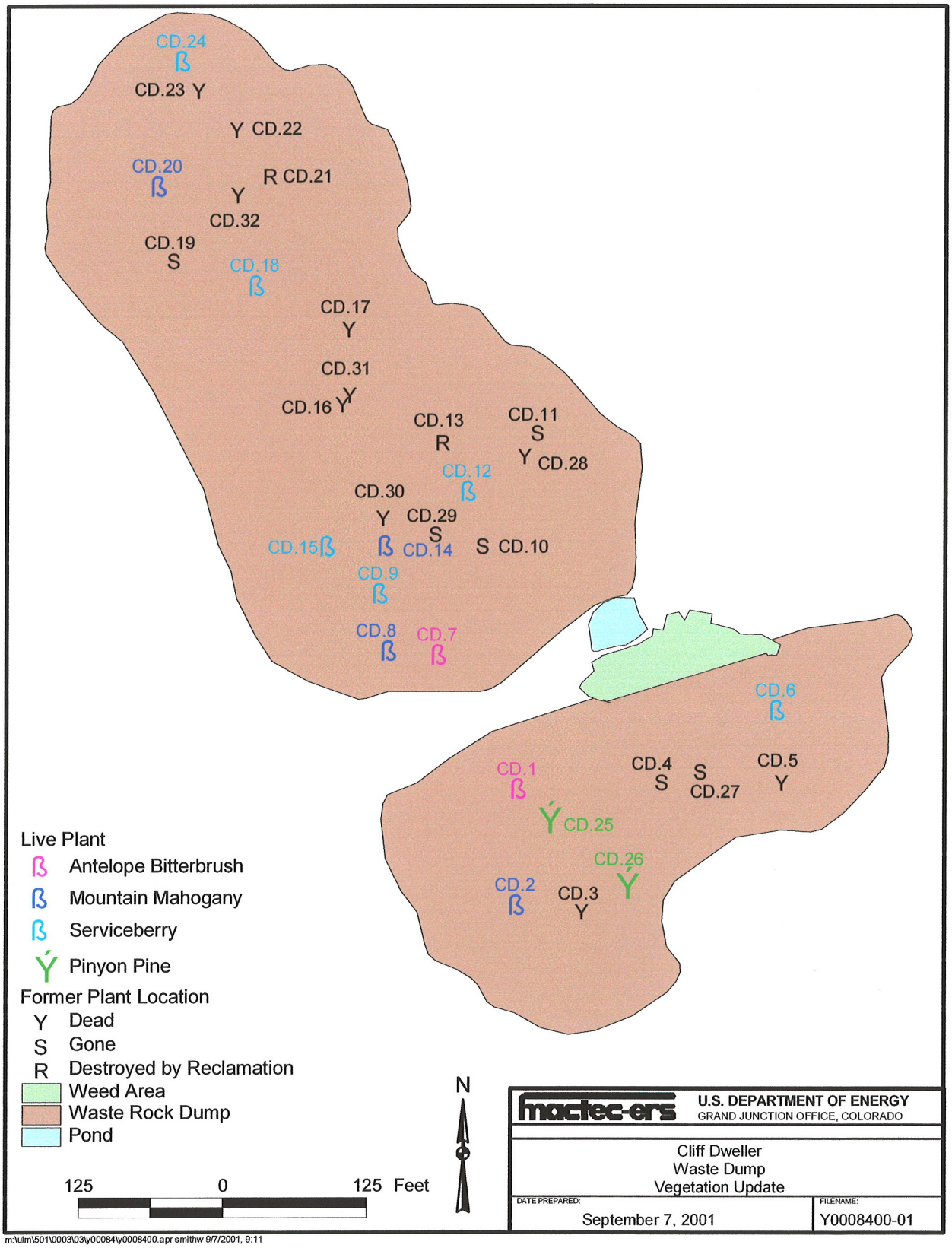


Figure 3. Shrub Survival Status at Cliff Dweller Mine

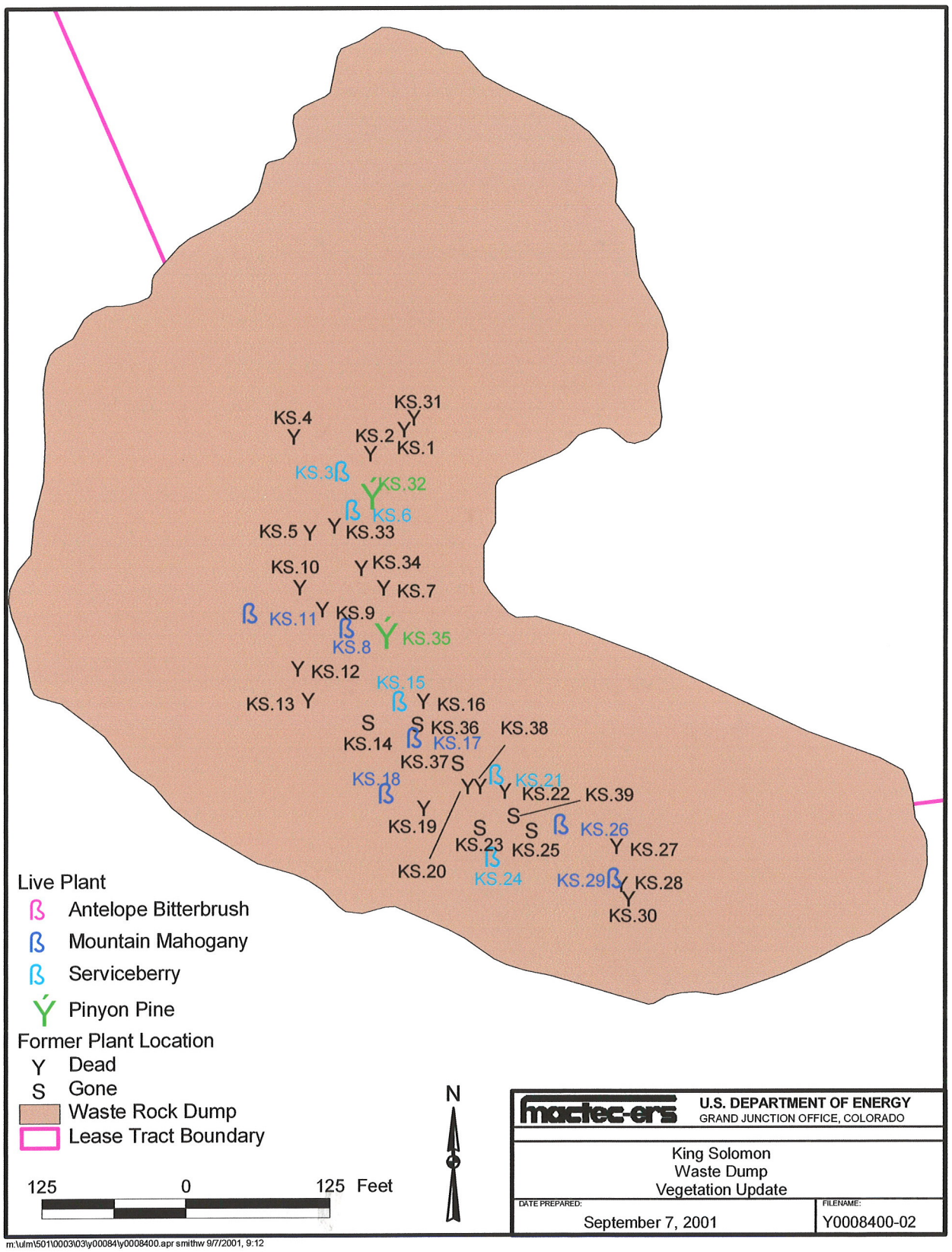


Figure 4. Shrub Survival Status at King Solomon Mine

Calamity #13 Center East, Calamity #17 South, Calamity #17 North, Calamity #18, Calamity #21, Calamity #25, and Calamity #28—were visited in June 2001 and assessed for first-year reclamation success. Site conditions are shown in photos P–39 through P–47, respectively. Vegetative cover at all the sites was similar and ranged from 15 to 25 percent total cover. Primary plant species consisted of yellow alyssum (an annual mustard), other annual mustard species, and thickspike and slender wheatgrass. Reclamation success was rated as fair at all the sites. These sites should be reevaluated in 2002 to determine if they have improved.

C–G–26/C–G–26A, Topsoil Borrow Sources: Two topsoil borrow areas on Calamity Mesa, one a stock pond and the other a "removed pond," were visited in May 2001. Both borrow areas were in poor or very poor condition because of the preponderance of weedy species. These sites should be visited again in 2002 to determine if reseeding is necessary.

C–G–26A: Five mine sites on this lease tract were reclaimed by DOE–GJO in May 1999 and evaluated in June 2000 for reclamation success. Two of them were considered successfully reclaimed in 2000, and the other three, deemed not as successful, were visited again in 2001 to determine if they had improved. Following are descriptions of those three mine sites.

Queen of Hills, Portals 1–5: Five portals were closed, and an access road was closed and pocked to control erosion. Considering that no topsoil was available for backfill, the site had fair success in 2000 with a 15-percent plant cover. In May 2001, a total plant cover of 28 percent, all of which were desirable species, gave this site a reclamation success rating of very good. Soils continued to be stable despite the site's steepness. Photo P–48 shows site conditions. This site should be proposed for relinquishment to BLM.

Small Spot: This former portal and waste rock dump area was recontoured, covered with approximately 6 inches of topsoil, ripped, and seeded. A sunflower cover crop was seeded along with the regular seed mix.

At the time of the inspection in July 2000, it was evident that the site had been moderately grazed. Inspectors also noted that a crop of cocklebur plants had germinated and died, probably in fall 1999 as a result of the wetter-than-normal weather. Cocklebur seeds most likely had been in the topsoil borrow source. The 30-percent total plant cover was composed primarily of sunflower (15 percent), galleta grass (5 percent), and sweet clover (5 percent). In contrast to the Worcester Shaft area on the C–AM–19 lease tract, the sunflower cover crop at this site was successful.

At the time of the May 2001 inspection, total plant cover had increased to 50 percent, but it consisted primarily of cocklebur (15 percent), sweet clover (10 percent), lambsquarter (10 percent), and seeded species (15 percent). Site conditions, which were rated as fair, are shown in photo P–49. Although this site currently is not considered successfully reclaimed, the potential for success is high within the next 2 years.

Matchless: This waste rock dump was recontoured, covered with approximately 6 inches of topsoil from a nearby stock pond, and ripped to create surface roughness. A Regreen cover crop was applied along with the regular seed mix.

At the time of the inspection in July 2000, Regreen had been so heavily grazed by cattle and elk that only the base of the plants remained. Total plant cover was 25 percent, most of it composed of Regreen "stubs." In May 2001, the percentage of Regreen had decreased dramatically, but the percentage of weedy species increased. The total plant cover of 40 percent consisted of 15 percent sweet clover, 10 percent cocklebur, 5 percent lambsquarter, and 10 percent seeded species. Site conditions are shown in photo P–50. With a current success rating of fair, this site is not yet considered successfully reclaimed, but the potential for success is high within the next 2 years.

C–G–27: Four sites on this lease tract were reclaimed by DOE–GJO in July 1999. Topsoil was available for each site, and all sites were pocked and/or ripped. The sites were visited in July 2000 and June 2001 and evaluated for reclamation success. Following are descriptions of each site.

Ronnie #1: A Regreen cover crop was seeded along with the regular seed mix at this site. The resulting first-year cover consisted of 20 percent Regreen and 2 percent sweet clover. Because of the predominance of annual species, reclamation success was rated as fair at the time of the inspection. At the time of the June 2001 inspection, total plant cover was estimated at 45 percent and consisted primarily of cheatgrass (16 percent), fourwing saltbush (5 percent), sweet clover (5 percent), other desirable or seeded species (11 percent), and other weedy species (8 percent). Site conditions are shown in photo P–51. Although reclamation success is considered only fair, the total plant cover at the site warrants the inclusion of this site in a proposal for relinquishment to BLM.

G–1/G–1A: Like the Ronnie #1 site, a Regreen cover crop was planted. The resulting first-year cover consisted of 20 percent Regreen, 5 percent sweet clover, and 4 percent Russian thistle. Because of the predominance of annual species, reclamation success was rated as fair at the time of the 2000 inspection. In June 2001, total plant cover increased to 35 percent, and consisted primarily of cheatgrass (15 percent), sweet clover (10 percent), and seeded species (7 percent). Cheatgrass had obviously invaded the reclaimed site from surrounding areas, which are infested with this species. Although reclamation success was rated as only fair, conditions at the site (as shown in photo P–52) are as good as those in the surrounding areas; therefore, it is recommended that this site be included in a proposal for relinquishment to BLM.

BLM Subsidence: In 2000, reclamation success at this site was similar to that at Ronnie #1 and G–1/G–1A. Of the 30 percent total cover, Regreen comprised 12 percent, seeded perennial grasses comprised 10 percent, and Russian thistle comprised 5 percent. In 2001, plant cover and species diversity had improved significantly, and the site was considered successfully reclaimed. It is recommended for relinquishment to BLM.

Neglected: At this site, a Rocky Mountain beeplant and sunflower cover crop was planted along with the regular seed mix. In 2000, the 30-percent plant cover consisted of beeplant (12 percent), seeded perennial grasses (8 percent), and cheatgrass (5 percent). Reclamation success was considered fair. In June 2001, total vegetative cover and species diversity improved significantly, and the site was considered successfully revegetated. This site is recommended for relinquishment to BLM.

C–G–27, Mesa #5: The waste rock dump at this mine site was reclaimed by Cotter Corporation for BLM (in lieu of a DOE royalty payment) in summer 2000. First-year success was evaluated in June 2001. The site had a total vegetative cover of 25 percent, but most of it consisted of cheatgrass, sweet clover, and annual weeds (see photo P–53). Cheatgrass invaded the site from the nearby camp area, which was covered with this species. Because of the lack of seeded species, reclamation success was rated as poor. This site should be evaluated again in 2002.

C–G–27A, G–2 Mine: The vertical shaft and waste rock dump at this mine site were reclaimed in July 1999 by DOE–GJO. Topsoil was obtained from a local stock pond and backfilled on the site. Sideslopes were pocked, and the top was ripped to provide surface roughness. Along with the regular seed mix, a cover crop of sunflower and Rocky Mountain beeplant was seeded. The site was in excellent condition after one season of growth, and continued to be in an excellent condition at the time of the 2001 inspection (see photo P–54). This site does not need to be revisited.

C–G–27A, Hansen Claim: The waste rock dump at this mine site was recontoured, covered with topsoil borrowed from a local stock pond, ripped, and seeded with the regular seed mix. A sunflower and Rocky Mountain beeplant cover crop also was seeded.

At the time of the 2000 inspection, the site was in good condition and had a diverse plant mix. The 30-percent plant cover consisted of numerous grasses and forbs, including Rocky Mountain beeplant (5 percent) and sunflower (3 percent). By June 2001, the site still had a 30-percent plant cover, but it was composed primarily of perennial seeded species. Site conditions are shown in photo P–55. Because reclamation success was rated as very good, this site should be proposed for relinquishment to BLM.

3.0 Summary

Table 2 summarizes the status of mine site reclamation as of August 2001. Successfully reclaimed sites are suitable for relinquishment to BLM. Sites that require reevaluation but no action at this time are not yet considered successfully reclaimed but have good potential for success over time. The table lists the year (in parentheses) that the site should be reevaluated. If some type of action is needed at a site, it is listed in the fourth column of the table. Details of the recommendations for action are provided in Section 2.0 of this report.

Reclamation efforts on DOE lease tracts continue to be mostly successful. After numerous years of conducting reclamation projects, ULMP personnel have developed reclamation methods that have enhanced the chance for success. Following is a brief description of tools and/or methods that have worked well for reclaiming mine sites in southwestern Colorado.

Table 2. Status of Uranium Lease Tract Sites

Site	Successfully Reclaimed	Needs Reevaluation (No Action at this Time)	Action Needed
C–JD–5, Mineral Joe 4	X		
C–JD–7, Oversight Mine		X (2002)	
C–JD–9		X (2002) Weed Check Only	Spray Noxious Weeds
C–SR–10, Sam Mine	X		
C–SR–11, Upper Brighton (waste rock dump & portal areas)		X (2002)	Topsoil Imported September 2001
C–SR–11, Lower Brighton	X		
C–SR–11, Tomboy	X		
C–SR–11, Ike #1		X (2002)	
C–SR–11, Ike #3		X (2002)	
C–SR–11, Ike #4		X (2002)	
C–SR–11, Park		X (2002)	
C–SR–11, Mercantile North		X (2002)	
C–SR–11, Emma Lou	X	X (2002)	
C–SR–11, Dawson Incline		X (2002)	
C–SR–13, various sites		X (2002)	
C–SR–14, Portal & Waste Rock Dump		X (2002)	
C–SR–16, Fraction #5	X		
C–SR–16, Charles T SW	X		
C–SR–16, Charles T SW north incline trench	X		
C–SR–16, Hawk Mine, P1 Site		X (2002)	
C–SR–16, Hawk Mine, P2 Site		X (2002)	
C–SR–16, Hawk Mine, P3 Site		X (2002)	
C–SR–16, Hawk Mine, P4 Site		X (2002)	
C–SR–16, Hawk Mine, P5 Site		X (2002)	
C–SR–16, Hawk Mine, P6 Site		X (2002)	
C–SR–16, Hawk Mine, P7 Site		X (2002)	
C–SR–16, Hawk Mine, P8 Site		X (2002)	
C–SM–18 pond area	X		
C–AM–19, Golden Cycle Mine	X		Monitor Shrub Survival
C–AM–19, Worcester Shaft		X (2002)	Monitor Shrub Survival
C–AM–19, Cliff Dweller waste rock dump, flat area	X	X (2002) Weed Check Only	Monitor Shrub Survival; Spray Noxious Weeds
C–AM–19, Cliff Dweller waste rock dump, hillside area		X (2002)	Monitor Shrub Survival
C–AM–19, King Solomon		X (2002)	Monitor Shrub Survival
C–LP–22A, TNT #1	X		
C–LP–22A, TNT #2	X		
C–LP–22A, TNT #3		X (2002)	
C–LP–23	X	X (2002) Weed Check Only	Spray Noxious Weeds
C–CM–25, O.S. Shaft	X		

Table 2 (continued). Status of Uranium Lease Tract Sites

Site	Successfully Reclaimed	Needs Reevaluation (No Action at this Time)	Action Needed
C–CM–25, Shadduck Den Shaft	X		
C–CM–25, Borrow Area	X		
C–G–26, Blunder Mine	X		
C–G–26, Lucky Boy Mine	X		
C–G–26, Calamity #2 Portal & Waste Rock Dump	X		
C–CG–26, Calamity #13 South		X (2002)	
C–CG–26, Calamity #13 Center East		X (2002)	
C–CG–26, Calamity #17 South		X (2002)	
C–CG–26, Calamity #17 North		X (2002)	
C–CG–26, Calamity #18		X (2002)	
C–CG–26, Calamity #21		X (2002)	
C–CG–26, Calamity #25		X (2002)	
C–CG–26, Calamity #28		X (2002)	
C–CG–26, Stock Pond Borrow Area		X (2002)	
C–CG–26/26A, Topsoil Borrow Area		X (2002)	
C–G–26A, Queen of Hills, Portals 1,2,3,4,5	X		
C–G–26A, Small Spot		X (2002)	
C–G–26A, Matchless		X (2002)	
C–G–27, Ronnie #1	X		
C–G–27, G–1/G–1A	X		
C–G–27, BLM Subsidence, Climax Dump	X		
C–G–27, Neglected Claim	X		
C–G–27, Mesa #5		X (2002)	
C–G–27A, G–2 Mine	X		
C–G–27, Hansen Claim	X		

- ULMP personnel have developed a method for regrading waste rock dumps that has resulted in a more natural-looking landscape. First, the area around the dump is dug out with a trackhoe or bulldozer, creating a trench or basin around the dump. Often, enough topsoil material is salvaged from the trench area to cover the regraded surface. Waste rock is then bulldozed into the trench until slopes are flattened, usually to a slope less than 4:1 or 5:1, if possible. The trenching allows the waste rock to "disappear" into the surrounding landscape. Additionally, the shallower slopes associated with this method result in less erosion potential.

- ULMP personnel also have learned that a rough, finished surface (versus a smooth surface that typically is desired in landscaping) increases reclamation success. The microtopography created by a roughened surface enhances seed germination by trapping precipitation and runoff. Roughened surfaces usually are achieved by pocking the surface with a trackhoe bucket or ripping with bulldozer ripper blades. Photo P–56 shows first-year grass growth in pocks created by a trackhoe bucket. The roughened surface also decreases the potential for soil movement off site. Sediments eroded by runoff travel only short distances and are deposited in either pocks or basin areas on the surface of the regraded area.

- After an area is regraded, ULMP personnel have learned to assess the landscape for drainage. Rerouting off-site drainage away from the reclaimed area has been a very successful method for avoiding soil erosion and maintaining the integrity of the pocks or roughened surface on the regraded area.

- If the area to be regraded contains large boulders, these are set aside during regrading activities and used later to "landscape" the surface. The placement of large boulders on the surface is visually more interesting, but more importantly, they create microenvironments that provide wildlife habitat and enhance seed germination, plant growth, and species diversity. If the regraded waste rock dump is located on a steep slope with rock outcrops, often the boulders will be placed in a row, side by side, to imitate a rock outcropping. This practice has led to more natural-looking landscapes.

- Whole trees and tree limbs also have been used to landscape regraded areas. Like the boulders, they provide microenvironments for plants and wildlife. During the reclamation assessments, ULMP personnel noted that vegetative cover and species diversity are almost always greater beneath downed trees or tree limbs than in open areas.

- The placement of topsoil on regraded areas has a tremendous effect on the success of the revegetation. ULMP personnel have been imaginative and resourceful in finding local sources of topsoil; often, sediments deposited in stock ponds are cleaned out and used as topsoil. In other situations, topsoil is borrowed from an undisturbed area containing deep soils. These borrow areas are reclaimed in the same manner as mine site features.

- When topsoil is not available for a site, the application of soil amendments increases the potential for revegetation success. ULMP personnel have seen positive results from the use of Biosol and Granular Humate. A minimum application rate of 1,800–2,000 pounds per acre of Biosol and 1,000 pounds per acre of Granular Humate is recommended for harsh sites. Cattle also have been used to amend poor soils. After hand-broadcasting seed, cattle are brought onto the site to "stomp in" the seed and the hay that is used as feed. The cattle leave behind manure, which enriches the soil, and small pocks or hoof-prints that retain precipitation. Hay fed to the cattle (before and during the project) must be certified as weed free to avoid an infestation of undesirable weeds on the project site.

- Seed is normally applied by hand-broadcasting, mainly because the regraded areas are small enough to seed by hand and because it is a cheap method. Because the surface of regraded areas is left in a rough condition, broadcast seed does not blow away but is trapped in crevices and basin areas. Other seeding methods have been used, however, especially on the larger sites. Hydroseeding has been used when the application of soil amendments has been deemed necessary. The seed and soil amendments can be mixed together and applied efficiently in one pass.

- The native seed mix (see Table 3) used at most of the mine sites has been very successful; all species seeded are found on most of the reclaimed sites.

Table 3. Native Seed Mix Used on DOE Uranium Lease Tracts

Species		Broadcast Application Rate (lbs. PLS/ acre)
Scientific Name	**Common Name**	
Pascopyrum smithii	Arriba western wheatgrass	4.0
Elymus trachycaulus ssp. trachycaulus	Slender wheatgrass	2.0
Oryzopsis hymenoides	Paloma Indian ricegrass	4.0
Bouteloua gracilis	Hachita blue grama	2.0
Hilaria jamesii (florets)	Galleta grass	2.0
Stipa comata	Needleandthread grass	1.0
Stipa viridula	Lodorm green needlegrass	2.0
Linum lewisii	Lewis flax	1.0
Penstemon palmeri	Cedar Palmer penstemon	0.5
Sphaeralcea coccinea or *Sphaeralcea parvifolia*	Scarlet or Parvifolia globemallow	0.3
Atriplex canescens	Rincon fourwing saltbush	3.0
Ceratoides lanata	Winterfat	1.0
	Total pounds per acre	**22.8**

- ULMP personnel have experimented with the use of a cover crop. Both Regreen, a sterile hybrid of wheat and wheatgrass, and a combination of Rocky Mountain beeplant and sunflower, have been used. Although Regreen germinates very well and provides a thick cover of grass during the first growing season, to date, no noticeable differences in long-term reclamation success have been observed between sites having a Regreen cover crop versus sites having a beeplant/sunflower cover crop, versus sites having no cover crop.

- ULMP personnel have learned that successful reclamation usually takes 3 years to achieve. Annual weeds typically dominate a site during the first growing season; annual weeds and seeded species typically share the total plant cover during the second growing season; and seeded species normally dominate the site during the third growing season. In reclamation, patience is a critical virtue.

- ULMP personnel are currently experimenting with the use of live shrub plantings on waste rock dumps. A 3-year shrub survival study (MACTEC–ERS 2001) has indicated that planting live, containerized shrub seedlings may be a viable option for establishing plant cover on reclaimed mine sites having poor soils, steep slopes, and/or harsh exposures.

- Weed control efforts, primarily the spraying of herbicide, have been very effective in reducing, and often eradicating, populations of noxious weeds.

During future reclamation, ULMP personnel would like to experiment with other new reclamation products. These products include DriWater pellets, which are gel-like pellets that biodegrade when applied to the soil and release water, and mycorrhizal inoculum. A mycorrhiza is a naturally occurring symbiotic combination of a plant root and fungus; mycorrhizal inoculum is the product that is applied to soil to colonize it with mycorrhizal fungi. Both of these products may have beneficial use in reclaiming mine sites.

4.0 References

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Appendix A
Field Sheets

Appendix B
Photographs

Appendix B, Photograph Log

Photograph Number	Photograph Description[a]
P–1	JD–7 Oversight Mine, View S from middle bench
P–2	SR–10 Sam Mine, View W across slope
P–3	SR–11 Upper Brighton, View NE of reclaimed area
P–4	SR–11 Lower Brighton, View N of reclaimed area
P–5	SR–11 Tomboy, View E of reclaimed portal area
P–6	SR–13, View E of reclaimed trench
P–7	SR–13, View NW of reclaimed pit
P–8	SR–13, View W of reclaimed trench
P–9	SR–14, View S of reclaimed portal
P–10	SR–14, View NE of reclaimed waste rock dump
P–11	SR–16 Hawk Mine, View WNW (from road) of Site P1
P–12	SR–16 Hawk Mine, View WSW (from road) of Site P2
P–13	SR–16 Hawk Mine, View E of Site P3
P–14	SR–16 Hawk Mine, View N (from road) of Site P4
P–15	SR–16 Hawk Mine, View SSE (from road) of Site P5
P–16	SR–16 Hawk Mine, View SW (from portal) of Site P6
P–17	SR–16 Hawk Mine, View NNW (from crest) of Site P7
P–18	SR–16 Hawk Mine, View W of Site P8
P–19	AM–19 Golden Cycle, View N from SW corner of reclaimed area
P–20	AM–19 Golden Cycle, View NW from GC–11 shrub site
P–21	AM–19 Worcester Shaft, View SW from WS–15 shrub site
P–22	AM–19 Worcester Shaft, View SSW from WS–10 shrub site
P–23	AM–19 Cliff Dweller, View E of reclaimed waste rock dump (from middle of flat)
P–24	AM–19 Cliff Dweller, View W of reclaimed waste rock dump(from middle of flat)
P–25	AM–19 Cliff Dweller, View N of S-facing hillslope
P–26	AM–19 Cliff Dweller, View SE of NW portion of reclaimed area
P–27	AM–19 Cliff Dweller, View SE of W portion of reclaimed area
P–28	AM–19 Cliff Dweller, View E of W portion of reclaimed area
P–29	AM–19 King Solomon, View NW of (upper) top portion
P–30	AM–19 King Solomon, View SSE of (lower) top portion
P–31	AM–19 King Solomon, View of KS–18 shrub site from KS–17
P–32	AM–19 King Solomon, View W from KS–30 shrub site
P–33	CM–25 O.S. Shaft, View SE of reclaimed shaft
P–34	CM–25 Shadduck Den Shaft, View N of reclaimed site

Photograph Number	Photograph Description[a]
P–35	CM–25 Borrow Area, View NW of reclaimed borrow area
P–36	G–26 Blunder Mine, View S of reclaimed area
P–37	G–26 Lucky Boy Mine, View S of reclaimed area
P–38	G–26 Calamity #2, View NNW of reclaimed area
P–39	G–26 Calamity #13 South, View SSW (from portal) of reclaimed area
P–40	G–26 Calamity #13 Center East, View W (from dead tree) of reclaimed waste rock dumps
P–41	G–26 Calamity #13 Center East, View SW (from dead tree) of reclaimed waste rock dump
P–42	G–26 Calamity #17 South, View W of reclaimed waste rock dump
P–43	G–26 Calamity #17 North, View N (from road) of reclaimed waste rock dump
P–44	G–26 Calamity #18, View W of reclaimed waste rock dump
P–45	G–26 Calamity #21, View N of reclaimed waste rock dumps
P–46	G–26 Calamity #25, View S (from portal) of reclaimed waste rock dump and portal
P–47	G–26 Calamity #28, View ENE of reclaimed area
P–48	G–26A Queen of Hills, View SW (uphill) of reclaimed road
P–49	G–26A Small Spot, View NNE of reclaimed portal area
P–50	G–26A Matchless, View S of reclaimed waste rock dump
P–51	G–27 Ronnie #2, View SSW of reclaimed waste rock dump
P–52	G–27 Mesa #5, View W of reclaimed waste rock dump
P–53	G–27 G–1/G–1A, View W of reclaimed area
P–54	G–27A G2 Mine, View SW of reclaimed area
P–55	G–27A Hansen Claim, View ESE of reclaimed area
P–56	Close-up of vegetation in pocks

[a]Abbreviations used in table include: W = west; N = north; S = south; E = east; GC = Golden Cycle Mine; KS = King Solomon Mine, WS = Worcester Shaft.

P–1: JD–7 Oversight Mine, View S from middle bench

P–2: SR–10 Sam Mine, View W across slope

P–3: SR–11 Upper Brighton, View NE of reclaimed area

P–4: SR–11 Lower Brighton, View N of reclaimed area

P–5: SR–11 Tomboy, View E of reclaimed portal area

P–6: SR–13, View E of reclaimed trench

P–7: SR–13, View NW of reclaimed pit

P–8: SR–13, View W of reclaimed trench

P–9: SR–14, View S of reclaimed portal

P–10: SR–14, View NE of reclaimed waste rock dump

P–11: SR–16 Hawk Mine, View WNW (from road) of Site P1

P–12: SR–16 Hawk Mine, View WSW (from road) of Site P2

P–13: SR–16 Hawk Mine, View E of Site P3

P–14: SR–16 Hawk Mine, View N (from road) of Site P4

P–15: SR–16 Hawk Mine, View SSE (from road) of Site P5

P–16: SR–16 Hawk Mine, View SW (from portal) of Site P6

P–17: SR–16 Hawk Mine, View NNW (from crest) of Site P7

P–18: SR–16 Hawk Mine, View W at Site P8

P–19: AM–19 Golden Cycle, View N from SW corner of reclaimed area

P–20: AM–19 Golden Cycle, View NW from GC–11 shrub site

P–21: AM–19 Worcester Shaft, View SW from WS–15 shrub site

P–22: AM–19 Worcester Shaft, View SSW from WS–10 shrub site

P–23: AM–19 Cliff Dweller, View E of reclaimed waste rock dump (from middle of flat)

P–24: AM–19 Cliff Dweller, View W of reclaimed waste rock dump (from middle of flat)

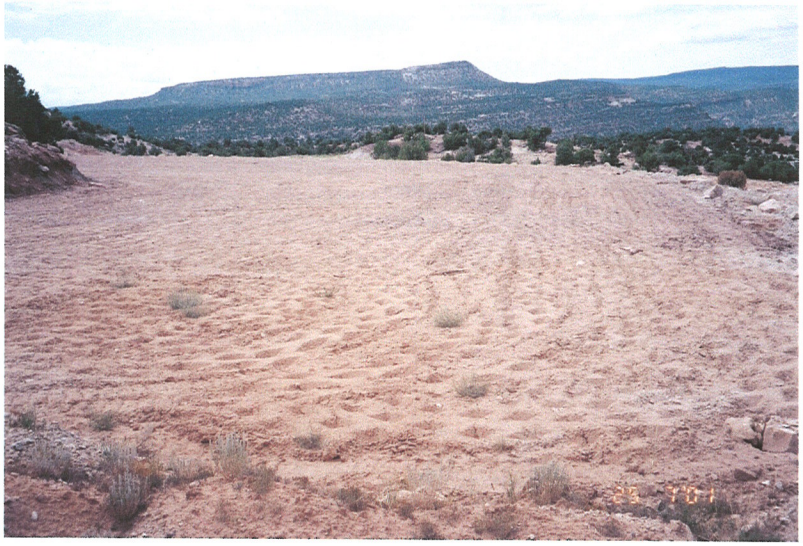
P–25: AM–19 Cliff Dweller, View N of S-facing hillslope

P–26: AM–19 Cliff Dweller, View SE of NW portion of reclaimed area

P–27: AM–19 Cliff Dweller, View SE of W portion of reclaimed area

P–28: AM–19 Cliff Dweller, View E of W portion of reclaimed area

P–29: AM–19 King Solomon, View NW of (upper) top portion



P–30: AM–19 King Solomon, View SSE of (lower) top portion

P–31: AM–19 King Solomon, View of KS–18 shrub site from KS–17

P–32: AM–19 King Solomon, View W from KS–30 shrub site

P–33: CM–25 O.S. Shaft, View SE of reclaimed shaft

P–34: CM–25 Shadduck Den Shaft, View N of reclaimed site

P–35: CM–25 Borrow Area, View NW of reclaimed borrow area

P–36: G–26 Blunder Mine, View S of reclaimed area

P–37: G–26 Lucky Boy Mine, View S of reclaimed area

P–38: G–26 Calamity #2, View NNW of reclaimed area

P–39: G–26 Calamity #13 South, View SSW (from portal) of reclaimed area

P–40: G–26 Calamity #13 Center East, View W (from dead tree) of reclaimed waste rock dumps

P–41: G–26 Calamity #13 Center East, View SW (from dead tree) of reclaimed waste rock dump

P–42: G–26 Calamity #17 South, View W of reclaimed waste rock dump

P–43: G–26 Calamity #17 North, View N (from road) of reclaimed waste rock dump

P–44: G–26 Calamity #18, View W of reclaimed waste rock dump

P–45: G–26 Calamity #21, View N of reclaimed waste rock dumps

P–46: G–26 Calamity #25, View S (from portal) of reclaimed waste rock dump and portal

P–47: G–26 Calamity #28, View ENE of reclaimed area

P–48: G–26A Queen of Hills, View SW (uphill) of reclaimed road

P–49: G–26A Small Spot, View NNE of reclaimed portal area

P–50: G–26A Matchless, View S of reclaimed waste rock dump

P–51: G–27 Ronnie #2, View SSW of reclaimed waste rock dump

P–52: G–27 Mesa #5, View W of reclaimed waste rock dump

P–53: G–27 G–1/G–1A, View W of reclaimed area

P–54: G–27A G2 Mine, View SW of reclaimed area

P–55: G–27A Hansen Claim, View ESE of reclaimed area

P–56: Close-up of vegetation in pocks

2003 Reclamation Success Trip Report

Uranium Leasing Sites

April 2004

Prepared by Environmental Services Group
The S.M. Stoller Corporation

1.0 Overview

On June 17 and 18, August 18, and September 2, 2003, Uranium Leasing Sites staff assessed eight reclaimed mine sites on lease tracts managed by the U.S. Department of Energy (DOE), ten reclaimed mine sites located on lands managed by the U.S. Bureau of Land Management, and one reclaimed DOE site near the Slick Rock disposal cell. The purpose of the assessments was to inspect vegetation establishment and soil stability at the sites to determine if they had been successfully reclaimed. This trip report summarizes the results of the reclamation assessments.

To determine reclamation success, the following parameters were recorded at each site: 1) percent plant cover, 2) percent litter cover, 3) percent rock cover, 4) percent bare ground, and 5) erosion condition. Percent cover for plants, litter, rock, and bare ground was determined by ocular estimate. Erosion condition was determined by observing gullying; rilling; depth of soil removal around rocks, plants, or debris; pedestaling of stones or plants; and presence of flow patterns. On the basis of these observations, the site was then subjectively rated as stable, slightly eroding, moderately eroding, or severely eroding.

After conditions at the reclaimed sites were observed and recorded, they were compared with the conditions on adjacent, relatively undisturbed lands. Conditions that compared favorably were given a "reclamation success" descriptor of good, very good, or excellent, and conditions that compared unfavorably were given a descriptor of fair, poor, or very poor. The overall soil stability of the sites also was factored into the assessment. Table 1 summarizes the rankings and observations at each of the reclaimed sites. Copies of the field sheets are in Appendix A, and photographs of the reclaimed areas are in Appendix B. Section 2.0 provides details of the site rankings, and Section 3.0 summarizes results of the reclamation assessments.

2.0 Results and Recommendations

C–JD–7, Oversight Mine: Cotter Corporation reclaimed this area in spring 1999. In 2000, DOE constructed several diversion ditches to reduce gully erosion that had been occurring on the site. By the time of the 2002 site visit, all the reclaimed areas—with the exception of the steep, west-facing sideslope—were considered successfully reclaimed. The west-facing sideslope consisted of 10 percent plant cover (3 percent of which were desirable species) and 92 percent bare ground and rock. At the time of the 2003 site visit, plants still composed 10 percent of the cover, but all plants were desirable species (fourwing saltbush, galleta grass, and Indian ricegrass). Although reclamation success was still rated as fair, a positive trend in the site's restoration was noted. This site should be evaluated again in 2004. Photograph P–1 in Appendix B shows site conditions.

C–SR–11, Upper Brighton: This site is now considered successfully restored. Desirable plant cover increased from 4 percent in 2002 to 22 percent in 2003. Although many of the pocks formed on the steep sideslope were nearly filled with sediment, gullies and other erosional features were not significant at the time of the site visit. This site should be visited in 2004 or 2005 to ensure that soils have remained stable. Photograph P–2 in Appendix B shows site conditions.

Table 1. Summary of Site Descriptions

Reclaimed Site	Date Reclaimed	Plant Cover (%)	Litter Cover (%)	Rock Cover (%)	Bare Ground (%)	Erosion Condition	Reclamation Success
C–JD–7, Oversight Mine (west-facing slope only)	1999 by Cotter for DOE	10	5	20	65	Fair-Good	Fair
C–SR–11, Upper Brighton (waste rock dump and portal areas)	Summer 1999 by Cotter for DOE Topsoil—Summer 2001 by Reams for DOE	25	5	35	35	Fair on sideslopes	Very Good
C–SR–13A, Veda Mad	Jan/Feb 2003 by Cotter	t	0	35	65	Good	Poor
C–SR–15, Cougar Point	2001 by Reams for DOE	20	t	10-40	40-70	Good	Fair-Good
C–SM–18, WRD & Portal	June 2001 by Cotter	10-20	10	15	55-65	Good	Poor-Fair
C–AM–19, King Solomon (upper top portion)	Spring 2002 by UMETCO	15	t	30	55	Excellent	Fair
C–AM–19, King Solomon (lower top portion)	Spring 2002 by UMETCO	10	t	25	65	Excellent	Fair
C–AM–19, Cliff Dweller (top)	Spring 2002 by UMETCO	35	5	25	35	Excellent	Fair
C–CM–25 Main Portal Area	February 2003	8	t	30	62	Good	Poor
BLM Yellowbirds, Site 45	Fall 2001 by Sutherland for BLM	25	15	20	40	Excellent	Good-Very Good
BLM Yellowbirds, Site 46	Fall 2002 by Sutherland for BLM	20	20	30	30	Good	Fair
BLM Yellowbirds, Site 47 (BSB)	Fall 2001 by Sutherland for BLM	35	25	5	35	Excellent	Very Good
BLM 5th National Bank	Summer 2002 by Cotter for BLM	6	9	5	85	Good	Fair
BLM Long Park 11	Summer 2002 by Cotter for BLM	8	7	5	80	Fair	Fair
BLM Long Park 16	Summer 2002 by Cotter for BLM	15-25	15	5	55-65	Fair	Good
BLM Bluebell 1291	Spring 2002 by Cotter for BLM	20	15	20	45	Good	Good
BLM Bluebell Topsoil Borrow Source	Spring 2002 by Cotter for BLM	35	5	0	60	Good	Good
BLM Firecracker 1292 and 1293	Spring 2002 by Cotter for BLM	25	10	15	50	Excellent	Good

Reclaimed Site	Date Reclaimed	Plant Cover (%)	Litter Cover (%)	Rock Cover (%)	Bare Ground (%)	Erosion Condition	Reclamation Success
BLM Firecracker 1294	Spring 2002 by Cotter for BLM	10	15	10	65	Good	Fair-Good
Slick Rock Disposal Cell, Spoils Pile	September 2001	25	t	20	55	Good	Fair

C–SR–13A, Veda Mad: Cotter Corporation competed reclamation of this mine site in January/February 2003. At the time of the site visit in August 2003, only a trace of vegetation was present on the site. Reclamation success was rated as poor. Photograph P–3 shows the reclaimed drainage channel and stock pond area. This site should be evaluated again in 2004.

C–SR–15, Cougar Point: Reams Construction reclaimed this mine site for DOE in 2001. Reclamation success was considered good on most of the site, with the exception of the talus slopes. Reclamation success in this latter area was rated as fair because of the relatively high percentage of plant cover composed of Russian thistle. Photographs P–4 and P–5 show site conditions. This mine site is considered successfully reclaimed, with the exception of the talus slope area, which should be reevaluated in 2004.

C–SM–18, Waste Rock Dump and Portal Areas: Cotter Corporation reclaimed this mine site in June 2001. At the time of the June 2003 site visit, Russian thistle dominated plant cover. Reclamation success was considered poor on the waste rock dump and fair at the former portal area. Photographs P–6 and P–7 show site conditions. The flat area around the building is highly compacted and does not support plant life. It should be ripped, topsoiled, and seeded. This site is not yet considered successfully reclaimed and should be evaluated again in 2004.

C–AM–19, Golden Cycle Mine: This site is considered successfully reclaimed and does not need to be visited again, except for monitoring shrub growth and survival as part of a long-term shrub survival study. DOE planted 16 shrubs on this reclaimed mine site in May and October 1999. Following are the shrub survival rates by year:

July 2000: 81 percent
July 2001: 69 percent
August 2002: 69 percent
June 2003: 69 percent

A figure showing locations, types, and survival status of shrubs planted at the mine site is in Appendix C.

C–AM–19, Worcester Shaft: This site is considered successfully reclaimed and does not need to be visited again, except for monitoring shrub growth and survival as part of a long-term shrub survival study. DOE planted 16 shrubs on this reclaimed mine site in May and October 1999. Following are the shrub survival rates by year:

July 2000: 69 percent
July 2001: 50 percent
August 2002: 38 percent
June 2003: 25 percent

A figure showing locations, types, and survival status of shrubs planted at the mine site is in Appendix C.

C–AM–19, King Solomon Waste Rock Dump: This waste rock dump was recontoured, pocked, and seeded by UMETCO in December 1998. Some areas were topsoiled, and others were not. In spring/summer 2001, UMETCO ripped the top portions of the dump—one on the north end and

one on the southeast end—and imported topsoil in an attempt to improve reclamation success. These areas were pocked in spring 2002 to repair erosional damage. By the time of the August 2002 visit, the repaired areas were barren except for a few Russian thistle plants.

In June 2003, site conditions were rated as fair on the basis of total plant cover (10-15 percent), but the types and diversity of established species were considered very good for 1 year's growth. This site is revegetated well enough that it could be released. Site conditions are shown in photographs P–8 through P–10. Inspectors found tamarisk growing on the upper top portion of the site. Although Montrose County does not yet require landowners to control this particular weed, it is considered noxious by the State of Colorado and the neighboring San Miguel County. It is recommended that UMETCO eradicate these plants before the site is released.

DOE planted 39 shrubs on this reclaimed site in May and October 1999 as part of a shrub survival study. Following are the shrub survival rates by year:

July 2000: 64 percent
July 2001: 33 percent (several shrubs destroyed by reclamation activity)
August 2002: no data collected
June 2003: 23 percent

A figure showing locations, types, and survival status of shrubs planted at the mine site is in Appendix C.

C–AM–19 Cliff Dweller Waste Rock Dumps: Two waste rock dumps at this mine site were recontoured, pocked, and seeded in December 1998 by UMETCO. One dump has a relatively flat topography and is south of the access road, and the other has steep slopes and is north of the access road. The dump south of the road is successfully reclaimed and does not need to be revisited, except for shrub monitoring.

In spring/summer 2001, UMETCO ripped the top portion of the north-side dump and imported topsoil in an attempt to improve reclamation success. Except for some Russian thistle plants, this area remained essentially bare in 2002. In June 2003, total plant cover on the top portion had increased to 35 percent, of which 20 percent was Russian thistle. The remaining 15 percent, however, was composed of desirable species. Although site conditions were rated as fair, the types and diversity of established species were considered very good for 1 year's growth. This site is revegetated well enough that it could be released. Site conditions are shown in photograph P–11.

Russian knapweed plants continue to thrive along the access road to this site. These noxious weeds need to be eradicated before the site is released.

DOE planted 32 shrubs on these reclaimed areas in May and October 1999 as part of a shrub survival study. Following are the shrub survival rates by year:

July 2000: 69 percent
July 2001: 37 percent (two shrubs destroyed by reclamation activity)
August 2002: no data collected
June 2003: 34 percent

A figure showing locations, types, and survival status of shrubs planted at the mine site is in Appendix C.

C–CM–25, Main Portal Area: Cotter Corporation reclaimed the main portal area in February 2003. At the time of the June 2003 site visit, total plant cover was measured at 10 percent, all of which was composed of annual weedy species. Reclamation success was considered poor. Populations of two noxious weeds—halogeton and Russian knapweed—were found at the site as well. These need to be controlled before the area can be released. Site conditions are shown in photograph P–12. Inspectors should evaluate the site again in 2004.

BLM Yellowbirds, Site 45: Sutherland Brothers reclaimed this site for BLM in fall 2001. At the time of the September 2003 visit, total plant cover was measured at 25 percent, of which 20 percent was considered desirable species. Reclamation success was considered good to very good. Site conditions are shown in photograph P–13. This site is considered successfully reclaimed and does not need to be visited again.

BLM Yellowbirds, Site 46: Sutherland Brothers reclaimed this site for BLM in fall 2002. After 1 year of plant growth, reclamation success was considered fair, mainly because of a relatively high annual weed cover. Site conditions are shown in photographs P–14 through P–16. This site should be evaluated again in 2004.

BLM Yellowbirds, Site 47 (BSB): Sutherland Brothers reclaimed this site for BLM in fall 2001. At the time of the September 2003 visit, total plant cover was measured at 35 percent, the majority of which was desirable species. Reclamation success was considered very good. The photograph of this site did not develop. This site is considered successfully reclaimed and does not need to be visited again.

BLM 5th National Bank: Cotter Corporation reclaimed this mine site for BLM in summer 2002. Reclamation success was considered fair at the time of the September 2003 visit, but plant cover and diversity were considered good for 1 year of growth. The photograph of this site did not develop. This site should be evaluated again in 2004.

BLM Long Park 11: Cotter Corporation reclaimed this mine site for BLM in summer 2002. At the time of the September 2003 visit, total plant cover was measured at 8 percent, half of which was considered desirable species.Reclamation success was considered fair. Site conditions are shown in photograph P–17. This site should be evaluated again in 2004.

BLM Long Park 16: Cotter Corporation reclaimed this mine site for BLM in summer 2002. At the time of the September 2003 visit, total plant cover was measured at 15-25 percent, the majority of which was considered desirable species. Reclamation success was considered good. Site conditions are shown in photographs P–18 and P–19. This site is considered successfully reclaimed and does not need to be visited again.

BLM Bluebell 1291: Cotter Corporation reclaimed this mine site for BLM in spring 2002. At the time of the September 2003 visit, total plant cover was measured at 20 percent, the majority of which was considered desirable species. Reclamation success was considered good. Site

conditions are shown in photographs P–20 and P–21. This site is considered successfully reclaimed and does not need to be visited again.

BLM Bluebell Topsoil Borrow Source: The topsoil borrow source used to reclaim BLM's Bluebell and Firecracker mine sites was reclaimed by Cotter Corporation in spring 2002. At the time of the September 2003 visit, total plant cover was measured at 35 percent, the majority of which was considered desirable species. Reclamation success was considered good. Site conditions are shown in photograph P–22. This site is considered successfully reclaimed and does not need to be visited again.

BLM Firecracker 1292 and 1293: Cotter Corporation reclaimed these mine sites for BLM in spring 2002. At the time of the September 2003 visit, total plant cover averaged 25 percent, the majority of which was considered desirable species. Reclamation success was considered good. However, a 50' by 120' patch of Russian knapweed was found between Vent 3 and the new drainage. This should be eradicated. Other than the noxious weeds, this site is considered successfully reclaimed. Site conditions are shown in photographs P–23 through P–28.

BLM Firecracker 1294: Cotter Corporation reclaimed this mine site for BLM in spring 2002. At the time of the September 2003 visit, total plant cover averaged 10 percent, the majority of which was considered desirable species. Overall, reclamation success was considered fair at the time of the September 2003 visit, although the types and diversity of established species were considered very good for 1 year's growth. Site conditions are shown in photograph P–29. This site should be evaluated again in 2004.

DOE Slick Rock Disposal Cell (SRDC) Spoils Pile: Crowley Construction reclaimed this area for DOE in September 2001. By the time of the August 2003 visit, plant cover totaled 25 percent, of which 20 percent was Russian thistle. Reclamation success was considered fair. Populations of two noxious weeds—halogeton and Russian knapweed—were found within the reclaimed area. Halogeton plants were dispersed throughout the sideslopes of the spoils pile, and Russian knapweed plants were growing in the "staging area" south of the access road. Site conditions are shown in photographs P–30 through P–32. The noxious weeds should be treated with herbicide and the site evaluated again in 2004.

3.0 Summary

Table 2 summarizes the status of site reclamation as of September 2003. Successfully reclaimed DOE lease tracts are suitable for relinquishment to BLM. Sites that require reevaluation but no action at this time are not yet considered successfully reclaimed but have good potential for success over time. The table lists the year (in parentheses) that the site should be reevaluated. If action needs to be taken, the action is listed in the fourth column of the table. Details of the recommendations for action are provided in Section 2.0 of this report.

Table 2. Status of Site Reclamation

Site	Successfully Reclaimed (or High Potential for Success)	Needs Reevaluation (No Action at this Time)	Action Needed
C–JD–7, Oversight Mine (west-facing slope)		X (2004)	
C–SR–11, Upper Brighton (waste rock dump & portal areas)	X	X (2004 or 2005)	Check Erosion Status of Sideslope
C–SR–13A, Veda Mad		X (2004)	
C–SR–15, Cougar Point	X	X (2004) Talus Slope Only	
C–SM–18, Waste Rock Dump & Portal		X (2004)	Area Around Building Needs Ripping, Topsoiling, Seeding
C–AM–19, Golden Cycle	X		Monitor Shrub Survival
C–AM–19, Worcester Shaft	X		Monitor Shrub Survival
C–AM–19, King Solomon	X		Remove Tamarisk; Monitor Shrub Survival
C–AM–19, Cliff Dweller	X	X (2004) Weed Check Only	Spray Noxious Weeds; Monitor Shrub Survival
C–CM–25, Main Portal Area		X (2004)	Spray Noxious Weeds
BLM Yellowbirds, Site 45	X		
BLM Yellowbirds, Site 46		X (2004)	
BLM Yellowbirds, Site 47 (BSB)	X		
BLM 5th National Bank		X (2004)	
BLM Long Park 11		X (2004)	
BLM Long Park 16	X		
BLM Bluebell 1291	X		
BLM Bluebell Topsoil Borrow Source	X		
BLM Firecracker 1292 & 1293	X	X (2004) Weed Check Only	Spray Noxious Weeds
BLM Firecracker 1294		X (2004)	
DOE SRDC Spoils Pile		X (2004)	Spray Noxious Weeds

Appendix A
Field Sheets

Noxious Weeds

ULMP Vegetation Assessment

water is in pond!

Date: 8-18-03	Staff: M Kastens / EC
Location: Slick Rock disposal cell – spoils pile	
Photos: MK7-9 View Easterly at N side of pile	Slope:
MK7-10 View NW from E. perch	Aspect:
MK7-11 " SE " " "	
Site Condition: farm	
Reclaimed by:	Year: Sept 2001
Topsoil Info:	
Amendments:	
Erosion Control Treatment:	
Erosion Condition: good	Site Use: and gravelled cell road
Noxious Weeds: – Halogeton along entrance road & here & there on	
Other: spoils pile; Russian knapweed in "staging area" & in 3 areas by pond	

Species:	% Cover	Species:	% Cover
SAPE		20	
ATCA		1	
Wheatgrasses / other young grasses		4	
SPCO		t	
pepperweed			
prostrate pigweed			
HEAN			
Western salsify			
ORHY			
Chenopodium sp.			
Aster sp.			
GUSA			
Solanum (ground cherry)			
halogeton			
4 O'clock			
blue flax			
		Total Plant Cover:	25
		Litter:	t
		Bare Ground:	55
		Rock:	20

ULMP Vegetation Assessment

Date: 9-2-03	Staff: M Kastens / EC
Location: JD-7 Oversight Mine - W slope only	
Photos: MK7 - 12 View WNW	Slope: steep
	Aspect: W
Site Condition: FAIR - not yet successful, but there is	
Reclaimed by: positive trend	Year:
Topsoil Info:	
Amendments: pocks	
Erosion Control Treatment: most pocks are nearly full of sediment	
Erosion Condition: Good - fair	Site Use:
Noxious Weeds: none	
Other:	

Species:	% Cover	Species:	% Cover
HIJA	3		
ORHY	2		
ATCA	5		
BRTE	t		
ATCO	t		
CHVI	t		
Western or slender wheatgrass	t		
Mormon tea	t		
few skeletons of MEOF		5	
		Total Plant Cover:	10
		Litter:	5
		Bare Ground:	65
		Rock:	20

ULMP Vegetation Assessment

Date: 8-18-03	Staff: MKastens / EC
Location: Upper Brighton SR-11	
Photos: MK7-5	Slope:
	Aspect:
Site Condition: Very Good	
Reclaimed by:	Year:
Topsoil Info:	
Amendments:	
Erosion Control Treatment:	
Erosion Condition: Mod on-site erosion	Site Use:
Noxious Weeds: many pocks nearly filled in	
Other: none	

Species:	% Cover	Species:	% Cover
ORHY	7		
MEOF	3		
ATCA	10		
Palmer Penstemon			
Slender Wheatgr	5		
West. Wheatgr			
SAPE			
SIHY			
Solanum (ground cherry)			
Prostrate pigweed			
LILE			
		Total Plant Cover:	25
		Litter:	5
		Bare Ground:	35
		Rock:	35

ULMP Vegetation Assessment

Date: 8-18-03	Staff: M Kastens / EC
Location: SR-13A / Veda Mad	
Photos: MK7-8 View SW of drainage channel / stock pond	Slope: 5-30%
	Aspect: WSW
Site Condition: Poor - no veg yet	
Reclaimed by: Cotter	Year: Jan/Feb 2003
Topsoil Info: yes - from nearby sources at base of reclaimed hillside	
Amendments:	
Erosion Control Treatment: packing	
Erosion Condition: good	Site Use:
Noxious Weeds: none	
Other:	

Species:	% Cover	Species:	% Cover
ATCO	t		
Wheatgrass	t		
prickly pear	t		
HIJA	t		
Blazing Star	t		
		Total Plant Cover:	t
		Litter:	0
		Bare Ground:	65
		Rock:	35

ULMP Vegetation Assessment

Date: 8-18-03	Staff: MKastens / EC
Location: SR-15 Cougar Point	
Photos: MK7-6 View S from Vent C-14 of "top"	Slope:
MK7-7 View NW at Cougar Point dump	Aspect:
Site Condition: Good	
Reclaimed by: Reams Contr. for DOE	Year: 2001
Topsoil Info: talus slopes fair (more SAPE)	
Amendments:	
Erosion Control Treatment:	
Erosion Condition: Good- some sheet wash	Site Use:
Noxious Weeds:	
Other:	

Species:	% Cover	Species:	% Cover
SAPE	8		
ORHY	2		
ATCA	8		
HIJA			
Wheatgrasses- slender	2		
Winterfat			
GUSA			
LILE			
juniper			
STCO			
prickly pear			
Eriogonum			
tansy aster			
blazing star			
		Total Plant Cover:	20
		Litter:	t
		Bare Ground:	70
		Rock:	10- 40 depending on area

ULMP Vegetation Assessment

Date: 6-17-03	Staff: M Kastens / E Cotter
Location: SM-18 - Cotter's Reclamation - former portal & WRD	
Photos: MK2-18: looking (SE) at portal	Slope: 2-15%
2-19: view NW at WRD	Aspect: all
* Site Condition: poor - fair (site may need to be reseeded)*	
Reclaimed by: Cotter Corp.	Year: June 2001
Topsoil Info: from nearby (scraped off from around WRD	
Amendments: topsoil	
Erosion Control Treatment: ripping & slight packing	
Erosion Condition: good	Site Use:
Noxious Weeds: none seen	
Other: dismal	

Species:	% Cover	Species:	% Cover
BRTE	1		
heronsbill	t		
MEOF	t		
Sporobolus cryptandrus (sand dropseed)	t		
SAPE	12		
SPCO	t		
kochia	2		
4-wing saltbush	3		
young wheatgrass	2		
Haplopappus filifolius	t		
HIJA	t		
LILE	t		
Blue grama	t		
curlycup gumweed	t		
GUSA	t		
CHVI	t		
Western stickright	t		
Astragalus sp	t		
tumble mustard	t		
Sand aster	t	Total Plant Cover:	10 - 20
Palmer penstemon	t	Litter:	10
STCO	t	Bare Ground:	55 - 65
prickly pear	t	Rock:	15

The WRD is not revegetated well enough to be released.

* on flats around building - spread topsoil, rip to break up compacted soil

ULMP Vegetation Assessment

Date: 6-17-03	Staff: M Kastens / E. Cotter
Location: AM-19 King Solomon - upper top portion	
Photos: MK2-14 looking NW of upper top	Slope:
	Aspect:
* Site Condition: Fair (V. good for 1-year's growth)	
Reclaimed by:	Year: Spring 2002
Topsoil Info: topsoil from nearby source	
Amendments: none	
Erosion Control Treatment: pocked surface	
Erosion Condition: excellent	Site Use:
Noxious Weeds: (Montrose Co.) → tamarisk on upper top portion	
Other:	

Species:	% Cover	Species:	% Cover
SAPE	2		
LILE (Blue flax)	1		
MEOF (yellow)	t		
ORHY	1		
young HIJA / young wheatgrasses (western thickspike)	10		
Astragalus sp.	t		
Heronsbill	t		
SPPA	t		
SIHY	t		
tamarisk	t		
Winterfat	t		
GUSA	1		
BRTE	t		
4-Wing saltbush	t		
Eriogonum (bladderpod)	t		
LASE	t		
Princes plume	t		
HEAN	t		
alfalfa	t		
tumble mustard	t	Total Plant Cover:	15
cocklebur ? or HEAN	t	Litter:	t
		Bare Ground:	55
		Rock:	30

* The site is revegetated well enough that it could be

ULMP Vegetation Assessment

Date: 6-18-03	Staff: MKastens / E. Cotter
Location: AM-19 King Solomon - Lower Top Portion	
Photos: MK2-15 View SE of lower top	Slope:
MK2-16 View SW downslope	Aspect:
Site Condition: Fair (good for 1st season growth)	
Reclaimed by:	Year: Spring 2002
Topsoil Info: from nearby source	
Amendments: none	
Erosion Control Treatment: packs	
Erosion Condition: excellent	Site Use:
Noxious Weeds:	
Other:	

Species:	% Cover	Species:	% Cover
GUSA	t		
LILE	t		
SAPE	1		
young wheatgrasses / young HISA	8		
MEOF	t		
cocklebur? or HEAN	t		
ORHY	t		
Astragalus sp.	t		
BRTE	t		
heronsbill	1		
HEAN	t		
SIHY	t		
SPPA	t		
H-wing	t		
CHAL	t		
		Total Plant Cover:	10
		Litter:	t
		Bare Ground:	65
		Rock:	25

* site is revegetated well enough that it could be

ULMP Vegetation Assessment

Date: 6-18-03	Staff: M Kastens / E Cotten
Location: AM-19 Cliff Dweller top	
Photos: MK2-17 looking N at reclaimed top	Slope:
	Aspect:
Site Condition: Fair	
Reclaimed by:	Year: Spring 2002
Topsoil Info: from nearby source	
Amendments:	
Erosion Control Treatment: rocks	
Erosion Condition: excellent	Site Use:
Noxious Weeds: * Russian knap along access road	
Other:	

Species:	% Cover	Species:	% Cover
SAPE	20		
HIJA	3		
AGSM	10		
ORHY	1		
LILE	t		
Kochia	t		
STCO	t		
SIHY	1		
MEOF	t		
BRTE	t		
tumble mustard	t		
		Total Plant Cover:	35
		Litter:	5
		Bare Ground:	35
		Rock:	25

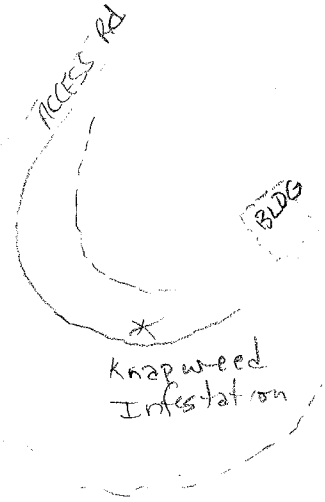
* Site is revegetated well enough to be released. - however

ULMP Vegetation Assessment

Date: 6-17-03	Staff: M Kastens / E Cotter
Location: CM-25 main portal area	
Photos: MK2-20 Looking SE at CM-25 portal area	Slope: all Aspect: all
Site Condition: poor	
Reclaimed by: Cotter Corp.	Year: Feb 2003
Topsoil Info: from local stockpile; most came from stock pond	
Amendments: some topsoil	
Erosion Control Treatment: ripping & packing	
Erosion Condition: good	Site Use:
Noxious Weeds: halogeton - just N along drainage on bottom & upper equip storage area	
Other: Russian knapweed	

Species:	% Cover	Species:	% Cover
SAPE	3		
MEOF	1		
Kochia	1		
cocklebur	3		
LILE	t		
halogeton	1		
hercules bell			
young wheatgrass			
CHAL			
BRTE			
CHVI			
ORHY			
Western stickseed	↓		
Sand dropseed	t		
		Total Plant Cover:	8
		Litter:	t
		Bare Ground:	62
		Rock:	30

* Need to spray weeds - halogeton. throughout


ACCESS RD
BLDG
Knapweed
Infestation

ULMP Vegetation Assessment

Date: 9-2-03	Staff: M Kastens / EC
Location: Yellowbirds - site 45?	
Photos: MK8-6: View E at former conical pile area	Slope:
	Aspect:
Site Condition: Good - V. Good - successful!	
Reclaimed by: Sutherland	Year: fall 2001
Topsoil Info: from adjacent areas	
Amendments:	
Erosion Control Treatment: ripping + packing	
Erosion Condition: excellent	Site Use: 0
Noxious Weeds: none	
Other:	

Species:	% Cover	Species:	% Cover
SAPE	5		
ATCA	5		
Wheatgrasses	5		
ORHY	5		
other young grasses	5		
blue flax			
P. Penstemon			
HEAN			
GUSA			
Euphorbia sp?			
		Total Plant Cover:	25
		Litter:	15
		Bare Ground:	40
		Rock:	20

ULMP Vegetation Assessment

Date: 9-2-03	Staff: MKastens / EC
Location: Yellowbirds 46 A5 & A6 & A4 & A3 & A1/A2	
Photos: MK8-3 : View SE of A5 WRD	Slope:
MK8-4 : View E of A3	Aspect:
Site Condition: Fair MK8-5: View SE of pond & A1/A2 WRD	
Reclaimed by: Sutherland	Year: fall 2002
Topsoil Info:	
Amendments:	
Erosion Control Treatment:	
Erosion Condition:	Site Use:
Noxious Weeds:	
Other:	

Species:	% Cover	Species:	% Cover
HEAN	5	Note: A2/A1 is in	
LILE		good condition &	
P. Penst.		has higher grass	
MEOF	5	cover (although	
Solonum	2	still quite weedy)	
Wheatgrasses	3	30-35%	
BRHY		plant cover	
Chenopodium sp.	5		
peppergrass			
GUSA			
Sand dropseed			
BRTE			
annual bursage	(5 in some areas)		
prostrate pigweed			
CHNI			
SPCO			
		Total Plant Cover:	20
		Litter:	20
		Bare Ground:	30
		Rock:	30

ULMP Vegetation Assessment

Date: 9-2-03	Staff: M Kastens / EC
Location: Yellowbirds - Site 47 (BSB)	
Photos: MK8-2 View N	Slope: 5-10
photo did not develop	Aspect: S
Site Condition: V. Good - successfully reclaimed	
Reclaimed by: Sutterland	Year: fall 2001
Topsoil Info: from adjacent areas	
Amendments:	
Erosion Control Treatment: ripping	
Erosion Condition: excellent	Site Use:
Noxious Weeds: none	
Other:	

Species:	% Cover	Species:	% Cover
wheatgrasses			
P. penstemon			
MEOF			
aster sp.			
ORHY			
wooly vetch			
CC gumweed			
Solanum (gr. cherry)			
tumble mustard			
chenopodium sp.			
GUSA			
Blue flax			
Euphorbia sp.			
ATCA			
alfalfa			
Blue grama			
pepperweed			
BRTE			
HEAN			
SPCO		Total Plant Cover:	35
		Litter:	25
		Bare Ground:	35
		Rock:	5

ULMP Vegetation Assessment

Date: 9-2-03	Staff: M Kastens / EC
Location: BLM 5th National Bank	
Photos: MK8-1: View NW	Slope: 3-12%
photo did not develop	Aspect: all
Site Condition: fair (good start)	
Reclaimed by: Carter Corp	Year: 2002
Topsoil Info: from adjacent areas	
Amendments:	
Erosion Control Treatment: roughened surface	
Erosion Condition: good	Site Use:
Noxious Weeds: none	
Other:	

Species:	% Cover	Species:	% Cover
RM bee plant			
SPCO			
ORHY			
wheatgrasses	3		
other young grasses			
sand dropseed			
blue flax			
Euphorbia sp.			
SAPE	1		
ATCA			
HEAN - yellow centers	1		
Solanum (gr cherry)	1		
ARFR			
P. penstemon			
Aster sp.			
pepperweed			
Chenopodium sp.			
		Total Plant Cover:	6
		Litter:	9
		Bare Ground:	85
		Rock:	5

ULMP Vegetation Assessment

Date: 9-2-03	Staff: M Kastens / EC
Location: BLM Long Park II	
Photos: MK 7-25: View N	Slope: 3-15
	Aspect: all
Site Condition: fair	
Reclaimed by: Cotter Corp for BLM	Year: 2002
Topsoil Info: from adjacent areas	
Amendments:	
Erosion Control Treatment: rough surface, ripping	
Erosion Condition: fair	Site Use:
Noxious Weeds: None	
Other:	

Species:	% Cover	Species:	% Cover
SAPE	3		
RM bee plant	t		
Wheatgrasses,	2		
other young grasses			
ORHY			
Sand dropseed			
Blue flax	t		
ATCA	1		
P. Penstemon	t		
Chenopodium sp	t		
HEAN	t		
Solanum (gr. cherry)	2		
MEOF			
unknown weedy fuzzy grass			
		Total Plant Cover:	8
		Litter:	7
		Bare Ground:	80
		Rock:	5

ULMP Vegetation Assessment

Date: 9-2-03	Staff: M Kastens / EC
Location: BLM Long Park 1c	
Photos: MK7-23 View S	Slope: 3-10
MK7-24 View NNW	Aspect: E/S
Site Condition: good - should be successful in near future	
Reclaimed by: Cotton Corp for BLM	Year: 2002
Topsoil Info: from adjacent area	
Amendments: topsoil	
Erosion Control Treatment: ripping, roughness	
Erosion Condition: fair, a few gullies; lots of sediment deposition	Site Use:
Noxious Weeds: none	
Other:	

Species:	% Cover	Species:	% Cover
Wheatgrasses	8		
Blue grama	t		
SAPE	5		
ATCA	5		
ORHY	t		
Blue flax	t		
MEOF	t		
RM Bee plant	t		
Sand dropseed	7		
Solanum (gr cherry)	t		
SPCO	t		
HEAN	t		
pigweed	t		
		Total Plant Cover: 15-	25
		Litter:	15
		Bare Ground:	55
		Rock:	5

ULMP Vegetation Assessment

Date: 9-2-03	Staff: M Kastens / EC
Location: Blue Bell 1291	
Photos: MK 7-20 View E at closed	Slope:
MK 7-21 - View S of [partial area]	Aspect:
Site Condition: [Blue Bell WPD] good condition	
Reclaimed by: Cotter Corp for BLM	Year: Spring 2002
Topsoil Info: from nearby sources	
Amendments:	
Erosion Control Treatment: packing	
Erosion Condition: good - quite a bit	~~Site Use~~: of sediment has filled
Noxious Weeds: none	low areas
Other:	

Species:	% Cover	Species:	% Cover
wheatgrasses	10	Nearby Topsoil	
ATCA	2	Borrow Source	
Blue grama	7	MK 7-22 : View ESE [reclaimed area]	
ORHY	3	SAPE	5
Solanum (gr. cherry)	1	HEAN (yellow center)	10
SAPE		SPCO	1
Rocky Mtn Bee Plant		ATCA	5
HEAN (yellow centers)	2	Euphorbia sp.	t
CHNA		Blue grama	1
CHVI		wheatgrasses	10
skeletonweed		unknown yellow forb	w/
Chenopodium sp.		pea-like flower	1
Sand dropseed		Palmer penstemon	t
		ORHY	2
		Blue flax	t
		SIHY	t
		sand drop t / Plant cover	35
		prickly pear t / litter	5
		Bare	60
		Total Plant Cover:	20
		Litter:	15
		Bare Ground:	45
		Rock:	20

ULMP Vegetation Assessment

Date: 9-2-03	Staff: M Kastens / EC
Location: Firecracker 1292 & 1293	
Photos: MK 7-14 View SSW of 1292 & 1293	Slope: variable Aspect: mainly N
Site Condition: - good - should be successful in near future	
Reclaimed by: Collier Corp for BLM	Year: spring 2002
Topsoil Info: from nearby sources	
Amendments:	
Erosion Control Treatment: pocks	
Erosion Condition: excellent	Site Use:
Noxious Weeds: Russian knapweed between vent 3 & new drainage	
Other: → 50 x 120' area	

Species:	% Cover	Species:	% Cover
wheatgrasses	20	Photos	
ORHY	1		
ATCA	1	MK 7-15: View SE of 1292 bat gate	
Solanum (or cherry)	1	MK 7-16: View NW of created drainage betw 1292 & 1293	
Blue grama	1		
HIJA	1		
skeletonweed	t	MK 7-17: View SE of created drainage by 1292	
MEOF			
HEAN		MK 7-18: View S of former 1293 WRD & portal	
SAPE			
GUSA		MK 7-19: View S of drainage "drop off" - note large boulder protecting pocked area	
CHNI			
		Total Plant Cover:	25
		Litter:	10
		Bare Ground:	50
		Rock:	15

ULMP Vegetation Assessment

Date: 9-2-03	Staff: M Kastens / EC
Location: Firecracker - Site 1294	
Photos: MK 7-13 View N of reclaimed area	Slope: 3-15
	Aspect: NNW
Site Condition: good for recent seeding; Fair overall	
Reclaimed by: Cotton Corp for BLM	Year: Spring 2002
Topsoil Info: from surrounding sources	
Amendments:	
Erosion Control Treatment: surface roughness & pocking	
Erosion Condition:	Site Use:
Noxious Weeds:	
Other:	

Species:	% Cover	Species:	% Cover
wheatgrass	6	trench above 1294 -	
ATCA	4	good condition	
ORHY	t	20% plant cover	
Solanum (gr. cherry)		successfully reclaimed	
HEMU			
SAPE			
young HIJA			
Palmer penstemon			
GUSA			
CHVI			
unknown thistle			
woolly loosestrife			
rocklebur	✓		
		Total Plant Cover:	10
		Litter:	15
		Bare Ground:	65
		Rock:	10

Appendix B
Photographs

Appendix B, Photograph Log

Photograph Number	Photograph Description
P–1	C–JD–7 Oversight Mine: View WNW of steep west-facing slope
P–2	C–SR–11, Upper Brighton: View NE or reclaimed waste rock dump
P–3	C–SR–13A, Veda Mad: View SW of drainage channel/stock pond
P–4	C–SR–15, Cougar Point: View S from Vent C–14 of "top"
P–5	C–SR–15, Cougar Point: View NW of reclaimed waste rock dump
P–6	C–SM–18: View SE of reclaimed portal area
P–7	C–SM–18: View NW of reclaimed waste rock dump
P–8	C–AM–19, King Solomon: View NW of upper top portion
P–9	C–AM–19, King Solomon: View SE of lower top portion
P–10	C–AM–19, King Solomon: View SW downslope
P–11	C–AM–19, Cliff Dweller: View N of reclaimed top
P–12	C–CM–25: View SE of main portal area
P–13	BLM Yellowbirds, Site 45: View E of former conical pile area
P–14	BLM Yellowbirds, Site 46: View SE of reclaimed A5 waste rock dump
P–15	BLM Yellowbirds, Site 46: View E of reclaimed A3 waste rock dump
P–16	BLM Yellowbirds, Site 46: View SE of pond and reclaimed A1/A2 waste rock dump
P–17	BLM Long Park 11: View N of reclaimed area
P–18	BLM Long Park 16: View S of reclaimed area
P–19	BLM Long Park 16: View NNW of reclaimed area
P–20	BLM Bluebell: View E of reclaimed 1291 portal area
P–21	BLM Bluebell: View S of reclaimed 1291 waste rock dump
P–22	BLM Bluebell: View ESE of reclaimed topsoil borrow source area
P–23	BLM Firecracker: View SSW of reclaimed 1292 and 1293 areas
P–24	BLM Firecracker: View SE of 1292 bat gate
P–25	BLM Firecracker: View NW of drainage created between 1292 and 1293
P–26	BLM Firecracker: View SE of drainage created adjacent to 1292
P–27	BLM Firecracker: View S of drainage "drop-off"; note large boulders protecting pocked area
P–28	BLM Firecracker: View S of reclaimed 1293 waste rock dump and portal area
P–29	BLM Firecracker: View N of reclaimed 1294 area
P–30	SRDC Spoils Pile: View E of N side of reclaimed pile (disposal cell in background)
P–31	SRDC Spoils Pile: View NW of S side of reclaimed pile (from E "perch")
P–32	SRDC Spoils Pile: View SE of S side of reclaimed pile (from E "perch")

P–1: C–JD–7 Oversight Mine: View WNW of steep west-facing slope

P–2: C–SR–11, Upper Brighton: View NE or reclaimed waste rock dump

P–3: C–SR–13A, Veda Mad: View SW of drainage channel/stock pond

P–4: C–SR–15, Cougar Point: View S from Vent C–14 of "top"

P–5: C–SR–15, Cougar Point: View NW of reclaimed waste rock dump

P–6: C–SM–18: View SE of reclaimed portal area

P–7: C–SM–18: View NW of reclaimed waste rock dump

P–8: C–AM–19, King Solomon: View NW of upper top portion

P–13: BLM Yellowbirds, Site 45: View E of former conical pile area

P–14: BLM Yellowbirds, Site 46: View SE of reclaimed A5 waste rock dump

P–15: BLM Yellowbirds, Site 46: View E of reclaimed A3 waste rock dump

P–16: BLM Yellowbirds, Site 46: View SE of pond and reclaimed A1/A2 waste rock dump

P–17: BLM Long Park 11: View N of reclaimed area

P–18: BLM Long Park 16: View S of reclaimed area

P–19: BLM Long Park 16: View NNW of reclaimed area

P–20: BLM Bluebell: View E of reclaimed 1291 portal area

P–21: BLM Bluebell: View S of reclaimed 1291 waste rock dump

P–22: BLM Bluebell: View ESE of reclaimed topsoil borrow source area

P–23: BLM Firecracker: View SSW of reclaimed 1292 and 1293 areas

P–24: BLM Firecracker: View SE of 1292 bat gate

P–25: BLM Firecracker: View NW of drainage created between 1292 and 1293

P–26: BLM Firecracker: View SE of drainage created adjacent to 1292

P–27: BLM Firecracker: View S of drainage "drop-off"; note large boulders protecting pocked area

P–28: BLM Firecracker: View S of reclaimed 1293 waste rock dump and portal area

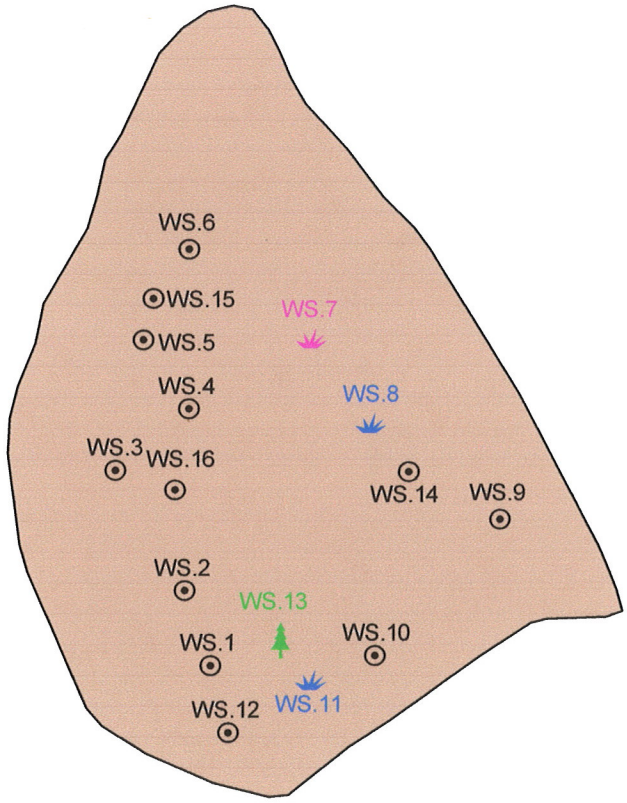
P–29: BLM Firecracker: View N of reclaimed 1294 area

P–30: SRDC Spoils Pile: View E of N side of reclaimed pile (disposal cell in background

P–31: SRDC Spoils Pile: View NW of S side of reclaimed pile (from E "perch")

P–32: SRDC Spoils Pile: View SE of S side of reclaimed pile (from E "perch")

Appendix C
Shrub Survival Figures



Live Plant

- Antelope Bitterbrush
- Mountain Mahogany
- Serviceberry
- Pinyon Pine
- Former Plant Location
- Waste Rock Dump

100 0 100 Feet

N

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE GRAND JUNCTION, COLORADO	Prepared by S.M. Stoller Corporation Under DOE Contract No. DE-AC13-02GJ79491
Worcester Shaft Waste Dump Vegetation Update	
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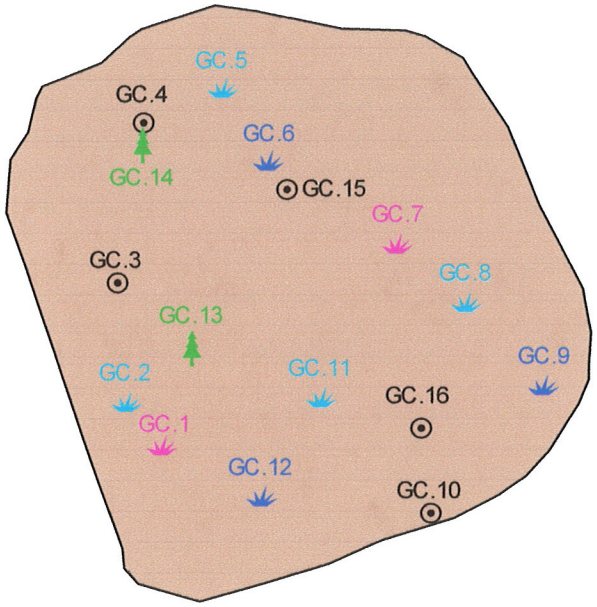

Live Plant

- Antelope Bitterbrush
- Mountain Mahogany
- Serviceberry
- Pinyon Pine
- Former Plant Location
- Waste Rock Dump

100 0 100 Feet

N

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE GRAND JUNCTION, COLORADO	Prepared by S.M. Stoller Corporation Under DOE Contract No. DE-AC13-02GJ79491
Golden Cycle Waste Dump Vegetation Update	
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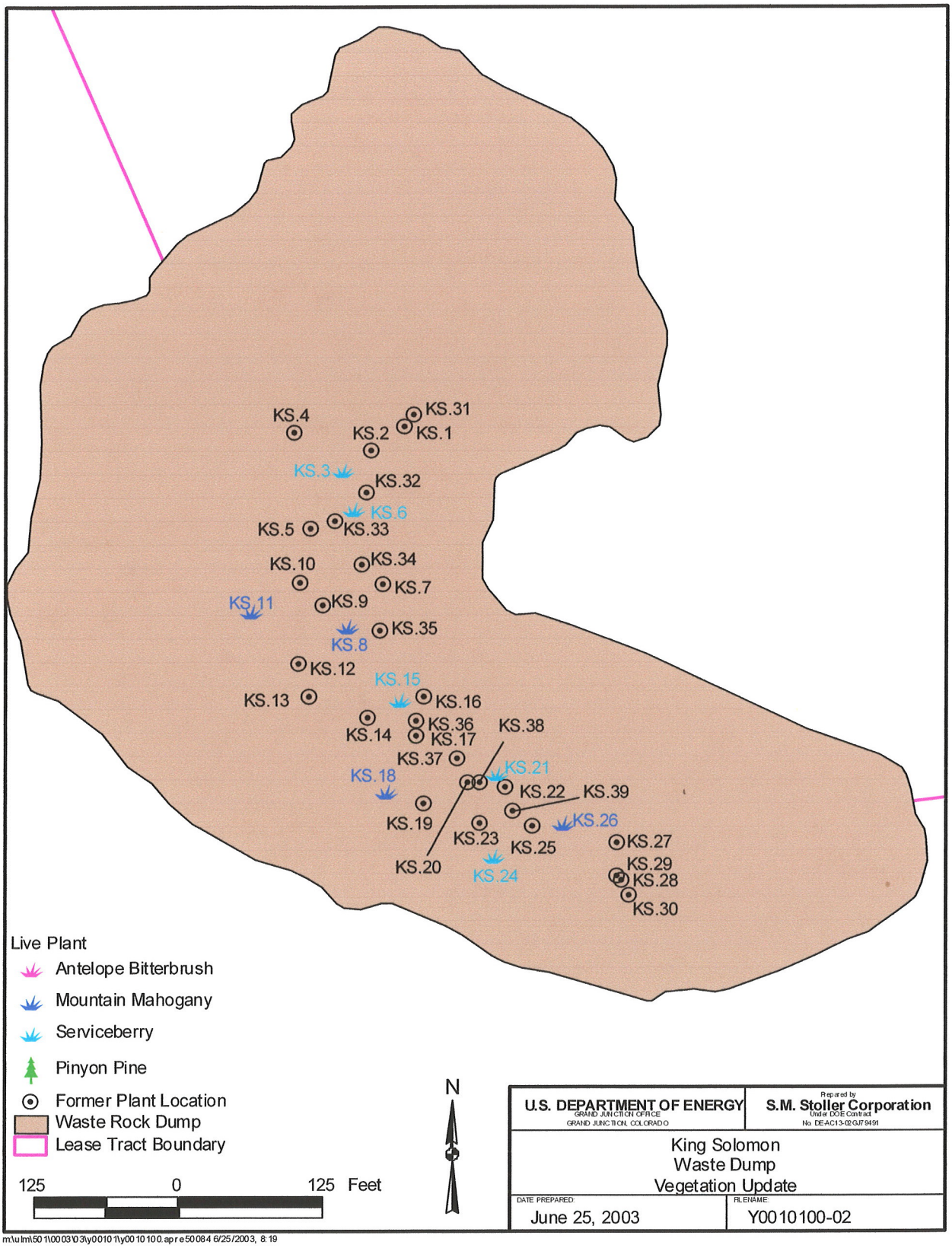

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GRAND JUNCTION, COLORADO

Prepared by
S.M. Stoller Corporation
Under DOE Contract
No. DE-AC13-02GJ79491

King Solomon
Waste Dump
Vegetation Update

DATE PREPARED: June 25, 2003

FILENAME: Y0010100-02

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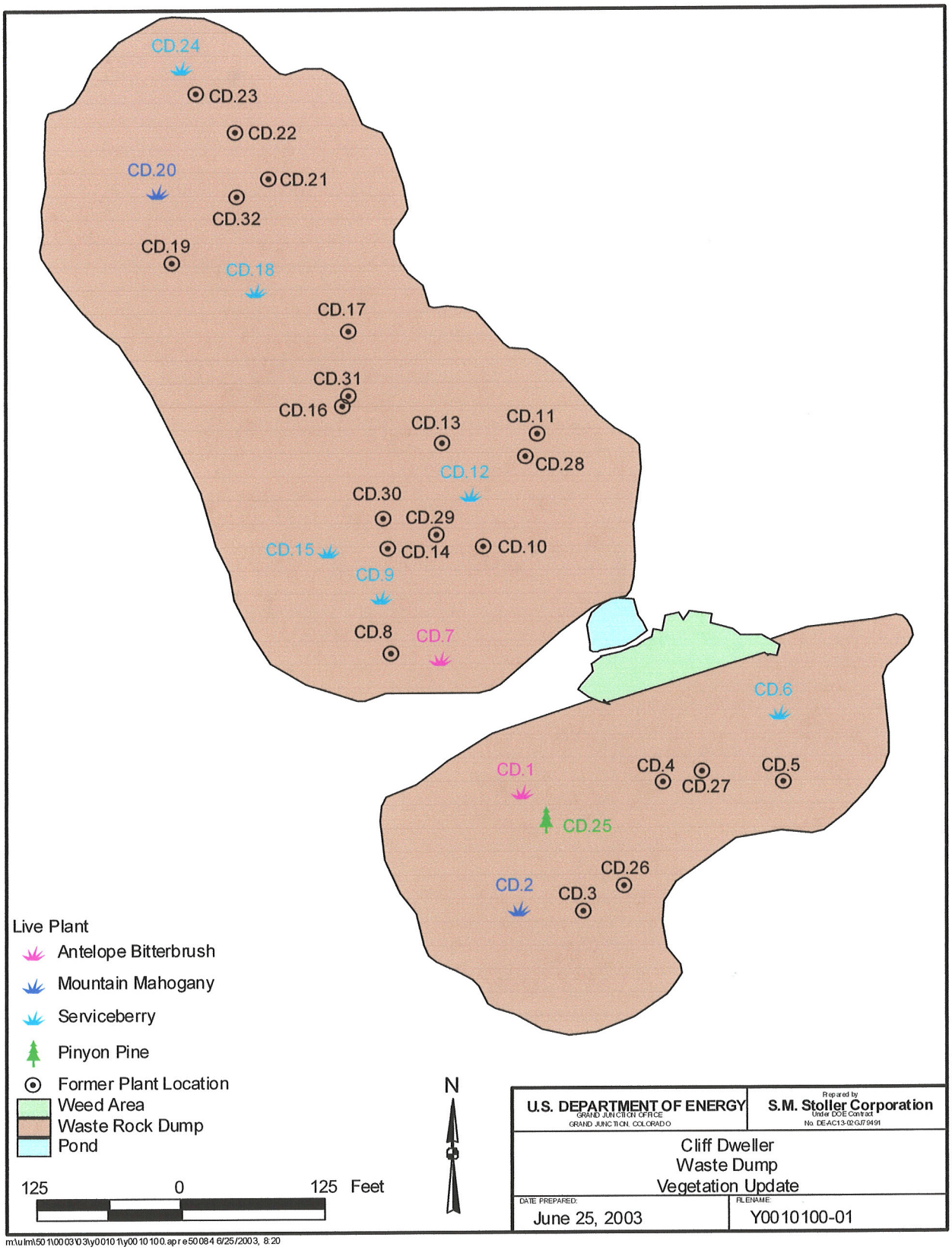

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GRAND JUNCTION, COLORADO

Prepared by
S.M. Stoller Corporation
Under DOE Contract
No. DE-AC13-02GJ79491

Cliff Dweller
Waste Dump
Vegetation Update

DATE PREPARED: June 25, 2003

FILENAME: Y0010100-01

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2004 Reclamation Success Trip Report

Uranium Leasing Sites

June 2005

Prepared by Environmental Services Group
The S.M. Stoller Corporation

1.0 Overview

On June 21 and 22 and July 13, 2004, Uranium Leasing Sites staff assessed 11 reclaimed mine sites on lease tracts managed by the U.S. Department of Energy (DOE), 15 reclaimed mine sites located on lands managed by the U.S. Bureau of Land Management, and 1 reclaimed DOE site near the Slick Rock disposal cell. The purpose of the assessments was to inspect vegetation establishment and soil stability at the sites to determine if they had been successfully reclaimed. This trip report summarizes the results of the reclamation assessments.

To determine reclamation success, the following parameters were recorded at each site: 1) percent plant cover, 2) percent litter cover, 3) percent rock cover, 4) percent bare ground, and 5) erosion condition. Percent cover for plants, litter, rock, and bare ground was determined by ocular estimate. Erosion condition was determined by observing gullying; rilling; depth of soil removal around rocks, plants, or debris; pedestaling of stones or plants; and presence of flow patterns. On the basis of these observations, the site was then subjectively rated as stable, slightly eroding, moderately eroding, or severely eroding.

After conditions at the reclaimed sites were observed and recorded, they were compared with the conditions on adjacent, relatively undisturbed lands. Conditions that compared favorably were given a "reclamation success" descriptor of good, very good, or excellent, and conditions that compared unfavorably were given a descriptor of fair, poor, or very poor. The overall soil stability of the sites also was factored into the assessment. Table 1 summarizes the rankings and observations at each of the reclaimed sites. Copies of the field sheets are in Appendix A, and photographs of the reclaimed areas are in Appendix B. Section 2.0 provides details of the site rankings, and Section 3.0 summarizes results of the reclamation assessments.

2.0 Results and Recommendations

C–JD–7, Oversight Mine: Cotter Corporation reclaimed this area in spring 1999. In 2000, DOE constructed several diversion ditches to reduce gully erosion that had been occurring on the site. By the time of the 2002 site visit, all the reclaimed areas—with the exception of the steep, west-facing sideslope—were considered successfully reclaimed. The west-facing sideslope consisted of 10 percent plant cover (3 percent of which were desirable species) and 92 percent bare ground and rock. By the time of the 2004 site visit, plants still composed 10 percent of the cover, but all plants were desirable species (fourwing saltbush, galleta grass, and Indian ricegrass). Given the soil quality, slope steepness, and slope aspect of this site, it is considered successfully reclaimed. Photograph P–1 in Appendix B shows site conditions.

C–SR–11, Upper Brighton: This site is now considered successfully restored. Desirable plant cover increased from 4 percent in 2002 to 30 percent in 2004. The site has remained stable for 3 years and is expected to remain stable. Photograph P–2 in Appendix B shows site conditions.

C–SR–13A, Veta Glad: Cotter Corporation topsoiled, pocked, and seeded this site in 2002 for DOE. In 2004, the site was considered successfully revegetated; however, a few active gullies were present on the site. Photograph P–3 shows one of the small gullies. This site should be visited in 2005 to determine if soils are stable.

Table 1. Summary of Site Descriptions

Reclaimed Site	Date Reclaimed	Plant Cover (%)	Litter Cover (%)	Rock Cover (%)	Bare Ground (%)	Erosion Condition	Reclamation Success
C–JD–7, Oversight Mine (west-facing slope only)	1999 by Cotter for DOE	10	t	20	70	Stable	Fair-Good
C–SR–11, Upper Brighton (waste rock dump)	Summer 1999 by Cotter for DOE Topsoil—Summer 2001 by Reams for DOE	30	t	30	40	Stable	Very Good
C–SR–13A, Veta Glad	2002 by Cotter for DOE	20	t	20	60	Slightly Eroding	Fair-Good
C–SR–13A, Georgetto	2002 by Cotter for DOE	13	t	30	57	Slightly Eroding	Fair
C–SR–13A, Veta Mad	Jan/Feb 2003 by Cotter	7	t	25	68	Slightly Eroding	Poor-Fair
C–SR–15, Cougar Point	2001 by Reams for DOE	28	t	45	27	Stable	Fair-Good
C–SM–18, WRD & Portal	June 2001 by Cotter	40	10	15	35	Stable	Poor
C–AM–19, King Solomon (upper top portion)	Spring 2002 by UMETCO	30	t	30	40	Stable	Good
C–AM–19, King Solomon (lower top portion)	Spring 2002 by UMETCO	30	t	25	45	Stable	Good
C–AM–19, Cliff Dweller (top portion)	Spring 2002 by UMETCO	40	5	20	35	Stable	Good
C–LP–21	Spring 2003 by Cotter	35	t	20	45	Stable	Fair
C–CM–25 Main Portal Area	February 2003 by Cotter	50	5	30	15	Stable	Poor
BLM 5th National Bank	Summer 2002 by Cotter for BLM	25	t	5	70	Stable	Fair
BLM Long Park 11	Summer 2002 by Cotter for BLM	35	t	5	60	Stable	Good
BLM Firecracker 1294	Spring 2002 by Cotter for BLM	25	10	5	60	Stable	Very Good
BLM Yellowbirds, Site 46	Fall 2002 by Sutherland for BLM	38	20	15	27	Stable	Fair-Good
BLM Yellowbirds, Site 47 (BSB)	Fall 2001 by Sutherland for BLM	39	5	5	51	Stable	Very Good
BLM Yellowbirds, Site 48 (A, B, C, and D)	Fall 2002 by Sutherland for BLM	20-40	5-20	5-40	15-70	Stable	Good

Reclaimed Site	Date Reclaimed	Plant Cover (%)	Litter Cover (%)	Rock Cover (%)	Bare Ground (%)	Erosion Condition	Reclamation Success
BLM Tailholt Mines	Oct. 2001 by Dirt 'n Iron for BLM	27	t	38	35	Stable	Very Good
BLM Full Moons, Site 11	Spring 2002 by Cotter for BLM	15	t	65	20	Stable	Good
BLM Full Moons, Site 15	Spring 2002 by Cotter for BLM	25	10	45	20	Stable	Very Good
BLM Full Moons, Site 16	Spring 2002 by Cotter for BLM	15	t	50	35	Stable	Good
BLM Full Moons, Site 17	Spring 2002 by Cotter for BLM	35	10	30	25	Stable	Excellent
BLM Full Moons, Sites 5, 6, 7, and 8	Spring 2002 by Cotter for BLM	25	5	35	35	Stable	Excellent
Slick Rock Disposal Cell, Spoils Pile	September 2001 by Crowley Construction for DOE	35	10	10	45	Stable	Fair

C–SR–13A, Georgetto: Cotter Corporation topsoiled, pocked, and seeded this site in 2002 for DOE. In 2004, revegetation success at the site was considered fair; plant cover was only 13 percent. Additionally, a large gully was present on the site. Photograph P–4 shows the gully. This site should be visited in 2005 to determine if vegetative cover has improved and soils are stable.

C–SR–13A, Veta Mad: Cotter Corporation competed reclamation of this mine site in January/February 2003. At the time of the site visit in August 2003, only a trace of vegetation was present on the site. By the time of the 2004 visit, plant cover had increased slightly to 7 percent and was mostly composed of desirable species. One species of noxious weed, halogeton, was found dispersed throughout the site. Reclamation success was rated as poor to fair. Two gullies were present through the middle of the reclaimed waste rock dump. Photograph P–5 shows the gullies, and photographs P–6 and P–7 show other reclaimed features at the site. The halogeton at this site should be treated with herbicide and the site evaluated again in 2005.

C–SR–15, Cougar Point: Reams Construction reclaimed this mine site for DOE in 2001. With the exception of the talus slope area, it was considered successfully reclaimed in 2003. By the time of the 2004 site visit, vegetative cover on the talus slope had improved, and this slope was considered successfully reclaimed as well. Photograph P–8 shows site conditions

C–SM–18, Waste Rock Dump and Portal Areas: Cotter Corporation reclaimed this mine site in June 2001. At the time of the June 2004 site visit, kochia and Russian thistle dominated plant cover. Reclamation success was considered poor. Photographs P–9 and P–10 show site conditions. This site is not yet considered successfully reclaimed and should be evaluated again in 2005.

C–AM–19, King Solomon Waste Rock Dump (Upper Top Portion and Lower Top Portion): The upper and lower top portions of the King Solomon waste rock dump were topsoiled, ripped, and reseeded in 2001. These areas were pocked in spring 2002 to repair erosional damage. In June 2003, site conditions were rated as fair on the basis of total plant cover (10-15 percent), but the types and diversity of established species were considered very good for 1 year's growth. By the time of the July 2004 visit, vegetative cover had increased to 30 percent at both areas, and the entire site was considered successfully reclaimed. Site conditions are shown in photographs P–11, P–12, and P–13.

C–AM–19 Cliff Dweller Waste Rock Dump (Top Portion): The top portion of the Cliff Dweller waste rock dump was topsoiled, ripped, and reseeded in 2001 to improve reclamation success. In June 2003, total plant cover on the top portion was 35 percent, of which 20 percent was Russian thistle. The remaining 15 percent, however, was composed of desirable species. By the time of the 2004 site visit, vegetative cover had increased to 40 percent, 20 percent of which was considered desirable. No Russian knapweed plants were observed along the access road. This site is considered successfully reclaimed. Site conditions are shown in photograph P–14.

C–LP–21: Cotter Corporation reclaimed this mine site in spring 2003. At the time of the 2004 site visit, vegetative cover totaled 35 percent, 13 percent of which was considered desirable species. Russian knapweed, a noxious weed, was observed on the flat area by the road. Because of the higher-than-desired weed cover, reclamation success was considered only fair. Site

conditions are shown in photographs P–15 through P–18. The Russian knapweed at this site should be treated with herbicide and the site evaluated again in 2005.

C–CM–25, Main Portal Area: Cotter Corporation reclaimed the main portal area in February 2003. At the time of the June 2003 site visit, plant cover totaled 10 percent, all of which was composed of annual weedy species. By June 2004, plant cover had increased to 50 percent, of which only 6 percent was considered desirable species. Populations of two noxious weeds—halogeton and Russian knapweed—were found at the site as well. These need to be controlled before the area can be released. Site conditions are shown in photograph P–19. Inspectors should evaluate the site again in 2005.

BLM 5th National Bank: Cotter Corporation reclaimed this mine site for BLM in summer 2002. Reclamation success was considered fair at the time of the September 2003 visit. By 2004, total plant cover had increased to 25 percent, but 15 percent of this total was composed of annual weedy species. Site conditions are shown in photograph P–20. This site should be evaluated again in 2005.

BLM Long Park 11: Cotter Corporation reclaimed this mine site for BLM in summer 2002. At the time of the September 2003 visit, total plant cover was estimated at 8 percent, half of which was considered desirable species. In 2004, plant cover totaled 35 percent, of which 18 percent was considered desirable. Although annual weeds composed a higher-than-desirable percentage of plant cover, a diverse mix of desirable species have become established, and the site is considered successfully reclaimed. Site conditions are shown in photograph P–21.

BLM Firecracker 1294: Cotter Corporation reclaimed this mine site for BLM in spring 2002. At the time of the September 2003 visit, total plant cover averaged 10 percent, the majority of which was considered desirable species. By 2004, plant cover totaled 25 percent, all but 1 percent of which was considered desirable species. Site conditions are shown in photograph P–22. This site is considered successfully reclaimed and does not need to be revisited.

BLM Yellowbirds, Site 46: Sutherland Brothers reclaimed this site for BLM in fall 2002. By 2004, plant cover totaled 38 percent, most of which was considered desirable species. Site conditions are shown in photograph P–23. This site is considered successfully reclaimed and does not need to be revisited.

BLM Yellowbirds, Site 47 (BSB): Sutherland Brothers reclaimed this site for BLM in fall 2001. At the time of the 2004 site visit, plant cover totaled 39 percent, the majority of which was desirable species. Reclamation success was considered very good. Site conditions are shown in photograph P–24. This site is considered successfully reclaimed and does not need to be visited again.

BLM Yellowbirds, Site 48: Sutherland Brothers reclaimed this site for BLM in fall 2002. At the time of the June 2004 site visit, plant cover totaled 20 to 40 percent, depending on the specific area of the mine site. Reclamation success was considered good, and the site will not need to be revisited. Site conditions are shown in photographs P–25 and P–26.

BLM Tailholt Mines: Dirt 'n Iron reclaimed this site for BLM in October 2001. By the time of the 2004 site visit, reclamation success was considered very good. However, a patch

(approximately 30 ft by 50 ft) of Russian knapweed was discovered on the reclaimed waste rock dump. This infestation needs to be controlled before the site is considered successfully reclaimed. Photograph P–27 shows site conditions. It is recommended that this site be revisited after the Russian knapweed has been treated.

BLM Full Moons: Cotter Corporation reclaimed these mine sites for BLM in spring 2002. All the sites visited in 2004—Sites 5, 6, 7, 8, 11, 15, 16, and 17—were in good to excellent condition and are considered successfully reclaimed. Photographs P–28 through P–30 show conditions at some of the mine sites. These sites do not need to be revisited.

DOE Slick Rock Disposal Cell (SRDC) Spoils Pile: Crowley Construction reclaimed this area for DOE in September 2001. By the time of the August 2003 visit, plant cover totaled 25 percent, of which 20 percent was Russian thistle. In 2004, total plant cover had increased to 35 percent, of which 17 percent was Russian thistle. Reclamation success was considered fair. As in 2003, halogeton plants were dispersed throughout the sideslopes of the spoils pile. Site conditions are shown in photographs P–31 through P–33. The halogeton should be treated with herbicide and the site evaluated again in 2005.

3.0 Summary

Table 2 summarizes the status of site reclamation as of July 2004. Successfully reclaimed DOE lease tracts are suitable for relinquishment to BLM. Sites that require reevaluation are not yet considered successfully reclaimed but have good potential for success over time. The table lists the year (in parentheses) that the site should be reevaluated. If action needs to be taken, the action is listed in the fourth column of the table. Details of the recommendations for action are provided in Section 2.0 of this report.

Table 2. Status of Site Reclamation

Site	Successfully Reclaimed	Needs Reevaluation	Action Needed
C–JD–7, Oversight Mine (west-facing slope)	X		
C–SR–11, Upper Brighton (waste rock dump & portal areas)	X		
C–SR–13A, Veta Glad		X (2005)	Check gully features
C–SR–13A, Georgetto		X (2005)	Check gully features
C–SR–13A, Veta Mad		X (2005)	Treat halogeton and check gully features
C–SR–15, Cougar Point	X		
C–SM–18, Waste Rock Dump & Portal		X (2005)	
C–AM–19, Golden Cycle	X		Monitor shrub survival
C–AM–19, Worcester Shaft	X		Monitor shrub survival
C–AM–19, King Solomon	X		Monitor shrub survival
C–AM–19, Cliff Dweller	X		Monitor shrub survival
C–LP–21		X (2005)	Spray noxious weeds
C–CM–25, Main Portal Area		X (2005)	Spray noxious weeds
BLM 5th National Bank		X (2005)	Check annual weed cover

Site	Successfully Reclaimed	Needs Reevaluation	Action Needed
BLM Long Park 11	X		
BLM Firecracker 1294	X		
BLM Yellowbirds, Site 46	X		
BLM Yellowbirds, Site 47 (BSB)	X		
BLM Yellowbirds, Site 48	X		
BLM Tailholt Mines		X (2005)	Spray noxious weeds
BLM Full Moons	X		
DOE SRDC Spoils Pile		X (2005)	Spray noxious weeds

Appendix A
Field Sheets

Date: 6-22-04	Staff: M Kastens / MK/EC
Location: JD-7 Oversight Mine	
Photos: EC1-~~25~~: View WNW of steep W-facing Slope 23	Slope:
	Aspect:
Site Condition: Fair - Good - as good as it's going to get	
Reclaimed by:	Year:
Topsoil Info:	
Amendments:	
Erosion Control Treatment:	
Erosion Condition: Stable	Site Use:
Noxious Weeds: NA	
Other:	

Species:	% Cover	Species:	% Cover
ORHY	3		
HIJA	4		
ATCA	2		
SIHY	t		
MEOF	1		
BRTE	t		
CHVI	t		
Monarda	t		
ATCO	t		
		Total Plant Cover:	10
		Litter:	t
		Bare Ground:	
		Rock:	

ULMP Vegetation Assessment

Date: 6-21-04	Staff: MK/EC
Location: SR-11 Upper Brighton	
Photos: EC1-~~10~~ 8; like #4 - nice Palmer Penstemon	Slope:
EC1-~~11~~ 10;	Aspect:
Site Condition: V. Good	
Reclaimed by:	Year:
Topsoil Info:	
Amendments:	
Erosion Control Treatment:	
Erosion Condition: V. good *?	Site Use:
Noxious Weeds: none → gullies from last year applac	
Other:	

Species:	% Cover	Species:	% Cover
Palmer Penstemon	2		
ATCA	7		
MEOF (yellow)	3		
SAPE	3		
ORHY	7		
western wheatgrass } slender wheat.	8		
other penstemon (~~[illegible]~~)	t	Z Blue-stem penstemon	
SIHY	t		
HEAN	t		
prince's plume	t		
		Total Plant Cover:	30
		Litter:	t
		Bare Ground:	40
		Rock:	30

ULMP Vegetation Assessment

Date: 6-21-04	Staff: MK/CC
Location: SR-13A Veta Glad / Georgetto	
V. Glad → Photos: EC1-15: View SSE at reclaimed WRD	Slope: 15-20%
& Georgetto → 1-16: View NNW at " "	Aspect: W / SW
Site Condition:	
Reclaimed by: Cotter for DOE	Year: topsoiled, packed & seeded 2002
Topsoil Info: from local site	
Amendments: —	
Erosion Control Treatment: packs	
Erosion Condition: Good - 1 big gully on N end of WRD	Site Use:
Noxious Weeds:	
Other:	

Species: Veta Glad	% Cover	Species: Georgetto	% Cover
STCO	2		
ATCA	9	SAPE	1
ORHY	5	ATCA	5
HIJA	1	Blazing Star	
GUSA	t	wheatgrass	2
SPCO	t	HIJA	1
Blue grama	1	ORHY	3
Wheatgrass (western)	2	LILE	
LILE	t	STCO	1
ATCO	t	prickly pear	
Palmer penst	t	Blue grama	
		Palmer penst	
Site Condition Fair → Good successful			
Total Cover: 20		Total Cover	13
Litter: t		Litter	t
Bare: 60		Bare	57
Rock: 20		Rock	30
		Total Plant Cover:	
		Litter:	
		Bare Ground:	
		Rock:	

ULMP Vegetation Assessment

Date: 6-21-04	Staff: MK/EC
Location: SR-15 Cougar Point - Steep sideslope (WRD)	
Photos: EC1-13; View NW of Recl. WRD	Slope: 30%
"	Aspect:
Site Condition: Fair - Good	
Reclaimed by:	Year:
Topsoil Info:	
Amendments:	
Erosion Control Treatment: pocking	
Erosion Condition: V. Good	Site Use:
Noxious Weeds:	
Other:	

Species:	% Cover	Species:	% Cover
SAPE	15		
ATCA	7		
ORHY	3		
wheatgrasses (western)	1		
Blazing Star	2		
Aster sp.	t		
4 o'clock	t		
HIJA	t		
Winterfat	t		
This is going to be a successfully revegetated area; there is a good stand of ATCA, ORHY & wheatgrasses; the SAPE will slowly fade away over time - AOK site			
		Total Plant Cover:	28
		Litter:	t
		Bare Ground:	27
		Rock:	45

Date: 6-22-04	Staff: M Kastens / EC
Location: C-SM-18 WRD	
Photos: EC2-8: View NW of WRD	Slope:
EC2-9: View SE of partial area	Aspect:
Site Condition: Poor	
Reclaimed by:	Year:
Topsoil Info:	
Amendments:	
Erosion Control Treatment:	
Erosion Condition: stable	Site Use:
Noxious Weeds: none	
Other:	

Species:	% Cover	Species:	% Cover
Kochia	25		
BRTE	1		
MEAI			
SAPE	12		
ATCA	2		
Palmer penstemon			
wheatgrass (western)			
ORHY			
STCO			
CHVI			
yellow allysum			
sand dropseed			
HIJA			
Blue grama			
annual grass?			
western salsify			
ARTR			
		Total Plant Cover:	40
		Litter:	10
		Bare Ground:	
		Rock:	

Stoller

photo ~~20~~ 19 (P 8 from 2003 report)

JOB NO.: UM2P Vegetation DATE: 7/13/04

JOB NAME: AM219 King Solomon Upper top

PREPARED: Linda Sheader REVIEWED:

SHEET NO.: OF

Site Condition : Good
Erosion Condition : Stable

Spp.	%	Spp.	%
Oryzopsis hymenoides	7		
~~Elymus~~ ~~Agropyron~~ Elymus triticoides	2		
Sitanion hystrix	tr		
Hilaria jamesii	2		
~~Pascopyrum smithii~~			
Salsola Kali	8		
Gutierrezia sarothrae	tr		
Mentzelia sp.	tr		
Sphaeralcea coccinea	tr		
Melilotus alba	1		
Helianthus annuus	tr		
Ceratoides lanata	tr		
Stanleya pinnata	tr		
Astragalus sp.	tr		
Linum lewisii	tr		
Melilotus officinalis	tr		
Senecio sp.	tr		
Agropyron cristatum	tr		
Medicago sativa	tr		
Penstemon palmerii	tr		
Pascopyrum smithii	tr		
Atriplex canescens	tr		
Agropyron trachycaulum	10		

plants	30%
litter	trace
bare	40%
rock	30%

Stoller

JOB NO.: KMLP Vegetation DATE: 7/13/04

JOB NAME: AM-19 King Solomon-Lower top

PREPARED: Linda Sheader REVIEWED:

SHEET NO.: OF

18 19 w/ sideslope (P10 of 2003 report)

Photos: 18 17 (P9 of 2003 report)

Site Condition: Good

Erosion Condition: stable

Species	%	~~Species~~	~~%~~
Oryzopsis hymenoides	10		
Sitanion hystrix	2		
Hilaria jamesii	2		
~~Agropyron~~ Elymus triticoides	7		
Ceratoides lanata	tr		
Erodium cicutarium	tr		
Gutierrezia sarothrae	tr		
Melilotus alba	1		
Sphaeralcea coccinea	tr		
Salsola kali	~~2~~ 8		
Linum lewisii	tr		
Helianthus annuus	tr		
Penstemon palmeri	tr		
~~vetch~~ Astragalus sp.	tr		
Atriplex canescens	tr		
Lactuca serriola	tr		
Chenopodium album	tr		
Stanleya pinnata	tr		
Halogeton glomerata (on edge)	tr		
Grindelia squarrosa curlycup gumweed	tr		
Polygonum aviculare	tr		
Stipa comata	tr		

tam cut; regrowth in area below dump

no tam. in reclaimed area

Total plant cover	30%
Litter	trace
Bare	45%
Rock	25%

Stoller

JOB NO.: UMLP Vegetation DATE: 7/13/04

JOB NAME: Cliff Dweller top

PREPARED: Linda Sheader REVIEWED:

SHEET NO.: OF

Photo ~~21~~ 20 (P-11 from 2003 rept)

Site Condition: Good
Erosion Condition: Good

Spp	%	~~Spp~~	~~%~~
Oryzopsis hymenoides	2		
Pascopyrum smithii	2		
Agropyron trachycaulum	8		
Bromus tectorum	tr		
~~Agropyron~~ Elymus triticoides	8		
Hilaria jamesii	tr		
Sitanion hystrix	tr		
Salsola kali	20%		
Kochia scoparia	tr		
Ceratoides lanata	tr		
Tragopogon dubius	tr		
Melilotus alba	tr		
Atriplex confertifolia	tr		

No Russian knapweed seen in area
None seen along access road

Plant cover	40%
Litter	5%
Rock	20%
Bare	35%

Date: 6-22-04	Staff: M Kastens / EC
Location: LP-21	
Photos: EC2-3: View NW of former bldg/staging area; EC2-4: View N of reclaimed WRD	Slope: 3-15%
	Aspect: E, S, W, N
Site Condition: Fair; EC2-64: View NE of N lobe of WRD	
Reclaimed by: Cotter Corp; EC2-65: View NE of W side of WRD	Year: 2003 (spring)
Topsoil Info: tiny bit from site, mostly no topsoil	
Amendments:	
Erosion Control Treatment: pocking	
Erosion Condition: V. good	Site Use:
Noxious Weeds: Russian knapweed on flat area by road	
Other:	

Species:	% Cover	Species:	% Cover
SAPE	20	Astragalus sp.	
CHAL		Prince's plume	
tumble mustard		"ground cherry"	
HISA	1		
SPCO			
red-stem filaree			
HEAN	1	site condition rated	
ORHY	1	fair because of	
wheatgrasses west slender thick-sp.	4	high cover by weeds	
sand dropseed	1		
ATCA	1		
HOJU	t		
BRTE			
MEOF	1		
CHVI	3		
SIHY			
Blazing star			
ST Viridula			
Winterfat			
Western stickleaf		Total Plant Cover:	35
Kochia	2	Litter:	t
LILE		Bare Ground:	45
Palmer penstemon		Rock:	20

Date: 6-22-04	Staff: M Kastens / EC
Location: C-CM-25	
Photos: EC2-~~8~~ 7: View SE of main portal area	Slope:
	Aspect:
Site Condition: Poor	
Reclaimed by:	Year:
Topsoil Info:	
Amendments:	
Erosion Control Treatment:	
Erosion Condition:	Site Use:
Noxious Weeds: Halogeton (along former road) — is it noxious in Montrose Co.?	
Other:	

Species:	% Cover	Species:	% Cover
CHAL	3	crested wheatgrass	
Kochia	5	winterfat	
halogeton	2	Prince's plume	
SAPE	20	prostrate verbena	
devil's shoestring		sand dropseed	
MEAL/MEOF	13	cocklebur	
wheatgrasses	2	curlycup gumweed	
Palmer penstemon		GUSA	
LILE			
STCO			
peppergrass			
red-stem filaree		☆ reclaimed access road	
ATCA		is extremely weedy	
BRTE	1		
CHVI	1		
Japanese brome			
SIHY			
ORHY	1		
tumblemustard			
prickly lettuce		Total Plant Cover:	50
HIJA	2	Litter:	5
→ salty chenopod?		Bare Ground:	
"silvery goosefoot"		Rock:	

Chenopodium incanum on fremontii

sample #2

Date: 6-22-04	Staff: M Kastens / EC
Location: BLM - 5th National Bank	
Photos: EC2-6: View W at reclaimed WRD	Slope:
	Aspect:
Site Condition: Fair because of high weed cover	
Reclaimed by:	Year:
Topsoil Info:	
Amendments:	
Erosion Control Treatment:	
Erosion Condition:	Site Use:
Noxious Weeds: none	
Other:	

Species:	% Cover	Species:	% Cover
CHAL + other Chenopod.?	10	western stickseed	
Palmer amaranth		fringed sage	
Kochia			
ground cherry	1		
Winterfat			
ATCA	1		
ORHY	2		
wheatgrasses	2		
sunflower w/ yellow center	3		
yellow pea-like flowered plant - goldensmoke - Corydalis aurea			
Palmer penstemon	1		
STCO	1		
HIJA			
tumble mustard			
BRTE			
SPCO			
LILE			
red-stem filaree			
SAPE	3		
unknown bushy forb/shrub	t	Total Plant Cover:	25
unknown annual weed	1	Litter: Mentzelia sp.	t
w/ sticky leaves		Bare Ground:	70
MEAL	t	Rock:	5

Date: 6-22-04	Staff: M Kastens / E.C
Location: BLM Long Park II	
Photos: EC2-~~2~~1: View N	Slope:
	Aspect:
Site Condition: Good - too much SAPE ; but successful	
Reclaimed by:	Year:
Topsoil Info:	
Amendments:	
Erosion Control Treatment:	
Erosion Condition:	Site Use:
Noxious Weeds:	
Other:	

Species:	% Cover	Species:	% Cover
SAPE	16		
ORHY	8		
ATCA	3		
LILE	t		
Rocky Mtn. bee plant	1		
Palmer penstemon	1		
SPCO	1		
Wheatgrass (western	2		
MEOF	1		
Winterfat	t		
CHAL	t		
Blue grama	t		
HIJA	2		
HEAN	t		
other penstemon	t	→ Blue stem penstemon	
tumble mustard	t	Penstemon cyanocaulis	
SPCO	t		
		Total Plant Cover:	35
		Litter:	t
		Bare Ground:	60
		Rock:	5

3" ple

Date: 6-22-04	Staff: M Kastens / EC
Location: BLM Firecracker 1294	
Photos: EC2-0: View N of reclaimed 1294	Slope:
	Aspect:
Site Condition: V. Good	
Reclaimed by:	Year:
Topsoil Info:	
Amendments:	
Erosion Control Treatment:	
Erosion Condition:	Site Use:
Noxious Weeds: none except near 1292 / 1293	
Other:	

Species:	% Cover	Species:	% Cover
STCO	2		
ORHY	5		
ATCA	4		
Wheatgrass slender western	9		
CHAL	t		
HIJA	2		
SAPE	t		
Blue grama	t		
SIHY	1		
LILE	t		
MEOF	t		
Palmer penstemon	1		
Yellowspine thistle	1		
CHVI	1		
GUSA	t		
Borage sp.	t		
Prince's plume	t		
"ground cherry"	t		
HEAN	t		
Western stickleaf	t	Total Plant Cover:	25
skeletonweed	t	Litter:	10-15
Euphorbia sp.	t	Bare Ground:	60
Ipomopsis congesta	t	Rock:	5

Date: 6-22-04	Staff: M Kastens / EC
Location: BLM Yellowbird 46	
Photos: EC2-12: View S across 46 dump	Slope:
	Aspect: 3-8
Site Condition: Fair - Good	
Reclaimed by: Sutherland	Year: Fall 2002
Topsoil Info: from nearby	
Amendments:	
Erosion Control Treatment: pocking, roughening	
Erosion Condition: Excellent	Site Use:
Noxious Weeds: NA	
Other:	

Species:	% Cover	Species:	% Cover
MEOF	18		
wheatgrasses	13		
P. penstemon	1		
tumble mustard	3		
CHVI			
ORHY	2		
ground cherry			
GUSA			
SAPE			
HIJA			
yellowspine or waxyleaf thistle (1)			
LILE			
CHAL			
red-stem filaree			
HEAN			
SHY			
ATCA			
SPPA			
		Total Plant Cover:	38
		Litter:	20
		Bare Ground:	
		Rock:	15

Date: 6-22-04	Staff: M Kastens / EC
Location: BLM Yellowbird 47	
Photos: EC2 – 13: Site 47, View W	Slope: 3-5
	Aspect:
Site Condition: V. Good	
Reclaimed by: Sutherland	Year: Fall 2002
Topsoil Info: from on-site	
Amendments:	
Erosion Control Treatment: ripping, roughness	
Erosion Condition:	Site Use: most grasses heavily grazed
Noxious Weeds: NA	
Other:	

Species:	% Cover	Species:	% Cover
BRTE	3		
wheatgrasses			
GUSA	3		
P. penstemon	2	all desirable grasses together	23
SPCO			
MEOF	7		
ORHY			
mpl other needlegrass (tall)		Stipa lettermanii	
LILE			
ATCA	1		
woolly vetch			
red-stem filaree			
STCO			
unknown large forb w/ white flowers			
tiny			
Hymenoxys filifolia			
		Total Plant Cover:	39
		Litter:	5
		Bare Ground:	
		Rock:	5

Date: 6-22-04	Staff: M Kastens / EC
Location: BLM Yellowbird 48 A, B, C, D	
Photos: EC2-10: View N of Site 48D	Slope: 1-5 %
EC2-11: View SW of site 48C	Aspect: —
Site Condition: Good	
Reclaimed by: Sutherland for DOE/BLM	Year: Fall 2002
Topsoil Info: from local site	
Amendments:	
Erosion Control Treatment: pocks, rough surface, lots of dead limbs	
Erosion Condition: Excellent	Site Use: site heavily grazed by cattle
Noxious Weeds:	
Other:	

Species:	% Cover	Species:	% Cover
ATCA	2		
Palmer penstemon	2		
cow-munched perennial grass (desirable sp.)	20-25		
BRTE	5-20		
mustard sp.	5-20		
GUSA	2-5		
unknown large forb w/ tiny white flowers (4 petals), large tap root	1-5	— Mustard sp. (Lepidium sp.)	
ORHY (included above)	—		
LILE			
Eriogonum sp.			
MEOF / MEAL			
STCO			
woolly vetch			
astragalus sp.			
Borage sp.			
prickly lettuce			
red-stem filaree			
other purple penstemon		Total Plant Cover:	20-40
		Litter:	5-20
		Bare Ground:	
		Rock:	5-40

Sample

ULMP Vegetation Assessment

Date: 6-21-04	Staff: MK/EC
Location: BLM Tailholt Mines	
Photos: EC1-~~12~~ 10; View NNE @ reclaimed WRD	Slope: 5-12
	Aspect: all
Site Condition: V. Good	
Reclaimed by: Dirt 'n Iron	Year: Oct. 2001
Topsoil Info: a little bit from on site	
Amendments:	
Erosion Control Treatment: some pocking	
Erosion Condition: V. Good	Site Use:
Noxious Weeds: Russian Knapweed on reclaimed WRD ~30x50' patch	
Other:	

Species:	% Cover	Species:	% Cover
LILE	t		
ORHY	7		
ATCA	7		
BRTE	t		
wheatgrasses:	10		
western			
slender			
STCO	1		
yellow foxtail	t		
Astragalus sp.	t		
Wooly Vetch	t		
Palmer penstemon	t		
Russian Knapweed	1		
SIHY	1		
CHNA	t		
SAPE	t		
Aster sp.	t		
red stem filaree	t		
MEOF	t		
foxtail barley	t	Total Plant Cover:	≈ 7
		Litter:	t
		Bare Ground:	35
		Rock:	38

ULMP Vegetation Assessment

Date: 6-21-04	Staff: MK/EC
Location: BLM Full Moons - Sites	
Photos:	Slope:
	Aspect:
Site Condition:	
Reclaimed by: Cotter Corp for BLM	Year: Spring 2002
Topsoil Info:	
Amendments:	
Erosion Control Treatment: pocking	
Erosion Condition: Excellent	Site Use:
Noxious Weeds:	
Other:	

Species: Site 17	% Cover	Species: Site 16	% Cover
photo EC1-20 Portal B/C		Good Cond.	
" " 21 Portal A			
		Total plant	15
Excellent condition		Litter	t
ORHY	3	Bare	35
STCO	3	Rock	50
LILE	t		
skeletonweed	t		
ATCA	8	Site 15	
wheatgrass? ryegrass?	14	V. Good	
prince's plume	3	Total	25
BRTE	2	Litter	10
hairy golden aster	t	Bare	20
CHAL	t	Rocks	45
HIJA	t		
Blue grama	2	Site 11 Good	
Mormon tea	t	Total	15
Total	35	Litter	t
Litter	10	Rock	65
Rock	30	~~Total Plant Cover~~: Bare	20
bare	25	~~Litter~~:	
		~~Bare Ground~~:	
		~~Rock~~:	

view NW
" N

sample

weather
" seeded
wheatgrass

ULMP Vegetation Assessment

Date: 6-21-04	Staff:
Location: BLM Full Moons	
Photos:	Slope:
	Aspect:
Site Condition:	
Reclaimed by: Cotter	Year: Spring 2002
Topsoil Info:	
Amendments:	
Erosion Control Treatment:	
Erosion Condition:	Site Use:
Noxious Weeds:	
Other:	

Species: Sites 5, 6, 7, 8	% Cover	Species:	% Cover
photo ECI-22: view S of			
reclaimed WRD			
Excellent Cond.			
Total Plant no weeds!	25		
Litter	5		
Rock	35		
Bare	35		
		Total Plant Cover:	
		Litter:	
		Bare Ground:	
		Rock:	

ULMP Vegetation Assessment

Date: 6-21-04	Staff: MK/EC
Location: SRDC Spoils Pile	
Photos: EC1-19: View SE of S Side from middle perch 1-20: View NW of S side from middle perch 1-21: View E of N side	Slope: Aspect:
Site Condition: Fair - because of cover by SAPE	
Reclaimed by:	Year:
Topsoil Info:	
Amendments:	
Erosion Control Treatment: ripping on contour	
Erosion Condition: V. Good	Site Use:
Noxious Weeds: Halogeton - extremely healthy along road	
Other:	

Species:	% Cover	Species:	% Cover
SAPE	17	* site is v. dry;	
lambsquarter	t	plants are drought-stressed	
halogeton (pulled)	1	many grasses appear dead;	
ATCA	8	even SAPE is stressed	
wheatgrasses (slender, western)	2		
ORHY	4	elk sign is common	
SPCO	t		
SIHY	1	vege is slightly	
STCO	3	more lush on N side	
Blue grama	t		
HIJA	t		
Western sticktight	t		
Palmer penstemon	t		
GUSA	t		
tumble mustard	t		
BRTE	t		
Western salsify	t		
HEAN	t		
		Total Plant Cover:	35
		Litter:	10
		Bare Ground:	45
		Rock:	10

Appendix B
Photographs

Appendix B, Photograph Log

Photograph Number	Photograph Description
P–1	C–JD–7 Oversight Mine: View WNW of steep west-facing slope
P–2	C–SR–11, Upper Brighton: View NE or reclaimed waste rock dump
P–3	C–SR–13A, Veta Glad: View SSE of reclaimed waste rock dump
P–4	C–SR–13A, Georgetto: View NNW of reclaimed waste rock dump
P–5	C–SR–13A, Veta Mad: View S of reclaimed waste rock dump
P–6	C–SR–13A, Veta Mad: View NW of reclaimed topsoil borrow area
P–7	C–SR–13A, Veta Mad: View SW of drainage channel
P–8	C–SR–15, Cougar Point: View NW of reclaimed waste rock dump
P–9	C–SM–18: View SE of reclaimed portal area
P–10	C–SM–18: View NW of reclaimed waste rock dump
P–11	C–AM–19, King Solomon: View NW of upper top portion
P–12	C–AM–19, King Solomon: View SE of lower top portion
P–13	C–AM–19, King Solomon: View SW downslope
P–14	C–AM–19, Cliff Dweller: View N of reclaimed top
P–15	C–LP–21: View NW of former building/staging area
P–16	C–LP–21: View N of reclaimed waste rock dump
P–17	C–LP–21: View NE of N lobe of reclaimed waste rock dump
P–18	C–LP–21: View NE of W side of reclaimed waste rock dump
P–19	C–CM–25: View SE of main portal area
P–20	BLM 5th National Bank: View W of reclaimed waste rock dump
P–21	BLM Long Park 11: View N of reclaimed waste rock dump
P–22	BLM Firecracker: View N of reclaimed 1294 area
P–23	BLM Yellowbirds, Site 46: View S across reclaimed waste rock dump
P–24	BLM Yellow birds, Site 47: View W of reclaimed area
P–25	BLM Yellowbirds, Site 48D: View W of reclaimed area
P–26	BLM Yellowbirds, Site 48C: View SW of reclaimed area
P–27	BLM Tailholt Mines: View NNE of reclaimed waste rock dump
P–28	BLM Full Moons, Site 17: View NW of reclaimed portal B/C
P–29	BLM Full Moons, Site 17: View N of reclaimed portal A
P–30	BLM Full Moons, Sites 5, 6, 7, and 8: View S of reclaimed waste rock dump
P–31	SRDC Spoils Pile: View SE of S side from middle perch
P–32	SRDC Spoils Pile: View NW of S side from middle perch
P–33	SRDC Spoils Pile: View E of N side

P–1: C–JD–7 Oversight Mine: View WNW of steep west-facing slope

P–2: C–SR–11, Upper Brighton: View NE or reclaimed waste rock dump

P–3: C–SR–13A, Veda Glad: View SSE of reclaimed waste rock dump

P–4: C–SR–13A, Georgetto: View NNW of reclaimed waste rock dump

P–5: C–SR–13A, Veta Mad: View S of reclaimed waste rock dump

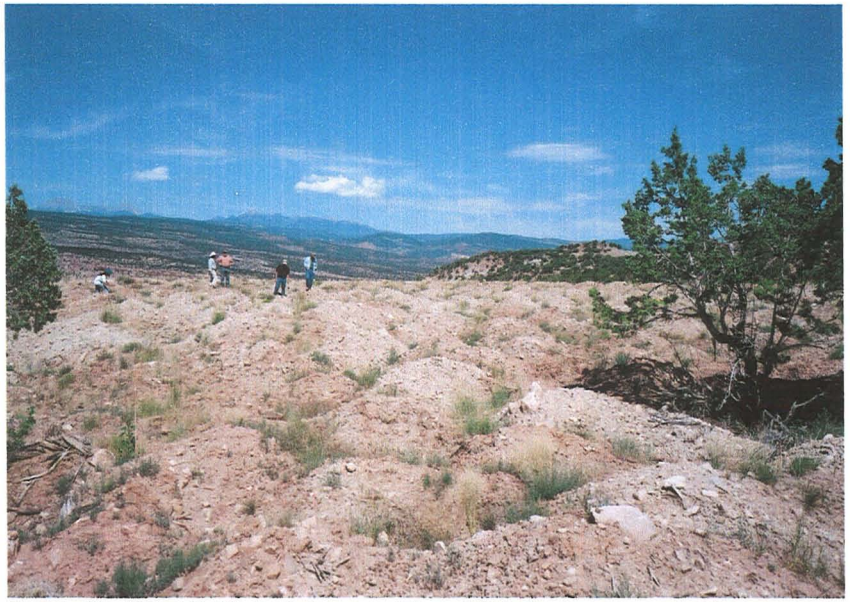
P–6: C–SR–13A, Veta Mad: View NW of reclaimed topsoil borrow area

P–7: C–SR–13A, Veta Mad: View SW of drainage channel

P–8: C–SR–15, Cougar Point: View NW of reclaimed waste rock dump

P–9: C–SM–18: View NW of reclaimed ~~waste rock dump~~ portal area

P–10: C–SM–18: View NW of reclaimed waste rock dump



P–11: C–AM–19, King Solomon: View NW of upper top portion

P–12: C–AM–19: King Solomon: View SE of lower top portion

P–13: C–AM–19, King Solomon: View SW downslope

P–14: C–AM–19, Cliff Dweller: View N of reclaimed top

P–15: C–LP–21: View NW of former building/staging area

P–16: C–LP–21: View N of reclaimed waste rock dump

P–17: C–LP–21: View NE of N lobe of reclaimed waste rock dump

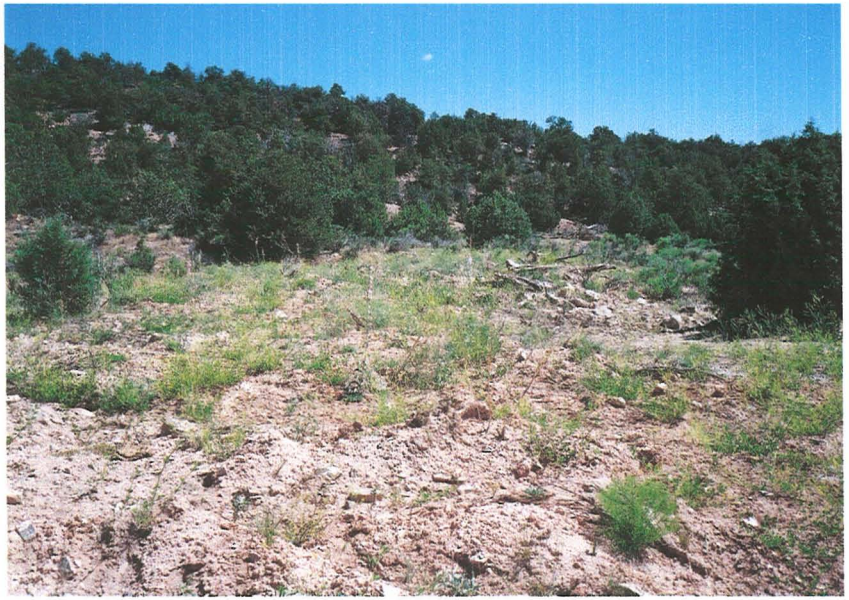
P–18: C–LP–21: View NE of W side of reclaimed waste rock dump

P–19: C–CM–25: View SE of main portal area

P–20: BLM 5th National Bank: View W of reclaimed waste rock dump

P–21: BLM Long Park 11: View N of reclaimed waste rock dump

P–22: BLM Firecracker: View N of reclaimed 1294 area

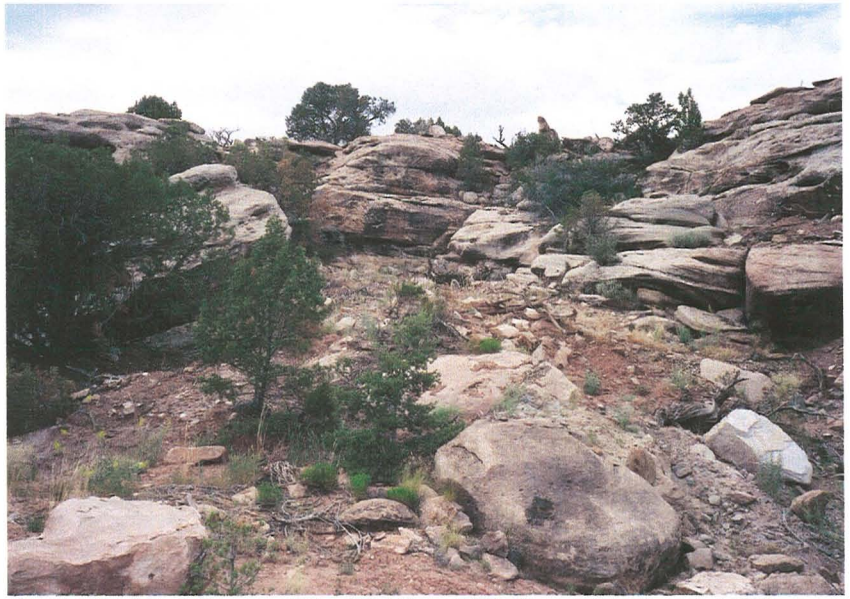

P–23: BLM Yellowbirds, Site 46: View S across reclaimed waste rock dump

P–24: BLM Yellowbirds, Site 47: View W of reclaimed area

P–25: BLM Yellowbirds, Site 48D: View W of reclaimed area

P–26: BLM Yellowbirds, Site 48C: View SW of reclaimed area

P–27: BLM Tailholt Mines: View NNE of reclaimed waste rock dump



P–28: BLM Full Moons, Site 17: View NW of reclaimed portal B/C

P–29: BLM Full Moons, Site 17: View N of reclaimed portal A

P–30: BLM Full Moons, Sites 5, 6, 7, and 8: View S of reclaimed waste rock dump

P–31: SRDC Spoils Pile: View SE of S side from middle perch

P–32: SRDC Spoils Pile: View NW of S side from middle perch

P–33: SRDC Spoils Pile: View E of N side

2005 Reclamation Success Trip Report

Uranium Leasing Sites

December 2005

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

1.0 Overview

On June 14 and October 3, 2005, Uranium Leasing Sites (ULS) staff assessed six reclaimed mine sites on lease tracts managed by the U.S. Department of Energy (DOE), four reclaimed mine sites located on lands managed by the U.S. Bureau of Land Management, and one reclaimed DOE site near the Slick Rock disposal cell. The purpose of the assessments was to inspect vegetation establishment and soil stability at the sites to determine if they had been successfully reclaimed. In addition, staff monitored shrub survival on four reclaimed mine sites within lease tract C–AM–19. This trip report summarizes the results of the reclamation assessments and shrub survival monitoring.

To determine reclamation success, the following parameters were recorded at each site: 1) percent plant cover, 2) percent litter cover, 3) percent rock cover, 4) percent bare ground, and 5) erosion condition. Percent cover for plants, litter, rock, and bare ground was determined by ocular estimate. Erosion condition was determined by observing gullying; rilling; depth of soil removal around rocks, plants, or debris; pedestaling of stones or plants; and presence of flow patterns. On the basis of these observations, the site was then subjectively rated as stable, slightly eroding, moderately eroding, or severely eroding.

After conditions at the reclaimed sites were observed and recorded, they were compared with the conditions on adjacent, relatively undisturbed lands. Conditions that compared favorably were given a "reclamation success" descriptor of good, very good, or excellent, and conditions that compared unfavorably were given a descriptor of fair, poor, or very poor. The overall soil stability of the sites also was factored into the assessment. Table 1 summarizes the rankings and observations at each of the reclaimed sites. Copies of the field sheets are in Appendix A, and photographs of the reclaimed areas are in Appendix B. Section 2.0 provides details of the site rankings and results of the shrub survival study, and Section 3.0 summarizes results of the reclamation assessments.

2.0 Results and Recommendations

C–SR–13A, Veta Glad: Cotter Corporation topsoiled, pocked, and seeded this site in 2002 for DOE. In 2004, the site was considered successfully revegetated; however, a few active gullies were present on the site. The site was revisited in June 2005, and the gullies were determined to be stable. Natural armoring in the channels, such as rock and vegetation, provide stability. Photographs P–1 and P–2 show conditions at the reclaimed mine site. ULS staff found one of the site's AP corner markers hanging in a tree. This marker needs to be replaced on the steep side slope.

C–SR–13A, Georgetto: Cotter Corporation topsoiled, pocked, and seeded this site in 2002 for DOE. In 2004, revegetation success at the site was considered fair; plant cover was only 13 percent. Additionally, a large gully was present on the site. In 2005, desirable plant cover had increased to 30 percent, and the gully was determined to be stable. Photograph P–3 shows plant cover at the site. This site is considered successfully reclaimed and does not need to be revisited.

Table 1. Summary of Site Conditions

Reclaimed Site	Date Reclaimed	Plant Cover (%)	Litter Cover (%)	Rock Cover (%)	Bare Ground (%)	Erosion Condition	Reclamation Success
C–SR–13A, Veta Glad	2002 by Cotter	20	trace	20	60	stable	good
C–SR–13A, Georgetto	2002 by Cotter	30	trace	10	60	stable	very good
C–SR–13A, Veta Mad	Jan/Feb 2003 by Cotter	20	trace	25	55	stable	good
C–SM–18, WRD & Portal	June 2001 by Cotter	65	5	15	15	stable	fair-poor
C–LP–21	Spring 2003 by Cotter	50	5	20	25	stable	excellent
C–CM–25 Main Portal Area	February 2003 by Cotter	65	10	15	10	stable	good
BLM 5th National Bank	Summer 2002 by Cotter	70	trace	5	25	stable	good
BLM Pickett Corral Mine Dump	Fall 2004 by Reams	5	0	30	65	severely eroding	poor
BLM Pickett Corral, Blue Streak Mine	Fall 2004 by Reams	3	0	80	17	severely eroding	poor
BLM Pickett Corral, Upper Portal	Fall 2004 by Reams	5	0	75	20	moderately eroding	fair
Slick Rock Disposal Cell, Spoils Pile	September 2001 by Crowley Construction	40	10	10	40	slightly eroding	good

C–SR–13A, Veta Mad: Cotter Corporation competed reclamation of this mine site in January/February 2003. In 2004, total plant cover was estimated at 7 percent. One species of noxious weed, halogeton, was found dispersed throughout the site. Two gullies were present through the middle of the reclaimed waste rock dump.

In 2005, desirable plant cover had increased to 20 percent, and the gullies were determined to be stabilized. Some halogeton plants were still present at the site. Photograph P–4 shows plant cover on the reclaimed waste rock dump. The large drainage on the south side of the site appeared stable, and sediment was deposited within the small settling pond. Approximately 6 inches of water was standing in the pond (photograph P–5). ULS staff noted that a small seep emanated from the toe of the reclaimed waste rock dump (photograph P–6). Except for the presence of halogeton plants, this site is considered successfully reclaimed. It is recommended that the halogeton plants be treated with herbicide and the site rechecked in 2006.

C–SM–18, Waste Rock Dump and Portal Areas: Cotter Corporation reclaimed this mine site in June 2001. At the time of the June 2004 site visit, kochia and Russian thistle dominated plant cover; reclamation success was considered poor. In June 2005, kochia, cheatgrass, and tumble mustard dominated plant cover. Of the 65 percent total plant cover, only 7 percent was composed of desirable species. Photographs P–7 and P–8 show site conditions. Because desirable perennial plant species have not increased significantly during the last four growing seasons, it is recommended that this site be reseeded with the ULS seed mix. The site should be visited again in 2006.

C–AM–19, Shrub Survival Study: In May 1999, ULS staff initiated a shrub survival study on four mine sites on lease tract C–AM–19. Sixteen shrubs were planted at the Golden Cycle Mine, 16 were planted at the Worcester Shaft site, 39 were planted at the King Solomon Mine, and 32 were planted at the Cliff Dweller Mine. Details concerning the study's objectives and first-year results are described in *Summary of Woody Plant Study on U.S. Department of Energy Uranium Lease Tract C–AM–19.* Table 2 summarizes survival percentages at each site between 2000 and 2005, and Appendix C contains figures showing plant locations and survival status.

Table 2. Shrub Survival Rates at Four Mine Sites (Percent Survival)

Monitoring Year	Golden Cycle	Worcester Shaft	King Solomon	Cliff Dweller
2000	81	69	64	69
2001	69	50	33[a]	37[a]
2002	69	38	no data collected	no data collected
2003	69	25	23	34
2004	no data collected	no data collected	no data collected	no data collected
2005	69	19	13	31

[a]several shrubs destroyed by reclamation activities.

Given the labor that was required to plant these shrubs and their low survivability at most of the mine sites, a shrub planting program is not recommended for the ULS mine reclamation program. Far better revegetation success has been achieved by topsoiling and seeding. Waste rock dumps on steep, rocky side slopes will continue to be a challenge to reclaim.

C–LP–21: Cotter Corporation reclaimed this mine site in spring 2003. At the time of the 2004 site visit, plant cover totaled 35 percent; cover by desirable species totaled 13 percent. Russian knapweed, a noxious weed, was observed on the flat area by the road. Because of the higher-than-desired weed cover, reclamation success was considered only fair.

By the time of the June 2005 site visit, total plant cover had increased to 50 percent, and cover by desirable species had increased to 36 percent. Reclamation success was considered excellent. Russian knapweed plants were not found at the site, as in the year before. Site conditions are shown in photographs P–9 through P–12. This site is considered successfully reclaimed and does not need to be revisited.

C–CM–25, Main Portal Area: Cotter Corporation reclaimed the main portal area in February 2003. In June 2004, plant cover totaled 50 percent; cover by desirable species totaled only 6 percent. Populations of two noxious weeds—halogeton and Russian knapweed—were found at the site as well.

By the time of the June 2005 site visit, total plant cover had increased to 60 percent, and cover by desirable species had increased to 28 percent. Although the site continued to be dominated by annual weedy species, reclamation success was considered to be good. ULS personnel found small patches of Russian knapweed and halogeton plants, but the populations were less dense than in 2004. Control of these weeds should continue. Site conditions are shown in photograph P–13. The site is considered successfully reclaimed, but it is recommended that weed conditions be evaluated at the site in 2006.

BLM 5th National Bank: Cotter Corporation reclaimed this BLM mine site for DOE in summer 2002. By the time of the 2004 site visit, plant cover totaled 25 percent, but 15 percent of this total was composed of annual weedy species. Reclamation success was considered fair. At the time of the June 2005 site visit, total plant cover had increased to 70 percent, and cover by desirable species had increased to 34 percent. Although the site remained weedy, reclamation success was considered good. Site conditions are shown in photograph P–14. This site is considered successfully reclaimed and does not need to be revisited.

BLM Pickett Corral Mine Dump: Reams Construction reclaimed this BLM mine site for DOE in fall 2004. The site is located on a steep, rocky side slope, and little topsoil was available for reclamation purposes. In late summer 2005, an intense storm event occurred in the area. Large amounts of stormwater runoff poured off the rim above the site and breached approximately 60 percent of the pocks. The diversion ditch that had been constructed at the top of the slope was over-banked by runoff waters and then filled in with sediment and rock. A number of gullies formed on the face of the recontoured waste rock dump (photograph P–15). In addition to being severely eroded, reclamation success was considered to be poor. Plant cover totaled 5 percent, and most of the plants were growing in areas containing a "smidgeon" of topsoil. Areas with no topsoil had no or few plants (photograph P–16). General site conditions are shown in photographs P–17 and P–18. This site should be visited again in 2006. If BLM wishes to repair the erosion, recommendations are provided in the Blue Streak Mine assessment below.

BLM Pickett Corral, Blue Streak Mine: Reams Construction also reclaimed this BLM mine site for DOE in fall 2004. Like the Pickett Corral Mine Dump, this site is located on a steep, rocky side slope. No topsoil was available for reclamation. This site was also adversely affected by the late-summer-2005 rainstorm event. Large gullies formed where stormwater runoff spilled over the rim and onto the site (photographs P–19 through P–21). Stormwater runoff scoured the main drainage below the site (photograph P–22), nearly destroyed the access road, and breached approximately 60 percent of the pocks. Total plant cover was 3 percent, and reclamation success was considered poor. With no topsoil on the site, the potential for plant cover is limited. This site should be visited again in 2006.

If no action is taken to repair the erosion damage, both at this site and the Mine Dump site, the side slopes would eventually "self-armor" with local rock, and the gullies would become permanent drainage channels. Little plant cover would be expected to establish over time, as few pocks would be present to retain precipitation. Visually, the mine sites would remain scars on the landscape. The potential for vegetative cover would be greater in topsoiled areas of the Mine Dump site.

If BLM wishes to repair the erosion damage, the following actions are recommended:

- Establish drainage patterns in the gullies' current locations;
- Rework the drainages by armoring the bottoms and banks with local rock (reduce the slopes of the cut banks);
- Recontour the side slopes around the new drainage channels;
- Transport topsoil to the recontoured slopes (only a "smidgeon" is needed to make a difference);
- Re-pock the side slopes.

BLM Pickett Corral, Upper Portal: Reams Construction reclaimed this BLM mine site at the same time as the other Pickett Corral sites. This site did not receive the volume of runoff water that the other sites received. Only a few gullies were formed by the storm, and most of the pocks were not breached. Plant cover totaled 5 percent. As no topsoil was available for reclamation of this site, the potential for plant cover is limited. Reclamation success was considered fair, considering only one growing season had passed. Site conditions are shown in photograph P–23. This site should be revisited in 2006.

DOE Slick Rock Disposal Cell (SRDC) Spoils Pile: Crowley Construction reclaimed this area for DOE in September 2001. By the time of the August 2003 visit, plant cover totaled 25 percent, of which 20 percent was Russian thistle. In 2004, total plant cover had increased to 35 percent, of which 17 percent was Russian thistle. In 2005, plant cover totaled 40 percent, of which 8 percent was Russian thistle; 23 percent of the cover was composed of desirable species. Although the site remains somewhat weedy, reclamation has been largely successful. A few active rills are present on the north and south side slopes, and a noxious weed, halogeton, is present in several areas. The primary infestations of halogeton are along the access road, above and below the rim rock areas, and scattered throughout the north side slope. It is recommended that the halogeton continue to be treated with herbicide. Site conditions are shown in photographs P–24 through P–26. The site should be evaluated again in 2006, primarily for weed growth. If conditions remain good, a site visit with Mr. Clyde Johnson, Realty Specialist with BLM, San Juan Field Office, should be made to negotiate termination of BLM Right-of-Way Permit COC-57851. Termination of this permit is contingent upon successful reclamation of the spoils pile area.

3.0 Summary

Table 3 summarizes the status of site reclamation as of October 2005. Sites that require reevaluation are not yet considered successfully reclaimed but have potential for success over time. These sites should be reevaluated in 2006. If action needs to be taken, the action is listed in the fourth column of the table. Details of the recommendations for action are provided in Section 2.0 of this report.

Table 3. Status of Site Reclamation

Site	Successfully Reclaimed	Needs Reevaluation in 2006	Action Needed
C–SR–13A, Veta Glad	X		Replace AP corner on side slope
C–SR–13A, Georgetto	X		
C–SR–13A, Veta Mad	X	X Weed check only	Treat halogeton
C–SM–18, Waste Rock Dump & Portal		X	Reseed site
C–LP–21	X		
C–CM–25, Main Portal Area	X	X Weed check only	Treat halogeton and Russian knapweed
BLM 5th National Bank	X		
BLM Pickett Corral Mine Dump		X	Repair erosion?
BLM Pickett Corral, Blue Streak Mine		X	Repair erosion?
BLM Pickett Corral Upper Portal		X	
DOE SRDC Spoils Pile		X	Treat halogeton

Appendix A

Field Sheets

ULMP Vegetation Assessment

Date: June 14, 2005	Staff: MKastens / DB
Location: SR-13A Veda ~~Mad~~ Glad Mine	
Photos: MK2-20: View S downslope from center of wet	Slope: just below rim
MK 2-19: View E upslope " " "	Aspect: " " "
Site Condition: good, considering steep slope	
Reclaimed by:	Year:
Topsoil Info:	
Amendments:	
Erosion Control Treatment: drainage gully, but there has been no	
Erosion Condition: site has large ^	Site Use: change since last year
Noxious Weeds: none	
* Other: AP corner is hanging in tree; needs to be replaced on steep slope	

Species:	% Cover	Species:	% Cover
LILE	t		
BRTE	t		
GUSA	t		
silvery goosefoot	1		
sticktight	t		
ATCA	10		
Palmer penstemon	t		
STCO	1		
ORHY	1		
HIJA	3		
PASM	4		
STVI	t		
blue grama	t		
blazing star	t		
SAPE	t		
prickly pear	t		
		Total Plant Cover:	20
		Litter:	t
		Bare Ground:	60
		Rock:	20

ULMP Vegetation Assessment

Date: 6-14-05	Staff: MKastens / D. Burns
Location: SR-13A Georgetto Mine	
Photos: MK2-21 View NE of WRD & portal	Slope:
	Aspect:
Site Condition: good- v. good	
Reclaimed by: successfully reclaimed	Year:
Topsoil Info:	
Amendments:	
Erosion Control Treatment: rocks	
Erosion Condition: Stable	Site Use:
Noxious Weeds: none	
Other: evidence of cattle grazing	

Species:	% Cover	Species:	% Cover
SPCO	t		
sticktight	t		
LILE	t		
ORHY	2		
HIJA	1		
ATCA	15		
GUSA	1		
PASM	10		
Slender wheatgrass	t		
SAPF	t		
Silvery goosefoot	t		
woolly plantain (Plantago patagonica)	t		
BRTE	t		
STCO	1		
Palmer penstemon	t		
flixweed	t		
SIHY	t		
STVI	t		
prickly lettuce	t		
allysum	t	Total Plant Cover:	30
purple mustard	t	Litter:	t
		Bare Ground:	60
		Rock:	10

ULMP Vegetation Assessment

Date: June 14, 2005	Staff: MKastens / DB
Location: SR-13A Veda Mad Mine	
Photos: MK2-18: View E of settling pond area	~~Slope~~ MK2-16: View E of toe
MK2-17: View NW across top of WRD	~~Aspect~~: seep coming from of WRD
Site Condition: Good, considering steep slope	
Reclaimed by:	Year:
Topsoil Info:	
Amendments:	
Erosion Control Treatment: drainage in good condition	
Erosion Condition: Stable;	Site Use:
Noxious Weeds: some halogeton	
Other: Settling pond currently has ~ 6" water; is silting in	

Species:	% Cover	Species:	% Cover
Astragalus sp.	t	winterfat	t
ORHY	5	MEOF	t
ATCA	2		
SAPE	t		
BRTE	t		
Kochia	t		
Palmer penstemon	t		
GUSA	t		
SPCO	t		
PASM	11		
silvery goosefoot	t		
tumble mustard	t		
prickly pear	t		
ST CO	t		
H 'JA	2		
HO JU	t		
halogeton	t		
stickright	t		
SIHY	t		
Woolly plantain	t	Total Plant Cover:	20
flixweed	t	Litter:	t
4 o'clock	t	Bare Ground:	55
blazing star	t	Rock:	25

ULMP Vegetation Assessment

Date: 6-14-05	Staff: M Kastens / E.C
Location: SM-18 WRD & former portal	
Photos: MKI-8, MKI-7	Slope:
	Aspect:
Site Condition: poor - fair	
Reclaimed by:	Year:
Topsoil Info: * Recommend reseeding	
Amendments:	
Erosion Control Treatment:	
Erosion Condition: stable	Site Use:
Noxious Weeds:	
Other:	

Species:	% Cover	Species:	% Cover
MEAL	3	Palmer penstemon	t
BRTE	20	prickly lettuce	t
CHNA	t	SPCO	t
curly cup gumweed	t	galleta grass	t
stork's bill (Erodium)	t	GUSA	t
SIHY	1	Stipa viridus	t
PASM	2	Sporobolus cryptandrus	t
Kochia	20		
prickly pear	t		
tumble mustard	10		
SAPE	4		
jointed goatgrass	t		
Rabbit barley	1	Hordeum marinum (annual)	
allysum	t		
ORHY	t		
Blue flax	t		
4-wing saltbush	4		
silvery goosefoot	t		
stick tight	t	Total Plant Cover:	65
slender wheatgrass	t	Litter:	5
Tragopogon (w. salsify)	t	Bare Ground:	15
		Rock:	15

ULMP Vegetation Assessment

Date: 6-14-05	Staff: MKastens / EC
Location: LP-21	
Photos: MK-4, 3, 2, 1	Slope:
	Aspect:
Site Condition: excellent	
Reclaimed by:	Year:
Topsoil Info:	
Amendments:	
Erosion Control Treatment:	
Erosion Condition: Stable	Site Use:
Noxious Weeds: no R. kraussii found	
Other:	

Species:	% Cover	Species:	% Cover
PASM	12	winterfat	t
ATCA	12	SIHY	t
ORHY	4	prickly lettuce	t
BRTE	1	tumbleweed	t
HIJA	1		
SAPE	5		
annual wheatgrass	t		
STCO	t		
STVI and STLE	t		
stork's bill (Erodium)	2		
Hordeum jubatum in bottom &		in some pits →	2
MEOF	5		
tumble mustard	1		
Kochia	t		
LILE	1		
CHNA	3		
Astragalus sp.	t		
Palmer penstemon	1		
Montzelia sp.	t		
clasping-leaf peppergrass	t	Total Plant Cover:	50
Prince's plume	t	Litter:	5
slender wheatgrass	t	Bare Ground:	25
SPCO	t	Rock:	20

ULMP Vegetation Assessment

Date: 6-14-05	Staff: MKastens/EC
Location: CM-25	
Photos: MK1-6	Slope:
	Aspect:
Site Condition: weedy but good?	
Reclaimed by: recommend checking next	Year:
Topsoil Info: year for decrease in weed cover	
Amendments:	
Erosion Control Treatment:	
Erosion Condition: stable	Site Use:
Noxious Weeds: a few R. knapweed still	
Other:	

Species:	% Cover	Species:	% Cover
Palmer penstemon	1	curlycup gumweed	t
Prince's plume	1	Bahia (Platyschkuhria)	t
stork's bill (Erodium)	15	SHIN	2
STCO	t	clasping-leaf pepperweed	t
STVI green needlegrass	t	Japanese brome	t
BRTE	16	Hymenoxys richardsonii	t
Thlaspi arvense (field pennycress)	t	prickly lettuce	t
MEOF	4	galleta grass	3
ORHY	4	Kochia	2
blue flax	t	winterfat	1
PASM	1	allysum	t
Astragalus sp.	t	SAPE	t
ATCA	3	halogeton	t
Stipa lettermanii	t	annual sunflower	t
Western wheatgrass	6		
blue grama	2		
Hare barley (annual)	1		
tumble mustard	1		
CHNA	2		
slender wheatgrass	1	Total Plant Cover:	65
		Litter:	10
		Bare Ground:	10
		Rock: formerly 30, but now covered by plants	15

ULMP Vegetation Assessment

Date: 6-14-05	Staff: MKastens / EC
Location: 5th National Bank (BLM)	
Photos: MK-5	Slope:
	Aspect:
Site Condition: good (still weedy)	
Reclaimed by:	Year:
Topsoil Info:	
Amendments:	
Erosion Control Treatment:	
Erosion Condition: stable	Site Use:
Noxious Weeds: none	
Other:	

Species:	% Cover	Species:	% Cover
ATCA	5	HIJA	t
tumble mustard	30	stick tight	1
SIHY	1	field pennycress	t
BRTE	2	sand dropseed	t
alyssum	t		
ORHY	1		
PASM	10		
palmer penstemon	3		
STCO	3		
blue flax	1		
winterfat	t		
purple-flowered penstemon	t		
SPCO	2		
SAPE	3		
annual sunflower	t		
prickly lettuce	t		
Mentzelia sp.	1		
silvery groundsel	t		
STIA or STLE - tall	t	→ s/a cm-25	
fringed sage	1	Total Plant Cover:	70
		Litter:	t
		Bare Ground:	25
		Rock:	5

Date: 10-3-05	Staff: M Kastens / DB
Location: Pickett Corral Mine Dump	
Photos: 24: No topsoil, No veg 23: Topsoil - note presence of vege 22: view downslope ESE at gully 21: View S of reclaimed WRD ; 20: View W of WRD toward rim	Slope: 25 % Aspect: E
Site Condition: pair-poor	
Reclaimed by: Reams for BLM	Year: Fall 2004
Topsoil Info: very little from local sources	
Amendments: NA	
Erosion Control Treatment: packing, rerouting drainage	
Erosion Condition: fair-poor big gully down middle of WRD - several other smaller gullies forming down WRD; many pocks breached	Site Use:
Noxious Weeds:	
Other:	

Species:	% Cover	Species:	% Cover
ORHY	1	* most vege'd areas are	
wheatgrasses slender western	2	in areas w/ a small gain	
ATCA	1	of topsoil; in areas w/	
BRTE	1	no topsoil, vege is almost	
Blazing star		nonexistent.	
Palmer penstemon		* LOTS of runoff water	
SAPE		has come off the	
sweet clover (no flowers)		rim & breached the	
Blue grama		pocks. The diversion	
Sporobolus cryptandrus		ditch on the top of	
galleta grass (HIJA)		the reclaimed WRD	
prickly pear		was filled in & over run	
Lewis' blue flax		w/ sediment, rocks,	
winterfat		and runoff water	
peppergrass		causing gullies to form	
CHNA		on the face of the WRD	
Astragalus sp.			
skeletonweed		~60% of pocks have been	
Chenopodium sp.		breached over entire WRD	
SIHY		Total Plant Cover:	5
GUSA		Litter:	0
		Bare Ground:	65
		Rock:	30

Date: 10-3-05	Staff: M Kastens / DB
Location: Pickett Corral - Blue Streak Mine	
Photos: 19: View NNE of gullies in WRD	Slope: ~25%
18: View NW of main drainage below WRDs	Aspect: SW
Site Condition: poor 17: View N of wash out in WRD 16: " ENE of main gullies - as in photo 19	
Reclaimed by: Reams for BLM	Year: fall 2004
Topsoil Info: NONE! photo: 14 - View NNE of Blue Streak WRD	
Amendments: NA	
Erosion Control Treatment: pocks	
Erosion Condition: washed out	Site Use:
Noxious Weeds:	
Other:	

Species:	% Cover	Species:	% Cover
Blazing star	1	~60% of pocks have	
ORHY	t	been breached by storm	
sweet clover	t	runoff water	
SAPE	2		
blue grama BUGR	t	* hillsides will eventually	
HISA		self-armor & permanent	
SIHY		drainages will form.	
wheatgrasses		With no topsoil on site,	
Astragalus sp.		potential for veg cover	
Palmer penstemon	↓	is very limited	
		Total Plant Cover:	3
		Litter:	0
		Bare Ground:	17
		Rock:	80

ULMP Vegetation Assessment

Date: 10-3-05	Staff: MKastens / DB
Location: Pickett Corral - Upper Portal	
Photos: 15: View NNW of WRD - top portion by portal	Slope: 30%
	Aspect: NE
Site Condition: fair	
Reclaimed by: Reams for BLM	Year: fall 2004
Topsoil Info: NONE	
Amendments:	
Erosion Control Treatment: pocks → few gullies & breached pocks	
Erosion Condition: fair-good	Site Use:
Noxious Weeds: NA	
Other:	

Species:	% Cover	Species:	% Cover
HIJA		most pocks at this WRD	
Blue gramma	1	have not been	
ORHY	1	breached	
wheatgrasses slender	1		
Blazing star	2		
sweet clover (white)			
ATCA			
BRTE			
		Total Plant Cover:	5
		Litter:	0
		Bare Ground:	20
		Rock:	75

ULMP Vegetation Assessment

Date: 6-14-05	Staff: MKastens / EC
Location: SRDC	
Photos: MK2-24, 23, 22	Slope:
	Aspect:
Site Condition: good (still fairly weedy)	
Reclaimed by: check next year for decrease in weeds; control halogeton	Year:
Topsoil Info:	
Amendments:	
Erosion Control Treatment: few small rills on S side & N side	
Erosion Condition: mostly stable	Site Use:
Noxious Weeds: halogeton along road (recently sprayed)	
Other: halogeton present on S-side beneath rim rocks & above rim rock (on N side too) and sparsely located on N side	

Species:	% Cover	Species:	% Cover
tumble mustard	6	winterfat	t
Western salsify	t		
BRTE	1		
ATCA	2		
SAPE	8		
SIHY	1		
prickly lettuce	t		
GUSA	t		
ORHY	8		
SPCO	1		
wheatgrasses (PASMS, Standen)	9		
STCO	1		
alyssum or flixweed (dried out)	2		
sticktight	t		
Palmer penstemon	1		
silvery goosefoot	t		
sticky feathery-leaved annual forb	t- (smelly) →	Ragweed (Ambrosia sp.)	
HIJA	t		
halogeton	t		
stork's bill	t	Total Plant Cover:	40
STVI	t	Litter:	10
4 o'clock	t	Bare Ground:	40
fringed sage	t	Rock:	10

does western wheat have a construction on the end of the bar? yes

Appendix B

Photographs

Photograph Log

Photograph Number	Photograph Description
P–1	C–SR–13A, Veta Glad: View S downslope of reclaimed waste rock dump (from center of dump below rim)
P–2	C–SR–13A, Veta Glad: View E upslope of reclaimed waste rock dump (from center of dump below rim)
P–3	C–SR–13A, Georgetto: View NE of reclaimed waste rock dump and portal
P–4	C–SR–13A, Veta Mad: View NW across top of reclaimed waste rock dump
P–5	C–SR–13A, Veta Mad: View E of settling pond area
P–6	C–SR–13A, Veta Mad: View E of seep coming from toe of reclaimed waste rock dump
P–7	C–SM–18, View SE of reclaimed portal area
P–8	C–SM–18, View NW of reclaimed waste rock dump
P–9	C–LP–21, View NW of former building/staging area
P–10	C–LP–21, View N of reclaimed waste rock dump
P–11	C–LP–21, View NE of N lobe of reclaimed waste rock dump
P–12	C–LP–21, View NE of W side of reclaimed waste rock dump
P–13	C–CM–25, View SE of main portal area
P–14	BLM 5th National Bank, View W of reclaimed waste rock dump
P–15	BLM Pickett Corral Mine Dump, View ESE downslope of gully through reclaimed waste rock dump
P–16	BLM Pickett Corral Mine Dump, Reclaimed waste rock dump; note difference in vegetative cover between areas with topsoil and no topsoil
P–17	BLM Pickett Corral Mine Dump, View W (towards rim) of reclaimed waste rock dump
P–18	BLM Pickett Corral Mine Dump, View S of reclaimed waste rock dump
P–19	BLM Pickett Corral, Blue Streak Mine, View NNE of gullies in reclaimed waste rock dump
P–20	BLM Pickett Corral, Blue Streak Mine, View N of gully in reclaimed waste rock dump
P–21	BLM Pickett Corral, Blue Streak Mine, View ENE of main gully (see photo P–19) in reclaimed waste rock dump
P–22	BLM Pickett Corral, Blue Streak Mine, View NW of main drainage below waste rock dumps
P–23	BLM Pickett Corral Upper Portal, View NNW of reclaimed waste rock dump, upper portion by portal
P–24	SRDC Spoils Pile, View SE of S side from middle perch
P–25	SRDC Spoils Pile, View NW of S side from middle perch
P–26	SRDC Spoils Pile, View E of N side

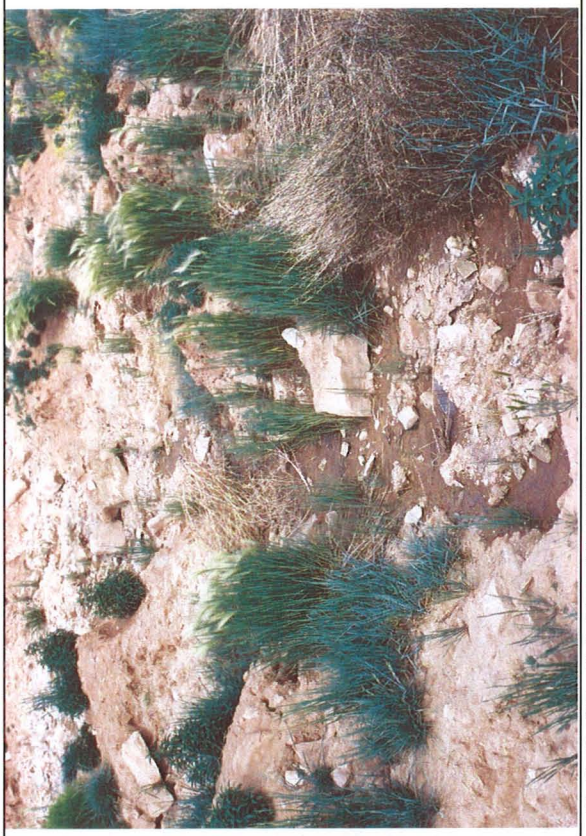
End of current text

P–1: C–SR–13A, Veta Glad: View S downslope of reclaimed waste rock dump (from center of dump below rim)

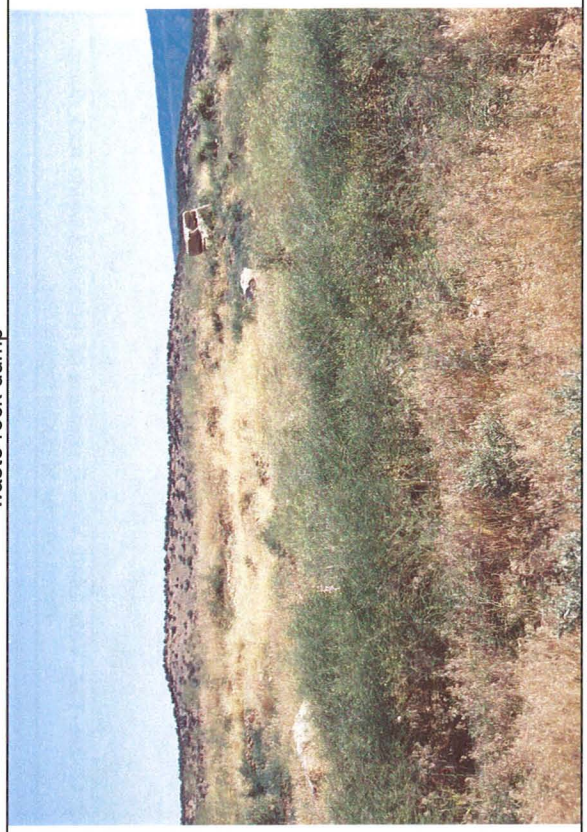
P–2: C–SR–13A, Veta Glad: View E upslope of reclaimed waste rock dump (from center of dump below rim)

P–3: C–SR–13A, Georgetto: View NE of reclaimed waste rock dump and portal

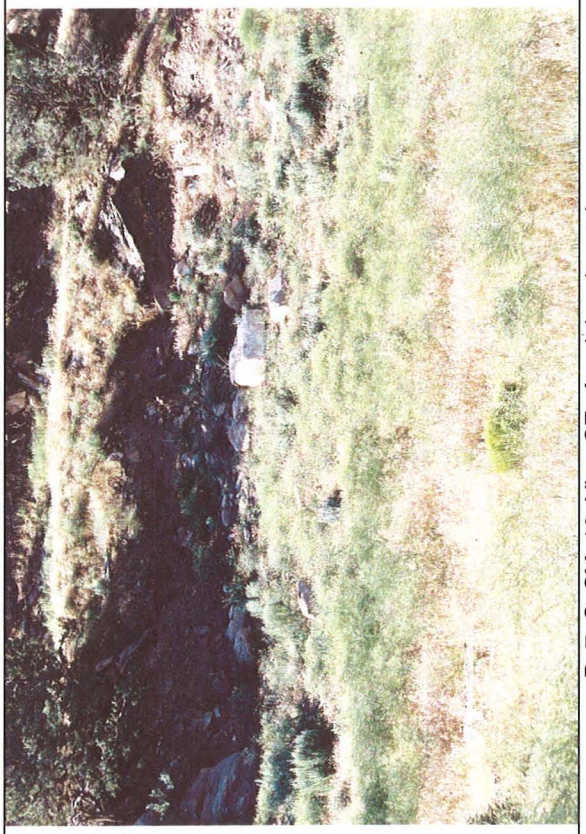
P–4: C–SR–13A, Veta Mad: View NW across top of reclaimed waste rock dump



P–5: C–SR–13A, Veta Mad: View E of settling pond area

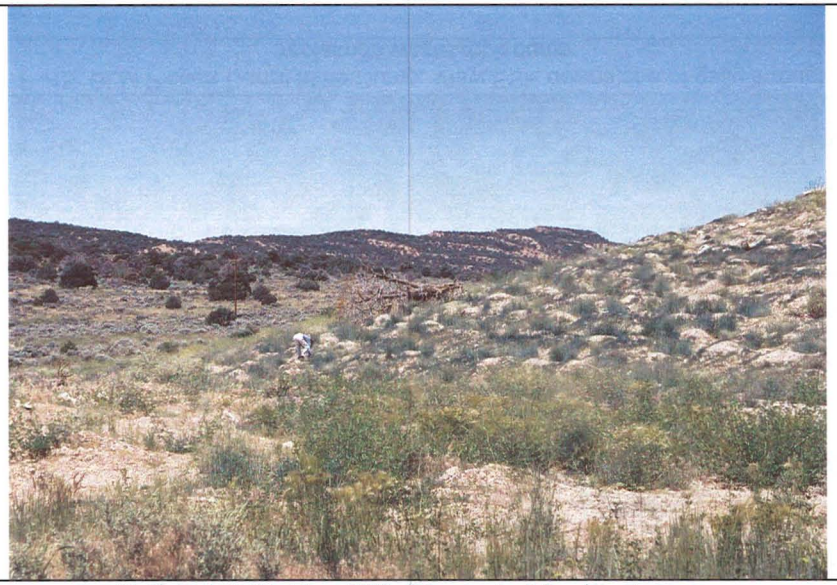


P–6: C–SR–13A, Veta Mad: View E of seep coming from toe of reclaimed waste rock dump

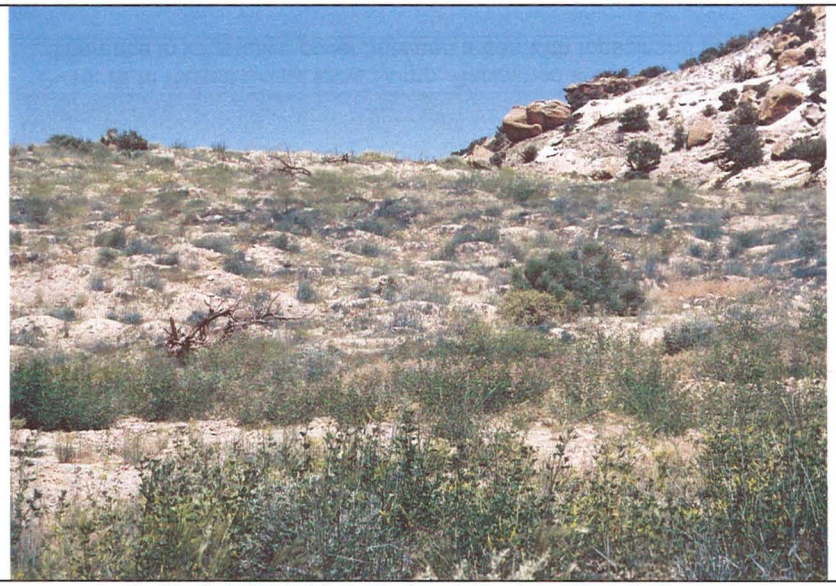


P–7: C–SM–18, View SE of reclaimed portal area

P–8: C–SM–18, View NW of reclaimed waste rock dump



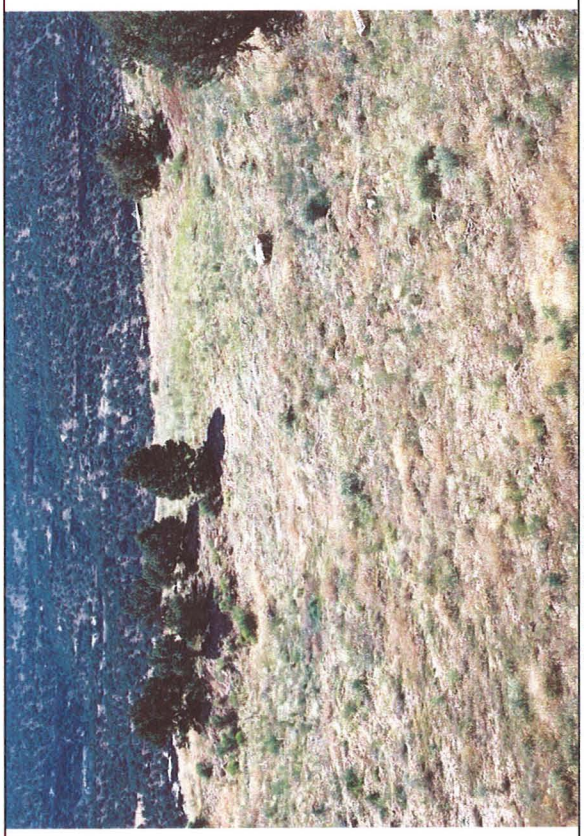
P–9: C–LP–21, View NW of former building/staging area



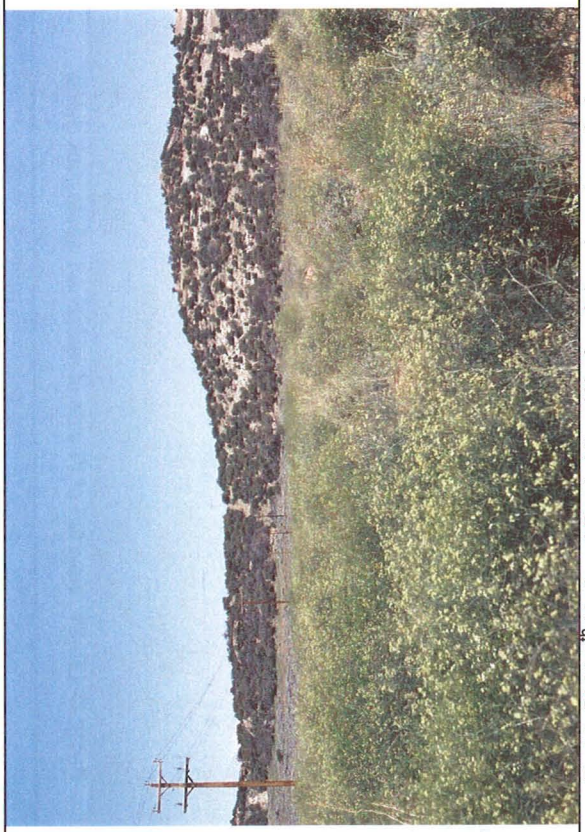
P–10: C–LP–21, View N of reclaimed waste rock dump

P–11: C–LP–21, View NE of N lobe of reclaimed waste rock dump

P–12: C–LP–21, View NE of W side of reclaimed waste rock dump



P–13: C–CM–25, View SE of main portal area



P–14: BLM 5th National Bank, View W of reclaimed waste rock dump

P–15: BLM Pickett Corral Mine Dump, View ESE downslope of gully through reclaimed waste rock dump

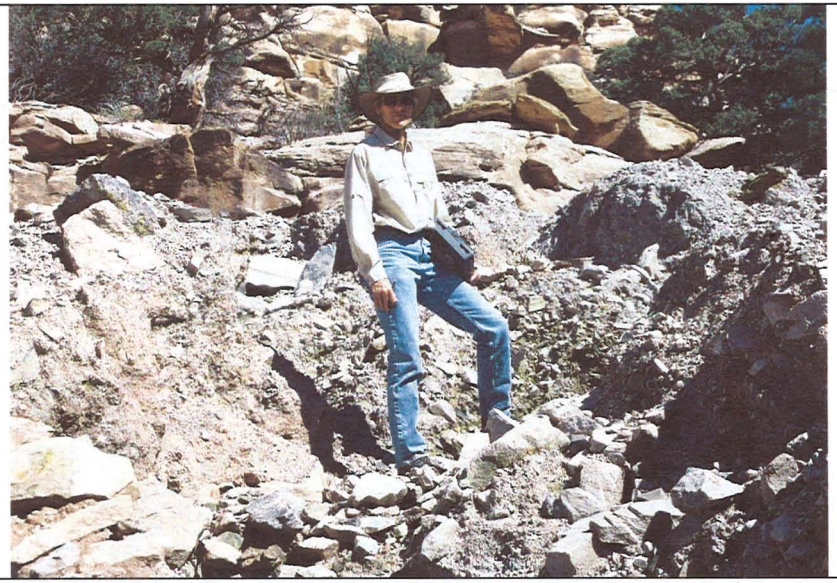
P–16: BLM Pickett Corral Mine Dump, Reclaimed waste rock dump; note difference in vegetative cover between areas with topsoil and no topsoil

P–17: BLM Pickett Corral Mine Dump, View W (towards rim) of reclaimed waste rock dump

P–18: BLM Pickett Corral Mine Dump, View S of reclaimed waste rock dump

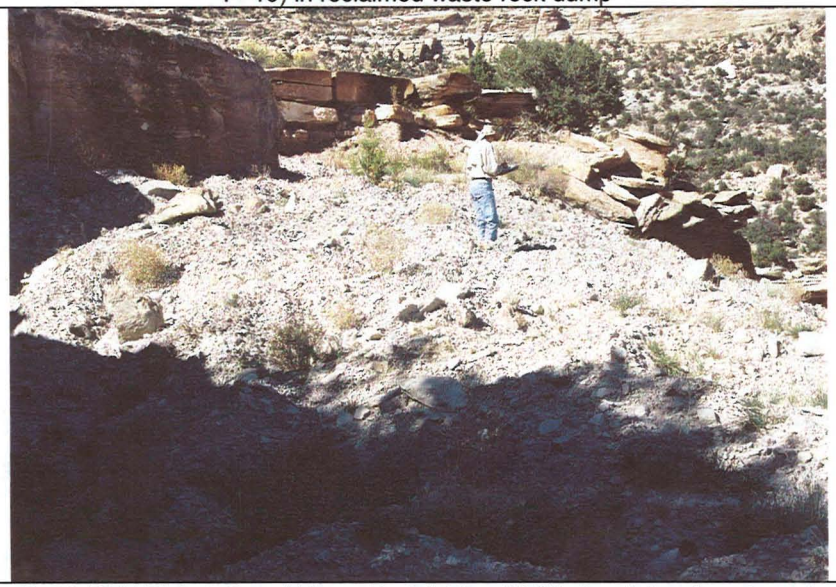
P–19: BLM Pickett Corral, Blue Streak Mine, View NNE of gullies in reclaimed waste rock dump

P–20: BLM Pickett Corral, Blue Streak Mine, View N of gully in reclaimed waste rock dump



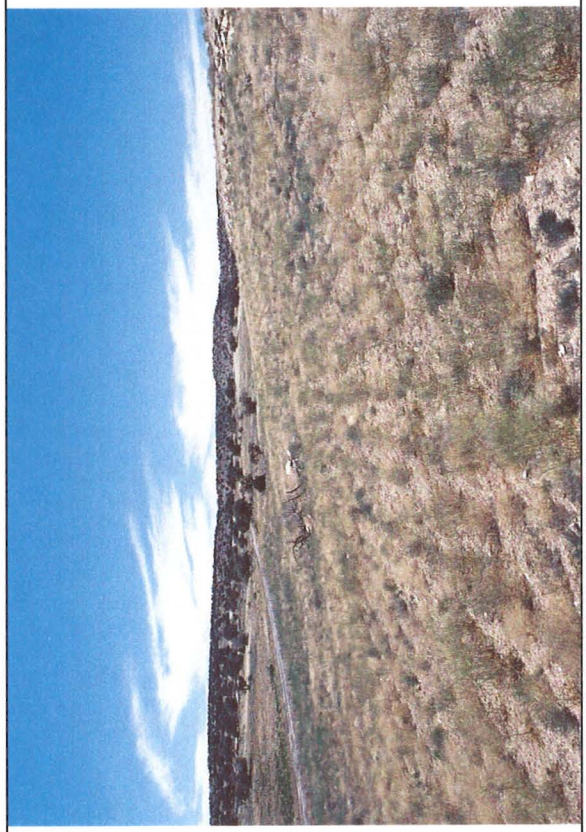
P–21: BLM Pickett Corral, Blue Streak Mine, View ENE of main gully (see photo P–19) in reclaimed waste rock dump

P–22: BLM Pickett Corral, Blue Streak Mine, View NW of main drainage below waste rock dumps

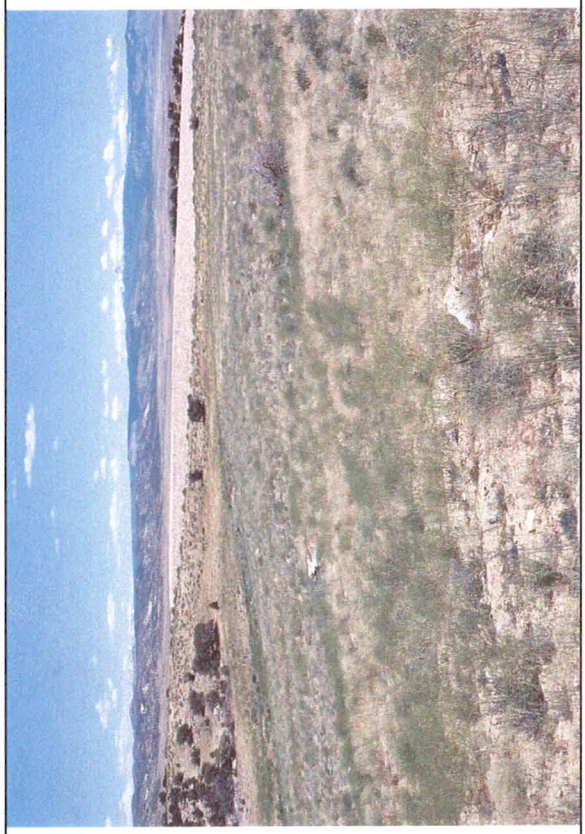


P–23: BLM Pickett Corral Upper Portal, View NNW of reclaimed waste rock dump, upper portion by portal

P–24: SRDC Spoils Pile, View SE of S side from middle perch



P–25: SRDC Spoils Pile, View NW of S side from middle perch

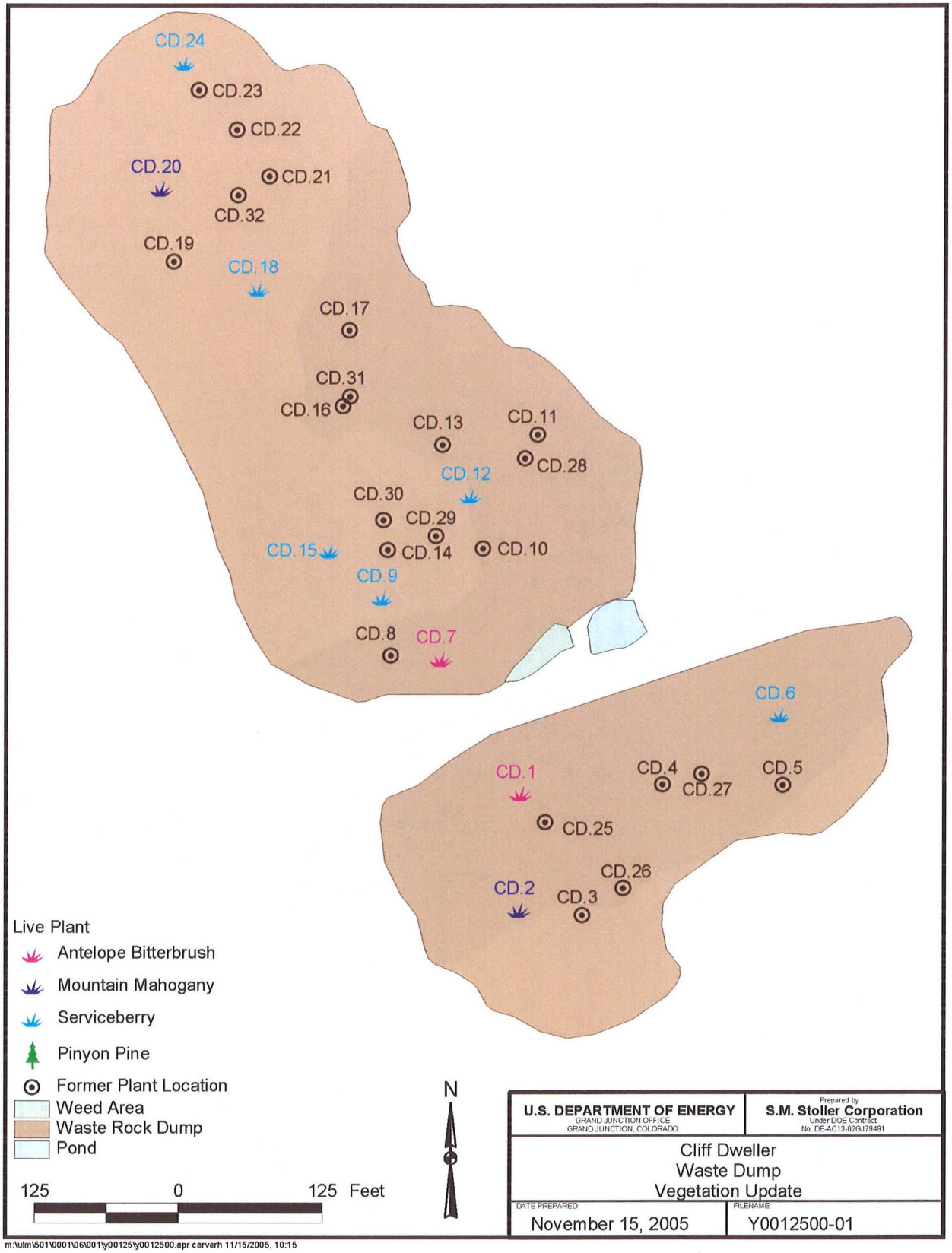


P–26: SRDC Spoils Pile, View E of N side

End of current text

Appendix C

Plant Survival Status



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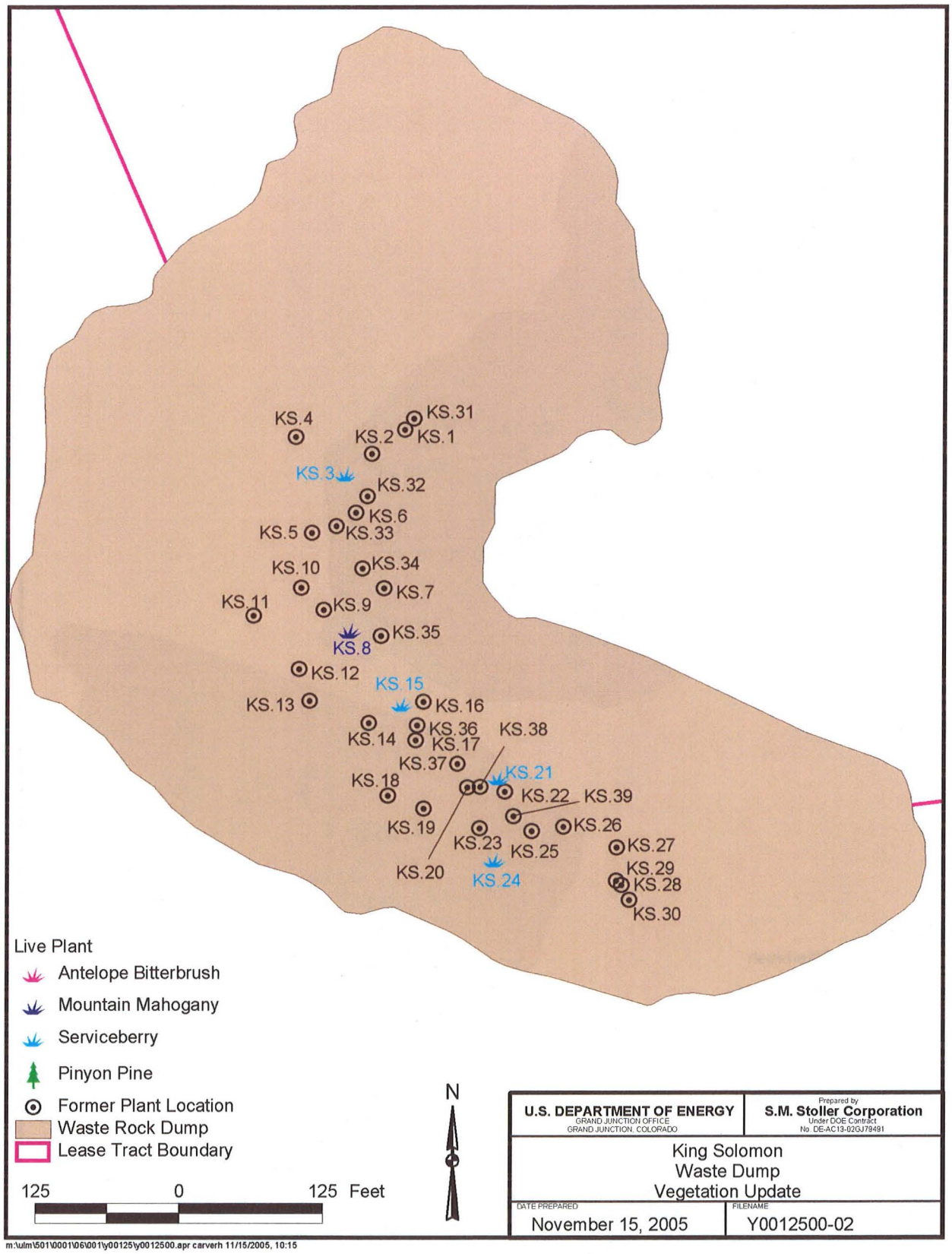
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KS.2
KS.1
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KS.7
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KS.16
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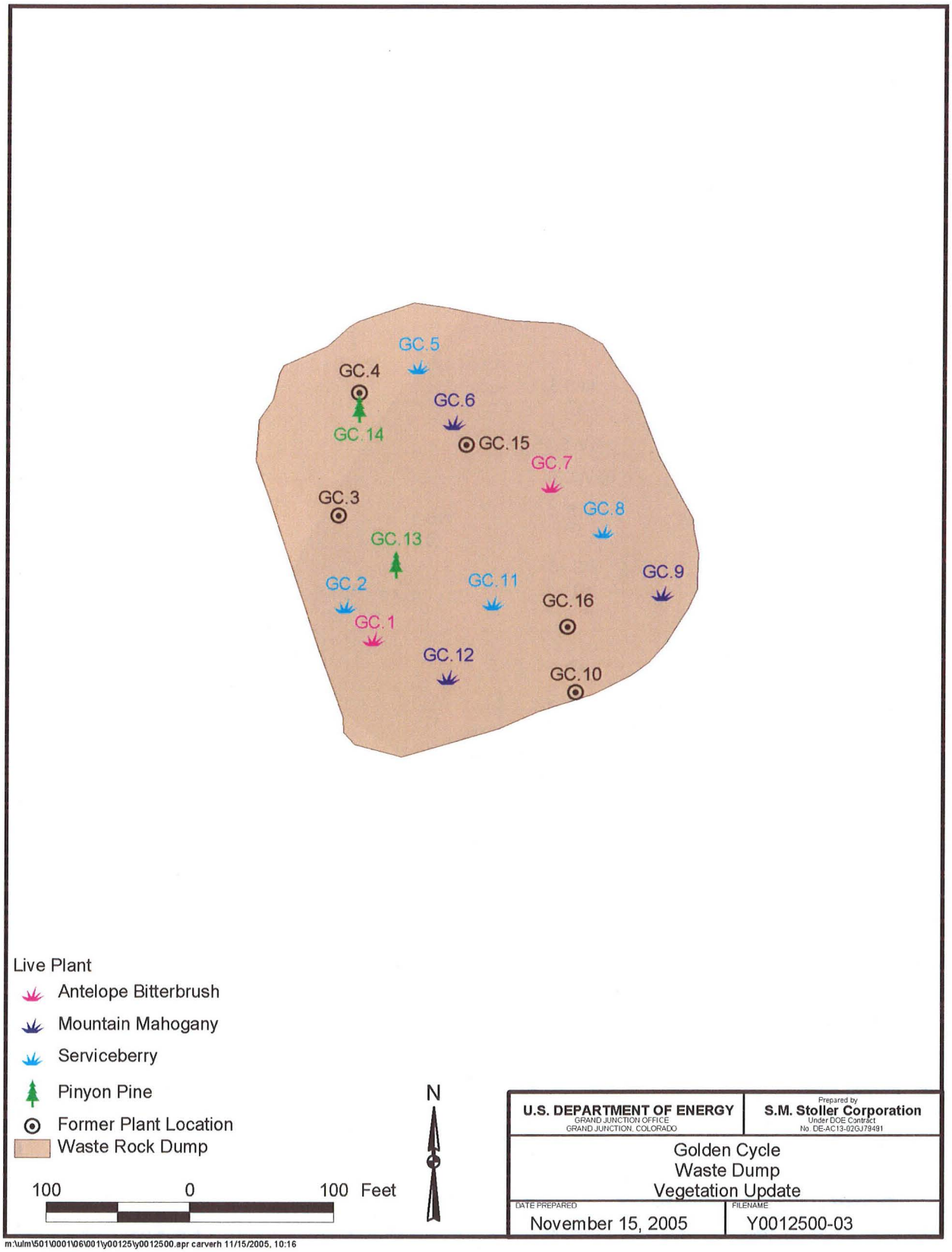
KS.38
KS.14
KS.17
KS.37
KS.21
KS.18
KS.22
KS.39
KS.19
KS.26
KS.23
KS.25
KS.27
KS.29
KS.20
KS.24
KS.28
KS.30
Live Plant
Antelope Bitterbrush
Mountain Mahogany
Serviceberry
Pinyon Pine
Former Plant Location
Waste Rock Dump
Lease Tract Boundary
125
0
125 Feet
N
U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION OFFICE
GRAND JUNCTION, COLORADO
Prepared by
S.M. Stoller Corporation
Under DOE Contract
No. DE-AC13-02GJ79491
King Solomon
Waste Dump
Vegetation Update
DATE PREPARED
November 15, 2005
FILENAME
Y0012500-02
m:\ulm\501\0001\06\001\y00125\y0012500.apr carverh 11/15/2005, 10:15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GC.2
GC.11
GC.16
GC.1
GC.12
GC.10
Live Plant
Antelope Bitterbrush
Mountain Mahogany
Serviceberry
Pinyon Pine
Former Plant Location
Waste Rock Dump
100
0
100 Feet
N
U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION OFFICE
GRAND JUNCTION, COLORADO
Prepared by
S.M. Stoller Corporation
Under DOE Contract
No. DE-AC13-02GJ79491
Golden Cycle
Waste Dump
Vegetation Update
DATE PREPARED
November 15, 2005
FILENAME
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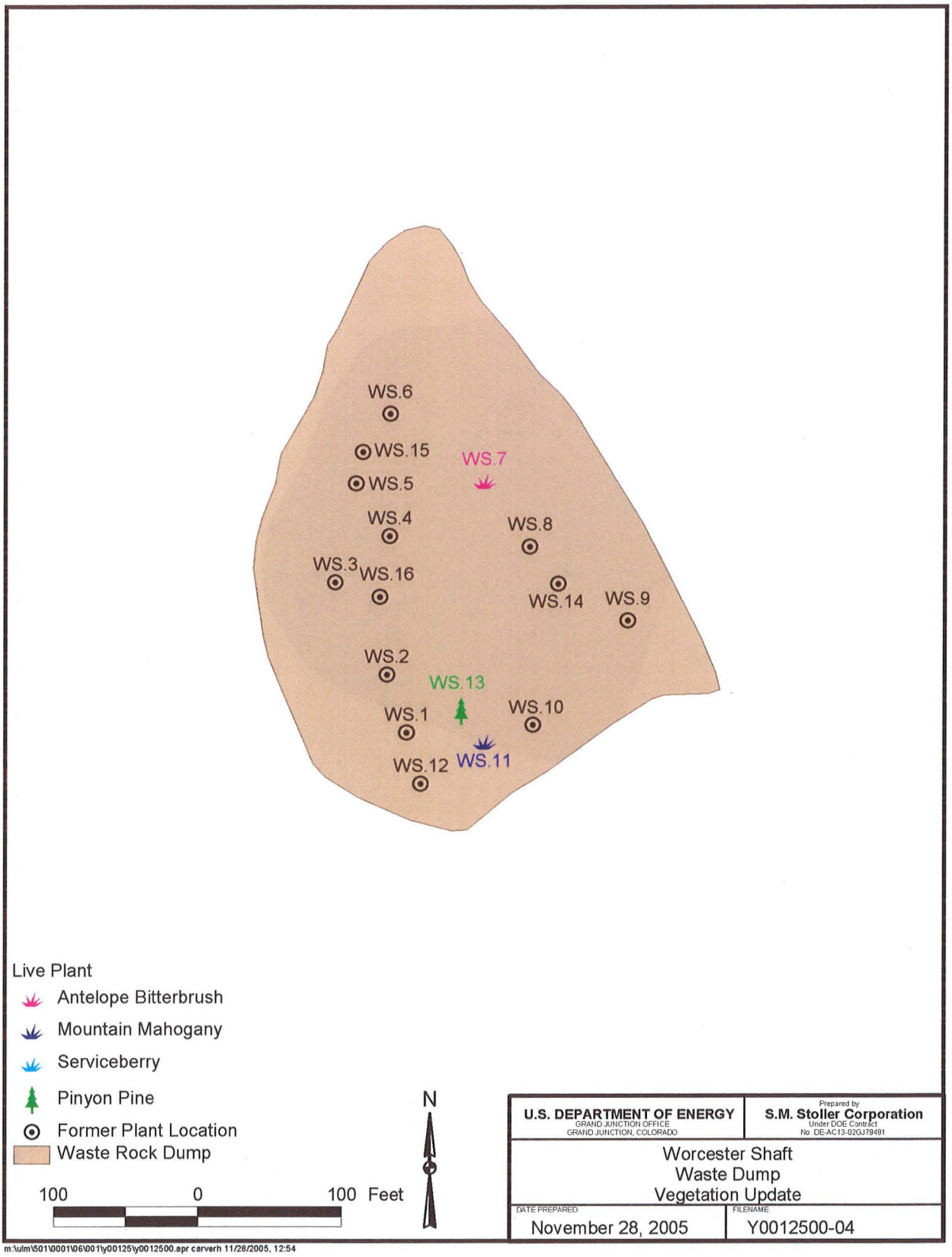
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Live Plant
Antelope Bitterbrush
Mountain Mahogany
Serviceberry
Pinyon Pine
Former Plant Location
Waste Rock Dump
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U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION OFFICE
GRAND JUNCTION, COLORADO
Prepared by
S.M. Stoller Corporation
Under DOE Contract
No. DE-AC13-02GJ78491
Worcester Shaft
Waste Dump
Vegetation Update
DATE PREPARED
November 28, 2005
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Y0012500-04
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Trip Report

Purpose: Field surveys for T&E and sensitive plant species
Location: Uranium Lease Program Sites C-AM-19 and C-AM-20, areas to be disturbed by mine reclamation activities planned in fall, 2011. Specific locations listed below.
Date: July 12, 2011
Trip Report by: Linda Sheader, botanist/ecologist, S.M. Stoller Corporation, contractor to U.S. Department of Energy Office of Legacy Management

A detailed summary of all listed Threatened/Endangered and Bureau of Land Management (BLM)– and Forest Service (FS)–sensitive plant species that occur in Montrose County, CO, including rationale for inclusion in these field surveys is in the site's NEPA documentation. During the field visit, surveys were performed for the following species:

- *Astragalus naturitensis* (Naturita milkvetch), BLM–sensitive
- *Astragalus rafaelensis* (San Rafael milkvetch), BLM–sensitive
- *Astragalus sesquiflorus* (sandstone milkvetch), BLM–sensitive
- *Astragalus wetherillii* (Wetherill's milkvetch), FS–sensitive
- *Cirsium perplexans* (adobe thistle), FS–sensitive
- *Pediomelum aromaticum* (aromatic Indian breadroot), BLM–sensitive
- *Sclerocactus glaucus* (Colorado hookless cactus), Federally threatened

Four specific locations, numbered below, were surveyed, each surrounding the site of proposed mine reclamation activities. The general vegetation around each location was briefly summarized. After this, concentric transects around each location were walked and surveyed in detail for the presence of any species in question. The size of the area surveyed depended upon the size of the planned disturbance, but was always greater than the extent of the planned disturbance.

1) Cliff Dweller (on/near C-AM-19). Area surveyed: approximate 40 ft radius around subsided portal, plus access area (reclaimed road). All work will be performed in a previously disturbed area, reclaimed in the late 1990's. The disturbed area is surrounded by patches of *Ericameria nauseosa* and pinon-juniper forest, which will not be disturbed. None of the target genera (*Astragalus*, *Cirsium, Pediomelum,* or *Sclerocactus*) were found within the work area during field surveys. Dominant species include *Elymus trachycaulus, Melilotus officinalis* (syn. *Melilotus alba*), and *Pleuraphis jamesii.* Less common species include *Achnatherum hymenoides, Bouteloua gracilis, Bromus tectorum, Convolvulus arvensis, Gutierrezia sarothrae, Hesperostipa comata, Heterotheca villosa, Krascheninnikovia lanata, Medicago sativa, Opuntia* sp., *Pascopyrum smithii,* and *Sphaeralcea coccinea.* Small numbers of Russian knapweed, a noxious species, were observed nearby.
2) Worcester Subsidence (on C-AM-19). Area surveyed: approximate 50 ft radius around subsided portal, plus access area (reclaimed road). All work will be performed in previously disturbed and reclaimed areas surrounding the subsidence. Soils immediately surrounding nearby historic cribwork structures will not be disturbed. None of the target genera were found in the work area

during field surveys. Dominant species include *Elymus trachycaulus* and *Gutierrezia sarothrae.* Less common species include *Achnatherum hymenoides, Bromus tectorum, Elymus elymoides, Ericameria nauseosa, Juniperus osteosperma, Melilotus officinalis, Mentzelia* sp., *Pascopyrum smithii, Pleuraphis jamesii, Salsola tragus,* and *Sarcobatus vermiculatus.* Russian knapweed plants in the area had recently been sprayed with herbicide.

3) King Solomon Vent (on C-AM-19). Area surveyed: approximate 100 ft radius around subsided portal, including areas surrounding large nearby rocks to be potentially placed in the portal, and reclaimed road. All work will be performed in a previously disturbed area, and access will be along reclaimed roads. The disturbed area is surrounded by a mosaic of pinon-juniper forest and sagebrush shrubland. Plants of the genus *Astragalus* were observed in the forest, but were not identified to species because they will not be disturbed. A single species of *Astragalus* was found in the reclaimed access road, but was determined not to be one of the sensitive species, as it differed in multiple characteristics. No target genera were found in the work area itself. Dominant species included *Pleuraphis jamesii* and *Elymus trachycaulus.* Less common species included *Achnatherum hymenoides, Aristida purpurea, Bromus tectorum, Convolvulus arvensis, Elymus elymoides, Ericameria nauseosa, Eriogonum* sp., *Euphorbia* sp., *Gutierrezia sarothrae, Hesperostipa comata, Krascheninnikovia lanata, Lepidium* sp., *Lomatium* sp., *Salsola tragus, Sarcobatus vermiculatus, Sisymbrium* sp., *Sphaeralcea coccinea, Stanleya pinnata,* and *Tragopogon dubius.* A large patch of Russian knapweed surrounds the subsided portal.
4) Open vent on C-AM-20. This vent will be closed by welding metal grating to the top. This activity will not involve any ground disturbance. Access to the site will be via a reclaimed road. One species of *Astragalus* was found on the reclaimed road but was determined not to be one of the sensitive species, as it differed in multiple characteristics. No other target genera were observed in the road or in the area surrounding the vent where a vehicle might travel.

Trip Report, Uranium Lease Sites Vegetation Surveys

Prepared by L. Sheader, Ecologist, S.M. Stoller Corporation on July 6, 2010

Several DOE Lease Tracts were visited in May and June, 2010 to identify any federally-listed plant species that may occur on or near mine features to be reclaimed in Fiscal Year 2010. No federally-listed or other sensitive species were found at any of the locations.

Date	Location	Feature	Field Notes
5/12/10	Calamity/ Outlaw Mesas	Maverick #6	Material will be moved into hole from approx. 10 ft in each direction. Topsoil (2") will be reserved and placed for reclamation. Pinon and juniper trees on the rock pile will be removed. Portions of the surrounding area include mature plant communities, including substantial population of *Pediocactus simpsonii*. Although this is not a sensitive species, request avoiding populations, and excavating from nearby disturbed areas instead, as a best management practice.
5/12/10	Calamity/ Outlaw Mesas	Radium #5	Shaft with windlass. The adit will be filled with rock from nearby slopes. No plant species of concern identified in the area.
5/12/10	Calamity/ Outlaw Mesas	Queen of the Hills	Subsided vent shaft will be repaired by pushing in sediments around the shaft. Large dead tree will be replaced in same location. No vegetation concerns.
5/12/10	Calamity/ Outlaw Mesas	Arrowhead Camp area / Blue Ribbon #11	Small vent will be crushed and covered. Surrounded by early successional vegetation; no concerns.
5/12/10	Calamity/ Outlaw Mesas	Blue Ribbon #4	A bat gate has been installed in the portal. A nearby subsidence will be filled with rocks and soil. No plant species of concern. Easter daisies observed in the area.
5/12/10	Calamity/ Outlaw Mesas	Arrowhead #12	Cut tree and place in vent. Use foam and soil to seal opening. Very new vegetation in area with annual weeds; no concerns.
5/12/10	Calamity/ Outlaw Mesas	BLM subsidence	All surrounding species are revegetation plants; no concerns; no sensitive plant species found on surrounding banks
5/12/10	Calamity/ Outlaw Mesas	Calamity #21	"Bull Elk Shaft" is a subsidence that will be filled with surrounding materials. May remove one tree for access. Additional fill will be removed if necessary from hillside. *Astragalus* observed, but not sensitive species
5/12/10	Calamity/ Outlaw Mesas	Calamity #17	Subsided opening to be filled from adjacent bank. Some cryptobiotic soils; mostly goldenweed, *Alyssum desertorum*, *Opuntia* sp. No sensitive spp. observed
5/12/10	Calamity/ Outlaw	G1/G1A	Subsidence by buildings to be repaired. All species in immediate area are revegetation plants. No sensitive spp. observed around the subsidence and at the borrow

	Mesas		area.
5/12/10	Calamity/ Outlaw Mesas	G3A	This portal may be opened and mined, or it may be closed. All species in the area are revegetation plants.
5/12/10	Calamity/ Outlaw Mesas	G3	Waste rock piles to be transported to fill hole. Vegetation mainly *Ericameria nauseosa, Alyssum desertorum,* and a variety of grasses. Some areas of *Artemisia tridentata* and cacti. No species of concern present.
5/13/10	Monogram Mesa	Aztec	Did not hike in to see the vent but observed from road. Hand shovels will be used to cover with soil after filling with foam. Minimal disturbance to vegetation requested.
5/26/10	Slickrock area (#11)	Tomboy	3 subsided holes. Surrounded by clay soils. Vegetation mainly *Ericameria nauseosa* and revegetation grasses.
5/26/10	Slickrock area (#11)	Beth Pits	High walls will be buried; waste rock piles to be dozed into the draw. Work will avoid most of the trees in the area. Most of area to be disturbed covered with early successional vegetation.
5/26/10	Slickrock area (#11)	Mercantile #4	Small subsided portal; push boulders in. No vegetation concerns
5/26/10	Slickrock area (#12)	Marne	Pits and trenches to be filled near Marne mine, with additional pit at BLM boundary if time. No vegetation concerns.
5/26/10	Slickrock area (#12)	Spud Patch area	2 pits to be filled. Although some of the vegetation is later successional, no sensitive species were found.
5/26/10	Lease Tract #17	GEU Drill Hole	Inspected area for proposed drill location. Has been previously disturbed; no plant spp. of concern
5/26/10	Lease Tract #17	Radium 10	"Penthouse" ore bin to be pulled down. Sparse vegetation in area; no sensitive spp.
6/14/10	Long Park	TNT #4 & TNT #1	Subsided portals to be repaired. Milk vetch species present in area, but no T&E or sensitive species present in or near work area
6/14/10	Long Park	Hidden Basin Mine	2 subsided shafts to be filled with materials from reclaimed dump area. Track hoe will be used to gather timbers from ore bin, track and shed. Will burn among waste rock. Entire area, including access route, has been disturbed and revegetated with *Ericameria nauseosa* and native grasses.
6/14/10	Long Park	Donald C	Re-fill portal and contour adjacent piles. This area has been disturbed recently and no plants of concern were identified.

ULP plants collected since mid 1990s; specimens available

Species	Location/Date
Achillea lanulosa	Tomboy Mine
Andropogon gerardii	Hwy 141 between Naturita and Slick Roc
Artemisia dracunculus	Lucky Strike Mine, SR-11A, 2011
Astragalus convallarius	ULP 2011
Astragalus flavus	Lease Tract 24, May 21, 2009
Astragalus linifolius	Found near, not on, lease tracts
Astragalus lonchocarpus	ULP
Astragalus nuttallianus	Lease Tract 24, May 21, 2009
Bromus japonicus	C-SR-12
Chamaesyce maculata	ULP 2011
Comandra umbellata	Outlaw Mesa
Dracocephalum parviflorum	C-SR-10
Elymus albicans	ULP; 5/20/2009
Elymus canadensis	ULP 2011
Elymus lanceolatus	Matchless Mine, Calamity Mesa
Elymus trachycaulus	BL-23B
Elymus triticoides	Cliff Dweller Mine (C-AM-19)
Eremopyrum triticeum	5/25/01, on Calamity Mesa
Eriogonum sp.	possibly twin bladderpod
Euphorbia micromeria	C-AM-19
Euthamia occidentalis	ULP 2011
Forestiera neomexicana	Riparian shrub along Dolores River
Geum rossii	ULP 2011
Gutierrezia sarothrae	ULP 2011
Hymenopappus filifolius	SR-14A; C-SR-11A
Hymenoxys richardsonii	CM-25
Ipomopsis congesta	CG-26
Lesquerella ludoviciana	Outlaw Mesa
Leucelene ericoides	Tomboy Mine C-SR-11
Lomatium sp.	Outlaw Mesa; note: not *L. concinnum*
Nicotiana attenuata	ULP 2011
Oenothera brachycarpa	C-SR-11A
Oreocarya flauoculata	C-AM-19
Oxybaphus linearis	Slickrock area
Panicum hallii	Drainage area near Slick Rock
Pascopyrum smithii	CM-25
Physaria acutifolia	from Blunder Mine
Platyschkuhria integrifolia	CM-25
Poa compressa	BLM Site 64, Calamity Mesa; may be Poa pratensis
Populus alba	Coll. in Slickrock area, at Dan Woodard's property
Rhus glabra	Waste rock piles on Outlaw Mesa
Sedum lanceolatum	CM-25, early June
Senecio eremophilus	C-AM-19; may be S. multilobata
Stenotus armerioides	C-AM-19
Stipa lettermanii	CM-25
Stipa viridis	G-1 / G-1A
Thinopyrum ponticum	Cliff Dweller Mine (C-AM-19)