1999 ANNUAL REPORT TO THE DIVISION OF OIL, GAS & MINING

1999 ANNUAL VEGETATION MONITORING REPORT

- COTTONWOOD MINE: ACT/015/019
- DEER CREEK MINE: ACT/015/018
- DES BEE DOVE MINE: ACT/015/017
- TRAIL MOUNTAIN MINE: ACT/015

PACIFICORP

ENERGY WEST Mining Co.

☆ Problem areas. ~~Need to check which areas are test plots~~

(1)

Pacificorp Annual Reports for Trail Mtn, Cottonwood, Des Bee Cook, and Deer Creek. Bill

Vegetation Monitoring (B.-2) Steve

Cottonwood

Old Fan Road - Qualitative - Vegetation Excellent

4th East Road - Cover good, diversity low (Thickspike, Alfalfa)

Storage Yard Slope. Some weeds, Rabbitbrush dominant, good grass cover

☆ Parking Lot Slope. Cover low. Many weeds → Gravel erosion control disturbed vegetation.

☆ Road/Site Pad Slopes. Plant growth unstable but not many weeds

☆ Tipple Area Slope. Area unstable for plant growth, hard to get established. Moderate weeds.

Sed Pond Banks. Vegetation disturbed by maintenance. Good where not disturbed.

Ninth East Road Breakout. Few Shrubs, lots of grasses/forbs.

Has been done

Restake Plots

Test Plots '88. Top half more weedy - may be affected by road salt. Plots dominated by "Aster chilensis" Plot with no mulch had best diversity - more grasses. Plots need to be restaked.

Waste Rock Area - Sampled intensively for bond release - Data given for each cell - Will look at release application

Density data shows a lot of snakeweed, ~~but 4-wing is more~~ dominant

The summary says this masks the amount of 4-wing, but there is more cover from snakeweed. Cells 5, 6, 7 had more 4-wing cover

There are some areas with lots of weeds, but desirable species dominate.

Also Berms 1, 2, 3

CTW Soil Piles Look pretty good

New Waste Rock Area Road Slopes (Interim) Cover and composition looking good

" " " Topsoil Stockpiles Mostly desirable spp.

☆ " " " Subsoil Piles Unmulched had many more weeds. Flat tops with mulch did best. Erosion beginning where mulch is decomposing. Much Halogeton in some areas

" " " Sed Pond. Looks good.

91, 94, 96

* Refuse Berms (Final Reclamation) Cover is reasonably good without comparing it to reference area, but diversity not very high

Des Bee Dove (All Qualitative)
Beehive Yard Slope (Qualitative) Good diversity and cover
Beehive Road Berm (Qualitative) Mostly shrubs, some weeds.
* Deseret Road Berm (Qualitative) Disturbed by road maintenance, weeds
* Portal Road Berm (Qualitative) Disturbed by maintenance Undisturbed areas look good.
Barthouse Road Berm (Qualitative) Mostly desirable, some weeds.
Tipple Slope Good considering steep slope
Sediment Storage Slope Few grasses, some weeds, moderate shrubs
Sed Pond Banks Bare to excellent depending on aspect
Beehive Substation Slope Cover, Diversity good but few forbs
Sed Pond Area Looked Excellent
Bathhouse Slopes Excellent, Diverse
Materials Yard Slopes Looked excellent
1989 Test Plot (Hard to tell condition from the notes) summer seeded doing well. Some - can't tell how many - weeds. West side best
One to watch * Beehive Slope - Cover & diversity good. Slope will probably hold well some erosion
Sed Pond Subsoil - ~50% weeds. Top has a few grasses, sides mostly shrubs.

Deer Creek

Marked? [Riparian RA (Qual) Aster foliaceous dominant
Mixed Conifer RA (Qual) ~45% cover, kind of open, ambitious standard
PJ RA (Qual) Good understory for PJ]
C2 Conveyor (Qual) Some disturbance. Good species mix
Riparian areas (Qual) <5% weeds Excellent
* Sed Pond Dam (Qual) Recent disturbance - Mostly weedy species. Top okay
Temp Sed Basin (Qual) Improving, fewer weeds.
Roadside areas (Qual) Mostly desirable grasses, few shrubs
Gate Area slope (Qual) Good condition considering slope. Some weeds
Fan Road Slopes (Qual) Good condition, some weeds.
Refuse Pile & Berm. Patchy weeds/good, mostly good.
* Rock slide & Berm (Qual) Erosion problems, Berm has no vegetation & severe erosion, slide area w/ erosion.

Deer Creek (Continued)
Water Plant Slope (Qual) Some disturbance, no weeds, cover probably okay
Pipeline (Qual) 45% cover, good diversity, patchy weeds, probably from road salt
Deer Canyon (Qual) Excellent

Waste Rock — Waste Rock RA (Qual) Some weeds, Gardner dominant, mostly shrubs
Access Road Slopes. Cut slopes - little veg, moderate erosion, Fill okay, Cut 50% weeds
↑ ☆ Phase I Berm (Final?) 70% weeds, 30% good, improving
☆ Drain Field - Hole may be dangerous to wildlife, Patchy weeds, mainly good
Waste Rock Phase I diversion, No weeds or erosion, basically good.

Trail Mountain
Grass/shrub RA Looks okay
☆ Seep Pond Outslope N1/2 of East Slope mostly weeds. Otherwise okay
Parking Lot Extension Species look okay, No woody

Cottonwood Canyon
Reclaimed slope Looks good. (Far portal portion doesn't)
☆ Soil Piles at Far Portal - Parts looked like they had not been seeded, (Subsoil pile) and there was erosion. Other parts looked good.
Far Portal RA - Okay but some disturbance (natural - rock slide?)
(35% cover - not tremendous diversity)
CBP Tube Conveyor '96 seeding Lots of YSC, No shrubs, Moderate grasses
Belt Conveyor (96) Lots of Boulders. Good cover, not good diversity
Portal Diesel (96) looks good but no shrubs
☆ Far Portal (98) (Qual) Good grass growth but no shrubs

Kilda
Pad area Slopes (Qual) Looks good but one slope is YSC
Roadway slope Cut slopes Fair, Fill Excellent
Topsoil Pile Looking good High YSC but others coming

PACIFICORP/ENERGY WEST
VEGETATION MONITORING
1999

VOLUME I

VEGETATION MONITORING REPORTS FOR THE
COTTONWOOD MINE, DES-BEE-DOVE, DEER CREEK MINE,
TRAIL MOUNTAIN MINE, COTTONWOOD CANYON & RILDA CANYON

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OIL, GAS AND MINING

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Report Date
March 2000

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INTRODUCTION

The following document addresses the results of vegetation monitoring of seeded areas and revegetation test plots results for 1999. The following is a list of areas monitored and reported within this document.

Cottonwood Mine Area
Old Fan Road
Reference Area
4th East Road
Storage Yard Slope
Parking Lot Slope
Road/Silo Pad Slope
Tipple Area Slopes
Sediment Pond Banks
Ninth East Road Breakout
Test Plots '88
Waste Rock (Old) Cell 1
Waste Rock (Old) Cell 2
Waste Rock (Old) Cell 3
Waste Rock (Old) Cell 4
Waste Rock (Old) Cell 5
Waste Rock (Old) Cell 6
Waste Rock (Old) Cell 7
Waste Rock (Old) Berm 1
Waste Rock (Old) Berm 2
Waste Rock (Old) Berm 3
Waste Rock (Old) Berm 4
CTW Reference Area
CTW Soil Piles (A,C) '94
Waste Rock (New) Road Slopes
Waste Rock (New) Topsoil Stockpiles
Waste Rock (New) Subsoil Stockpiles
Waste Rock (New) Sediment Pond Banks
Refuse Berm 1991 (Final)
Refuse Berm 1994 (Final)
Refuse Berm 1996 (Final)

Des-Bee-Dove Area
Beehive Yard Slope
Beehive Road Berm
Deseret Road Berm
Portal Road Berm
Bathhouse Road Berm
Tipple Slope
Sediment Storage Slope
Sediment Pond Banks
Beehive Substation Slope
Sediment Pond Area
Bathhouse Slope
Material Yard Slope
Test Plots '89
Beehive Slope
Subsoil Pile

Deer Creek
Riparian Reference Area
Mixed Conifer Reference Area
PJ Reference Area
C2 Conveyor (IU 132-190)'93
Riparian Areas
Sediment Pond Dam
Temp. Sediment Basin
Roadside Areas
Gate Areas Slope
Fan Road Slopes
Refuse Pile and Berm
Rock Slide and Berm
Water Plant Slope
Pipeline
Deer Canyon
Waste Rock Access Road Slopes
Phase I Berm
Drain Field '97
Phase I Diversion

Trail Mountain Mine
Reference Area
Sediment Pond Outslope '93
Parking Lot Ext.'96

Cottonwood Canyon
Fan Portal Reclaimed Slope
Soil Piles
Reference Area
Tube Conveyor Slope
Belt Portal
Portal (Diesel)
Reclaimed Slope (Final) '98

Rilda Facilities Area
Pad Area Slopes '96
Roadway Slopes
Topsoil Pile '95

METHODS

Vegetation monitoring was conducted on revegetated sites and test plots for PACIFICORP (ENERGY WEST) in the growing season of 1999. Quantitative and/or qualitative data were taken on each site, depending on the monitoring schedule. In other words, quantitative data sampling was not scheduled this year on some sites. Each data sheet will briefly describe the sample parameters specific to that site.

QUALITATIVE DATA

Qualitative data were recorded on all sites. A qualitative data sheet for each site is included in this report and provides the following information: site name, general area, sample date, observers, slope, exposure, acreage, animal disturbance, erosion damage, cover, dominant plant species observed, and other pertinent notes.

When quantitative data were recorded, results are shown on these data sheets or reference to where the data is located.

Site Name

The site name that is given correlates with PACIFICORP'S (ENERGY WEST'S) maps of the area and can be used for future reference and sampling.

Area

The "Area" on the data sheets is a reference to the general mine or property areas for quick reference and general use.

Date

Sample dates are also provided. All sample dates are within the 1999 growing season.

Workers

Lists the names of the individuals who recorded the data.

Exposure

Exposure was recorded on each site. Often the site had several exposures differences. In those cases, "variable" was written for the exposure on the data sheet.

Animal Disturbance

Values were given to the relative use by animal species at each site. The values and a brief explanation are given below.

None - no animal use was observed.

Slight - only little animal use was observed by droppings, tracks, or cropped vegetation.

Moderate - a fair degree of use was observed, mostly by the cropped vegetation. Several inches of production still remained available for use by the animals.

Severe - animal use had taken nearly all of the available current year's production.

Erosion

Erosion of the area was also assessed by qualitative methods. Actual measurements, descriptive notes or values described below were given to each site.

None - (or negligible) no erosion was observed.

Slight - small erosion rills beginning, usually less than 2:1 (2 inches wide by 1 inches deep).

Moderate - erosional rills and gullies from 2:1 to 4:2.

Severe - erosional rills and gullies over to 4:2 were observed.

Cover

Cover differences or notes may be given on the data sheet or references to the quantitative data.

Dominant Plant Species Observed

Sometimes plant species that were observed, but were not encountered in the quadrats when sampling. Many of these species were recorded here. However, some of the species were also encountered in the quadrats. Therefore, for a list of all species on a given site, one should refer to both quantitative and qualitative data sheets.

Notes

Site-specific, pertinent notes about each area were also taken i.e. identification of special considerations, areas of differential growth patterns, etc. Notes on specific methodologies on each site were also described here.

Photographs

Color photographs were taken for each site and are included in this report for documentation.

QUANTITATIVE DATA

Cover and Composition

Cover estimates were made using ocular methods with randomly or regularly placed meter square

quadrats. Total living cover, litter, rock and bareground were recorded. Cover by species was also recorded. Raw data summations were included in this report. They provide all means and standard deviations. Species composition was also assessed from the quadrats. Sample sizes were often kept consistent each year. Because these data are presented to observe only trends for revegetation success and soil stabilization, no attempt was made to achieve sample adequacy for each individual site.

Woody Species Density

In some areas woody plant densities estimates were needed. Densities were recorded using the point-quarter distance method (Cottom and Curtis 1956), belt transects, or in some cases, counting the entire population of a given area. In the point-quarter method, random points were placed on the sample sites and measured into four quarters. The distances to the nearest woody plant species were then recorded in each quarter. The average point-to-individual distance was equal to the square root of the mean area per individual.

In the belt transect method, sizes of transects varied with individual sites. In this method total counts of the woody species were conducted in each transect. They were then summed and averaged to calculate the number of individuals per acre.

Productivity

Total annual biomass was estimated by clipping, drying and weighing current annual productivity. When there was enough space within the sample area, “double sampling” or relative ocular estimates were also made placing four quadrats near the "clipped" quadrat to increase accuracy of the productivity estimates. In other words, one quadrat was placed. From this sample, four more quadrat estimates were made relative to the first quadrat. Biomass from the first quadrat was clipped and weighed.

RESULTS

To be consistent with previous years, data sheets for qualitative and quantitative (including raw data) sampling are included in this report. This gives the reviewer an overall view of the revegetation success of each area. For results of the above parameters, refer to the site-specific data sheets.

COTTONWOOD MINE AREA

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Old Fan Road

AREA: Cottonwood Mine (1984)

DATE: September 13-17, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 13-15 deg.

EXPOSURE: Variable

AREA: .8 acres

ANIMAL USE/DISTURBANCE: Heavy deer sign.

EROSION: Negligible

COVER: Not sampled this year

DOMINANT PLANT SPECIES OBSERVED:
Artemisia tridentata
Atriplex canescens
Atriplex confertifolia
Cercocarpus montanus
Chrysothamnus nauseosus
Eriogonum corymbosum
Gutierrezia sarothrae
Populus angustifolia
Salix exigua
Sambucus caerulea

Aster chilensis
Astragalus cicer
Cirsium sp.
Linum lewisii
Tragopogon dubius

Agropyron cristatum
Elymus cinereus
Elymus elymoides
Elymus spicatus
Elymus junceus
Elymus lanceolatus
Stipa hymenoides

NOTES:
1) We sampled only qualitative data in 1998-99.
2) Revegetation site looked excellent.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Reference Area

AREA: Cottonwood Mine Site

DATE: September 13-17, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 36 deg.

EXPOSURE: NE

ANIMAL USE/DISTURBANCE: Minimal

EROSION: Negligible

COVER: (See quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Abies concolor
Amalanchier utahensis
Artemisia tridentata
Chrysothamnus depressus
Chrysothamnus nauseosus
Ephedra viridis
Eriogonum corymbosum
Gutierrezia sarothrae
Juniperus osteosperma
Pinus edulis
Pseudotsuga menziesii
Rosa woodsii
Symphoricarpos oreophilus

Hedysarum occidentale var. canone
Galium boreale
Leptodactylon watsonii

Elymus salinus
Stipa hymenoides

NOTES:
1) Sampled for qualitative and quantitative data in 1999.
2) n=20 for cover and frequency.
3) The sensitive species, *Hedysarum occidentale var. canone* continues to be present and looks good.
4) No major disturbance has disrupted this site.

ENERGY WEST-COTTONWOOD MINE
Reference Area PJ
Acreage:
Slope 36 deg
Exposure: NE

Sample Date: 13-17 Sept 99	1.00	2.00	3.00	4.00	5.00	6.00
OVERSTORY						
Amalanchier utahensis	0.00	0.00	0.00	0.00	0.00	0.00
UNDERSTORY						
SHRUBS						
Amalanchier utahensis	0.00	0.00	0.00	0.00	0.00	25.00
Artemisia tridentata	0.00	0.00	0.00	0.00	0.00	0.00
Atriplex confertifolia	0.00	0.00	0.00	0.00	0.00	0.00
Chrysothamnus nauseosus	10.00	0.00	0.00	5.00	0.00	0.00
Eriogonum corymbosum	0.00	5.00	0.00	0.00	0.00	0.00
Gutierrezia sarothrae	0.00	0.00	0.00	0.00	0.00	0.00
Juniperus osteosperma	0.00	0.00	0.00	0.00	0.00	0.00
Pinus edulis	0.00	0.00	20.00	0.00	0.00	0.00
FORBS						
Hedysarum occidentale canone	5.00	0.00	0.00	0.00	5.00	0.00
GRASSES						
Elymus salinus	10.00	25.00	10.00	25.00	10.00	10.00
Stipa hymenoides	0.00	0.00	10.00	0.00	10.00	0.00
COVER						
Overstory	0.00	0.00	0.00	0.00	0.00	0.00
Understory	25.00	30.00	40.00	30.00	25.00	35.00
Litter	10.00	10.00	10.00	5.00	15.00	5.00
Bareground	5.00	5.00	5.00	10.00	5.00	5.00
Rock	60.00	55.00	45.00	55.00	55.00	55.00
% COMPOSITION						
Shrubs	40.00	16.67	50.00	16.67	0.00	71.43
Forbs	20.00	0.00	0.00	0.00	20.00	0.00
Grasses	40.00	83.33	50.00	83.33	80.00	28.57

7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00
0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	5.00
0.00	0.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00
10.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	15.00	25.00	30.00	10.00	20.00	20.00	25.00	15.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	30.00	25.00	35.00	35.00	40.00	30.00	30.00	40.00
15.00	10.00	5.00	5.00	25.00	20.00	5.00	30.00	10.00
5.00	5.00	5.00	10.00	5.00	5.00	5.00	5.00	5.00
55.00	55.00	65.00	50.00	35.00	35.00	60.00	35.00	45.00
20.00	0.00	0.00	14.29	71.43	50.00	33.33	0.00	62.50
40.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40.00	50.00	100.00	85.71	28.57	50.00	66.67	100.00	37.50

UP&L-COTTONWOOD MINE
Reference Area PJ
Acreage:
Slope 36 deg
Exposure: NE
Sample Date: 13-17 Sept 99

Mean	SDev	Freq	
1.00	3.74	6.67	*Amalanchier utahensis*
			SHRUBS
2.00	6.27	13.33	*Amalanchier utahensis*
1.33	4.99	6.67	*Artemisia tridentata*
0.67	2.49	6.67	*Atriplex confertifolia*
1.00	2.71	13.33	*Chrysothamnus nauseosus*
0.33	1.25	6.67	*Eriogonum corymbosum*
0.67	1.70	13.33	*Gutierrezia sarothrae*
1.67	6.24	6.67	*Juniperus osteosperma*
2.67	6.80	13.33	*Pinus edulis*
			FORBS
2.33	4.42	26.67	*Hedysarum occidentale canone*
			GRASSES
17.33	7.04	100.00	*Elymus salinus*
1.67	3.50	20.00	*Stipa hymenoides*
			COVER
1.00	3.74		Overstory
31.67	5.37		Understory
12.00	7.48		Litter
5.67	1.70		Bareground
50.67	9.29		Rock
			% COMPOSITION
29.75	25.43		Shrubs
8.67	15.86		Forbs
61.58	24.41		Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: 4th East Road

AREA: Cottonwood Mine (1986)

DATE: September 13-17, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 3 - 5 degrees

EXPOSURE: N

AREA: .1 acre

ANIMAL USE/DISTURBANCE:

EROSION: Negligible

COVER: (see quantitative data).

DOMINANT PLANT SPECIES OBSERVED:

Aster chilensis
Descurainia pinnata
Medicago sativa

Elymus lanceolatus

WOODY SPECIES DENSITY: no./Ac

	1995	1996	1997	1998
Chrysothamnus nauseosus		21.78		43.56
Eriogonum corymbosum		21.78	43.56	
Gutierrezia sarothrae	43.56			87.12
Pinus edulis		21.78	43.56	
Symphoricarpos oreophilus			43.56	43.56
TOTAL	43.56	65.34	130.68	174.24

ANNUAL PRODUCTIVITY:

	LBS/Ac (1997)	LBS/Ac (1998)
Herbaceous	782.75	870.56
Woody	0.00	0.00
Total	782.75	870.56

NOTES:

1) We sampled at regular at 20' intervals up entire road using a 200' tape.

2) Sampled cover (n=10) and frequency (n=10) by ocular methods.

3) We did not sample for density and production in 1999, but previous data has been retained for observation (see above)..

4) Cover was good, but species diversity was low.

ENERGY WEST-COTTONWOOD MINE
4th East Road (1986)
Acreage: .1
Slope: 3-5 deg
Exposure: N

Sample Date: 13-17 Sept 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
FORBS						
Aster chilensis	0.00	0.00	0.00	0.00	0.00	0.00
Medicago sativa	15.00	5.00	15.00	5.00	25.00	30.00
GRASSES						
Elymus cinereus	0.00	0.00	0.00	5.00	10.00	0.00
Elymus lanceolatus	55.00	75.00	60.00	55.00	40.00	40.00
Elymus smithii	0.00	0.00	0.00	0.00	0.00	0.00
COVER						
Total Living Cover	70.00	80.00	75.00	65.00	75.00	70.00
Litter	10.00	10.00	10.00	20.00	5.00	20.00
Bareground	5.00	5.00	5.00	5.00	5.00	5.00
Rock	15.00	5.00	10.00	10.00	15.00	5.00
% COMPOSITION						
Shrubs	0.00	0.00	0.00	0.00	0.00	0.00
Forbs	21.43	6.25	20.00	7.69	33.33	42.86
Grasses	78.57	93.75	80.00	92.31	66.67	57.14

ENERGY W
4th East Roa
Acreage: .1
Slope: 3-5 de
Exposure: N
Sample Date

7.00	8.00	9.00	10.00	Mean	SDev	Freq	
							SHRUBS
							FORBS
0.00	0.00	0.00	10.00	1.00	3.00	10.00	*Aster chilens*
35.00	15.00	20.00	25.00	19.00	9.43	100.00	*Medicago sa*
							GRASSES
0.00	0.00	0.00	0.00	1.50	3.20	20.00	*Elymus ciner*
30.00	40.00	35.00	30.00	46.00	13.93	100.00	*Elymus lanc*
0.00	0.00	5.00	0.00	0.50	1.50	10.00	*Elymus smit*
							COVER
65.00	55.00	60.00	65.00	68.00	7.14		Total Living
10.00	35.00	30.00	20.00	17.00	9.27		Litter
20.00	5.00	5.00	10.00	7.00	4.58		Bareground
5.00	5.00	5.00	5.00	8.00	4.00		Rock
							% COMPOS
0.00	0.00	0.00	0.00	0.00	0.00		Shrubs
53.85	27.27	33.33	53.85	29.99	16.02		Forbs
46.15	72.73	66.67	46.15	70.01	16.02		Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Storage Yard Slope

AREA: Cottonwood Mine (1988 Reveg. Area)

DATE: September 13-17, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 30 - 40 deg.

EXPOSURE: S & E

AREA: 1.3 acres

ANIMAL USE/DISTURBANCE:

EROSION: Mostly moderate.

COVER: (see quantitative data).

DOMINANT PLANT SPECIES OBSERVED: (see quantitative data)

Chrysothamnus nauseosus

Aster chilensis
Kochia scoparia
Penstemon palmeri

Agropyron cristatum
Bromus tectorum
Elymus cinereus
Elymus spicatus
Elymus lanceolatus
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	1998
	(no./ac)	
Artemisia tridentata		38.46
Atriplex confertifolia	39.89	
Chrysothamnus nauseosus	1396.14	1500.08
Eriogonum corymbosum	159.56	
Total	1595.59	1538.54

PRODUCTION:		
	(lbs/ac)	
Herbaceous	424.29	576.55
Woody	461.76	413.22
Total	886.05	989.78

NOTES:

1) Sampled regularly around area half the locations were on the SE and half on the E exposures.

2) Some sections on the E exposure a had little or no cover and supported mostly weedy species, whereas, the south face has a fair representation of native species.

3) Sampled cover (n=10) and frequency (n=10) by ocular methods.

4) We did not sample for density and production in 1999, but previous data has been retained for observation (see above).

ENERGY WEST-COTTONWOOD MINE
Storage Yard Slope
1988 Reveg. Interim
Acreage: 1.3
Slope: S & E
Exposure: 30 - 40 deg

Sample Date:13-17 Sept 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Chrysothamnus nauseosus	0.00	0.00	0.00	10.00	0.00	30.00
FORBS						
Aster chilensis	0.00	10.00	0.00	5.00	0.00	0.00
Kochia scoparia	0.00	0.00	45.00	10.00	5.00	0.00
Penstemon palmeri	0.00	0.00	0.00	0.00	0.00	10.00
GRASSES						
Agropyron cristatum	25.00	0.00	0.00	0.00	0.00	0.00
Bromus tectorum	0.00	0.00	0.00	0.00	10.00	0.00
Elymus cinereus	5.00	10.00	0.00	0.00	0.00	0.00
Elymus elymoides	0.00	0.00	5.00	5.00	0.00	0.00
Elymus lanceolatus	15.00	35.00	0.00	0.00	5.00	0.00
Elymus smithii	0.00	10.00	0.00	25.00	0.00	0.00
Stipa hymenoides	0.00	0.00	0.00	0.00	25.00	10.00
COVER						
Total Living Cover	45.00	65.00	50.00	55.00	45.00	50.00
Litter	25.00	20.00	5.00	10.00	10.00	5.00
Bareground	5.00	5.00	20.00	10.00	10.00	5.00
Rock	25.00	10.00	25.00	25.00	35.00	40.00
% COMPOSITION						
Shrubs	0.00	0.00	0.00	18.18	0.00	60.00
Forbs	0.00	15.38	90.00	27.27	11.11	20.00
Grasses	100.00	84.62	10.00	54.55	88.89	20.00

ENERGY W
Storage Yard
1988 Reveg.
Acreage: 1.
Slope: S & E
Exposure: 30

7.00	8.00	9.00	10.00	Mean	SDev	Freq		Sample Date
								SHRUBS
35.00	10.00	20.00	10.00	11.50	12.26	60.00		*Chrysotham*
								FORBS
0.00	0.00	0.00	0.00	1.50	3.20	20.00		*Aster chilens*
0.00	0.00	0.00	0.00	6.00	13.38	30.00		*Kochia scop*
15.00	10.00	10.00	0.00	4.50	5.68	40.00		*Penstemon*
								GRASSES
0.00	0.00	0.00	0.00	2.50	7.50	10.00		*Agropyron cr*
0.00	0.00	0.00	0.00	1.00	3.00	10.00		*Bromus tect*
0.00	0.00	0.00	0.00	1.50	3.20	20.00		*Elymus ciner*
0.00	0.00	0.00	0.00	1.00	2.00	20.00		*Elymus elym*
5.00	10.00	0.00	10.00	8.00	10.30	60.00		*Elymus lanc*
0.00	0.00	0.00	0.00	3.50	7.76	20.00		*Elymus smit*
0.00	10.00	10.00	15.00	7.00	8.12	50.00		*Stipa hymen*
								COVER
55.00	40.00	40.00	35.00	48.00	8.43			Total Living
10.00	10.00	10.00	10.00	11.50	5.94			Litter
5.00	5.00	10.00	30.00	10.50	7.89			Bareground
30.00	45.00	40.00	25.00	30.00	9.75			Rock
								% COMPOS
63.64	25.00	50.00	28.57	24.54	24.29			Shrubs
27.27	25.00	25.00	0.00	24.10	24.06			Forbs
9.09	50.00	25.00	71.43	51.36	32.36			Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Parking Lot Slope

AREA: Cottonwood Mine

DATE: September 13-17, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 26 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE:

EROSION: Slight to moderate

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus

Aster chilensis
Kochia scoparia
Halogeton glomeratus
Grindelia squarrosa

Elymus elymoides
Elymus smithii
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
Atriplex confertifolia			99.57
Chrysothamnus nauseosus	597.40		547.61
Eriogonum corymbosum	746.75		99.57
Total	1344.15		746.74

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	248.64		292.51
Woody	369.64		37.83
Total	618.28		330.34

NOTES:

1) Sampled cover (n=10) and frequency (n=10) by ocular methods.

2) We did not sample for density and production in 1999, but previous data has been retained for observation (see above).

3) Mostly weedy species because erosion control measures (½-inch-plus rock cover) disturbed existing vegetation.

ENERGY WEST-COTTONWOOD MINE
Parking Lot Slope
1988 Reveg Interim
Acreage:
Slope: 26 deg
Exposure: E

Sample Date: 13-17 Sept 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Chrysothamnus nauseosus	5.00	0.00	0.00	0.00	0.00	0.00
FORBS						
Aster chilensis	0.00	0.00	50.00	0.00	0.00	0.00
Grindelia squarrosa	0.00	0.00	0.00	0.00	35.00	0.00
Kochia scoparia	0.00	0.00	0.00	15.00	10.00	35.00
GRASSES						
Elymus elymoides	0.00	5.00	0.00	0.00	5.00	0.00
Elymus smithii	5.00	0.00	0.00	0.00	0.00	0.00
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	0.00
COVER						
Total Living Cover	10.00	5.00	50.00	15.00	50.00	35.00
Litter	5.00	5.00	10.00	5.00	10.00	5.00
Bareground	5.00	5.00	5.00	10.00	15.00	5.00
Rock	80.00	85.00	35.00	70.00	25.00	55.00
% COMPOSITION						
Shrubs	50.00	0.00	0.00	0.00	0.00	0.00
Forbs	0.00	0.00	100.00	100.00	90.00	100.00
Grasses	50.00	100.00	0.00	0.00	10.00	0.00

ENERGY W
Parking Lot
1988 Reveg I
Acreage:
Slope: 26 de
Exposure: E

7.00	8.00	9.00	10.00	Mean	SDev	Freq		Sample Date
								SHRUBS
0.00	0.00	0.00	5.00	1.00	2.00	20.00		*Chrysotham*
								FORBS
0.00	25.00	25.00	5.00	10.50	16.35	40.00		*Aster chilens*
0.00	10.00	0.00	0.00	4.50	10.59	20.00		*Grindelia squ*
25.00	0.00	0.00	0.00	8.50	12.05	40.00		*Kochia scop*
								GRASSES
0.00	0.00	0.00	0.00	1.00	2.00	20.00		*Elymus elym*
0.00	0.00	0.00	0.00	0.50	1.50	10.00		*Elymus smit*
0.00	0.00	0.00	35.00	3.50	10.50	10.00		*Stipa hymen*
								COVER
25.00	35.00	25.00	45.00	29.50	15.40			Total Living
20.00	10.00	5.00	5.00	8.00	4.58			Litter
5.00	5.00	5.00	25.00	8.50	6.34			Bareground
50.00	50.00	65.00	25.00	54.00	20.22			Rock
								% COMPOS
0.00	0.00	0.00	11.11	6.11	15.00			Shrubs
100.00	100.00	100.00	11.11	70.11	43.67			Forbs
0.00	0.00	0.00	77.78	23.78	36.05			Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Road/Silo Pad Slope

AREA: Cottonwood Mine (1988 Reveg. Area)

DATE: September 13-17, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 35 deg.

EXPOSURE: SE

ACREAGE: 1.4 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Moderate (see notes)

COVER: (see quantitative data).

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Chrysothamnus nauseosus
Eriogonum corymbosum

Aster chilensis
Grindelia grindelioides
Penstemon palmeri
Halogeton glomeratus
Kochia scoparia
Melilotus officinalis

Elymus cinereus
Elymus hispidus
Elymus lanceolatus
Elymus salinus
Elymus spicatus

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
Atriplex confertifolia	359.06		359.06
Chrysothamnus nauseosus	1997.21		1795.29
Eriogonum corymbosum	1331.47		239.37
Total	3328.68		2393.72

Page 2
Site: Road/Silo Pad Slope

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	472.04		557.87
Woody	392.63		226.30
Total	864.67		804.17

NOTES:

1) We took five samples below the test plot by conventional methods and 5 on the steep slope by LDS (long distance scan) methods (cover n=10).

2) We did not sample for density and production in 1999, but previous data has been retained for observation (see above).

3) Area was active with mine activity and constantly under change. The plant growth is unstable.

ENERGY WEST-COTTONWOOD MINE
Road/Silo Pad Slope
1988 Reveg Interim
Acreage: 1.4
Slope: 35 deg
Exposure: SE

Sample Date: 13-17 Sept 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Atriplex confertifolia	0.00	0.00	0.00	0.00	0.00	0.00
Chrysothamnus nauseosus	0.00	5.00	0.00	10.00	10.00	0.00
Eriogonum corymbosum	0.00	0.00	0.00	0.00	10.00	0.00
FORBS						
Aster chilensis	40.00	55.00	50.00	30.00	35.00	10.00
Grindelia squarrosa	0.00	0.00	5.00	0.00	0.00	0.00
Kochia scoparia	0.00	0.00	0.00	0.00	0.00	0.00
Melilotus officinalis	0.00	0.00	0.00	5.00	0.00	0.00
Penstemon palmeri	5.00	0.00	0.00	0.00	0.00	0.00
GRASSES						
Elymus salinus	0.00	0.00	0.00	10.00	0.00	0.00
Elymus spicatus	0.00	0.00	0.00	0.00	10.00	0.00
COVER						
Total Living Cover	45.00	60.00	55.00	55.00	65.00	10.00
Litter	5.00	5.00	5.00	5.00	10.00	5.00
Bareground	10.00	5.00	5.00	10.00	5.00	5.00
Rock	40.00	30.00	35.00	30.00	20.00	80.00
% COMPOSITION						
Shrubs	0.00	8.33	0.00	18.18	30.77	0.00
Forbs	100.00	91.67	100.00	63.64	53.85	100.00
Grasses	0.00	0.00	0.00	18.18	15.38	0.00

ENERGY W
Road/Silo Pa
1988 Reveg I
Acreage: 1.
Slope: 35 de
Exposure: S

7.00	8.00	9.00	10.00	Mean	SDev	Freq		Sample Date
								SHRUBS
20.00	0.00	0.00	0.00	2.00	6.00	10.00		*Atriplex conf*
0.00	15.00	0.00	15.00	5.50	6.10	50.00		*Chrysotham*
0.00	0.00	0.00	0.00	1.00	3.00	10.00		*Eriogonum c*
								FORBS
0.00	0.00	0.00	0.00	22.00	21.24	60.00		*Aster chilens*
0.00	0.00	0.00	0.00	0.50	1.50	10.00		*Grindelia squ*
0.00	0.00	5.00	0.00	0.50	1.50	10.00		*Kochia scop*
0.00	0.00	0.00	0.00	0.50	1.50	10.00		*Melilotus offi*
0.00	0.00	0.00	0.00	0.50	1.50	10.00		*Penstemon*
								GRASSES
0.00	0.00	0.00	0.00	1.00	3.00	10.00		*Elymus salin*
0.00	0.00	0.00	0.00	1.00	3.00	10.00		*Elymus spic*
								COVER
20.00	15.00	5.00	15.00	34.50	22.30			Total Living
10.00	5.00	5.00	5.00	6.00	2.00			Litter
5.00	5.00	20.00	5.00	7.50	4.61			Bareground
65.00	75.00	70.00	75.00	52.00	21.82			Rock
								% COMPOS
100.00	100.00	0.00	100.00	35.73	43.11			Shrubs
0.00	0.00	100.00	0.00	60.91	42.71			Forbs
0.00	0.00	0.00	0.00	3.36	6.74			Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Tipple Area Slope

AREA: Cottonwood Mine (1988 Reveg. Area)

DATE: September 13-17, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 35 deg.

EXPOSURE: Variable

AREA: .1 acre

ANIMAL USE/DISTURBANCE: none

EROSION: Some moderate erosion on north side of the road.

COVER: (see quantitative data).

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Eriogonum corymbosum
Chrysothamnus nauseosus

Aster chilensis
Kochia scoparia
Salsola pestifer

Elymus lanceolatus
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	1998
	(no./ac)	
Atriplex confertifolia	535.92	219.13
Chrysothamnus nauseosus	1224.96	913.05
Eriogonum corymbosum	1307.53	358.70
Total	3062.41	1460.88

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	113.50		399.05
Woody	280.12		437.35
Total	393.63		836.40

NOTES:

1) Sampled cover [n=10 (6 on N side of road and 4 on S side)] and frequency (n=10) by ocular methods.

2) We did not sample for density and production in 1999, but previous data has been retained for observation (see above)..

3) Area was still active constantly changing and active and therefore, unstable for plant growth. It's a difficult place for desirable spp. to become established.

ENERGY WEST-COTTONWOOD MINE
Tipple Area Slope
1988 Reveg Interim
Acreage: .1
Slope: 35 deg
Exposure: variable

Sample Date: 13-17 Sept 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Atriplex confertifolia	0.00	35.00	20.00	5.00	0.00	0.00
Chrysothamnus nauseosus	0.00	0.00	0.00	0.00	5.00	0.00
Eriogonum corymbosum	0.00	0.00	0.00	10.00	20.00	0.00
FORBS						
Aster chilensis	25.00	0.00	0.00	0.00	0.00	20.00
Halogeton glomeratus	0.00	0.00	0.00	0.00	0.00	0.00
Salsola pestifer	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES						
Elymus junceus	0.00	0.00	0.00	10.00	0.00	0.00
Elymus salinus	0.00	0.00	10.00	0.00	0.00	0.00
Elymus smithii	15.00	0.00	0.00	0.00	0.00	0.00
Stipa hymenoides	5.00	10.00	10.00	0.00	0.00	0.00
COVER						
Total Living Cover	45.00	45.00	40.00	25.00	25.00	20.00
Litter	10.00	10.00	10.00	5.00	5.00	5.00
Bareground	5.00	25.00	25.00	10.00	5.00	5.00
Rock	40.00	20.00	25.00	60.00	65.00	70.00
% COMPOSITION						
Shrubs	0.00	77.78	50.00	60.00	100.00	0.00
Forbs	55.56	0.00	0.00	0.00	0.00	100.00
Grasses	44.44	22.22	50.00	40.00	0.00	0.00

ENERGY W
Tipple Area
1988 Reveg I
Acreage: .1
Slope: 35 de
Exposure: va

7.00	8.00	9.00	10.00	Mean	SDev	Freq	Sample Date
							SHRUBS
0.00	0.00	0.00	0.00	6.00	11.36	30.00	*Atriplex conf*
10.00	0.00	0.00	0.00	1.50	3.20	20.00	*Chrysotham*
0.00	0.00	0.00	0.00	3.00	6.40	20.00	*Eriogonum c*
							FORBS
0.00	0.00	10.00	5.00	6.00	8.89	40.00	*Aster chilens*
20.00	20.00	5.00	0.00	4.50	7.89	30.00	*Halogeton gl*
0.00	0.00	0.00	10.00	1.00	3.00	10.00	*Salsola pesti*
							GRASSES
0.00	0.00	0.00	0.00	1.00	3.00	10.00	*Elymus junc*
0.00	0.00	0.00	0.00	1.00	3.00	10.00	*Elymus salin*
0.00	0.00	0.00	0.00	1.50	4.50	10.00	*Elymus smit*
0.00	0.00	25.00	0.00	5.00	7.75	40.00	*Stipa hymen*
							COVER
30.00	20.00	40.00	15.00	30.50	10.59		Total Living
5.00	5.00	5.00	10.00	7.00	2.45		Litter
5.00	5.00	5.00	5.00	9.50	7.89		Bareground
60.00	70.00	50.00	70.00	53.00	17.78		Rock
							% COMPOS
33.33	0.00	0.00	0.00	32.11	35.99		Shrubs
66.67	100.00	37.50	100.00	45.97	42.19		Forbs
0.00	0.00	62.50	0.00	21.92	23.82		Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Sediment Pond Banks

AREA: Cottonwood Mine (1988 Reveg. Area)

DATE: September 13-17, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 35 deg.

EXPOSURE: Variable

AREA: .9 acre

ANIMAL USE/DISTURBANCE:

EROSION: Slight

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED: (see also quantitative data)

Atriplex canescens
Chrysothamnus nauseosus
Eriogonum corymbosum

Aster chilensis
Convolvulus arvensis
Grindelia squarrosa
Halogeton glomeratus
Helianthus annuus
Kochia scoparia
Malcomia africana
Melilotus officinalis
Salsola pestifer

Agropyron cristatum
Bromus inermis
Elymus cinereus
Elymus elymoides
Elymus lanceolatus
Elymus smithii
Elymus spicatus
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
Chrysothamnus nauseosus	487.87		348.48
Eriogonum corymbosum	92.93		
Total	580.80		348.48

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	442.39		791.65
Woody	29.80		77.19
Total	472.19		868.85

NOTES:

1) We sampled on lower pond (n=8) and upper pond (n=7) where we tried to place the random numbers on both bare and vegetated areas. We sampled the top, middle and lower slope areas mostly on the north face. The other slopes had 100% rock cover for erosion control.

2) Sampled cover (n=15) and frequency (n=15) by ocular methods.

3) We did not sample for density and production in 1999, but previous data has been retained for observation (see above).

4) Patchy vegetation growth patterns with some desirable and some weedy species. This is due to erosion control and fluctuating water levels in pond.

5) Regular maintenance of pond disturbs vegetation.

6) There was lots of material added around banks that disturbed the vegetation.

7) The cover looked good on ponds that had not been disturbed.

ENERGY WEST-COTTONWOOD MINE
Sediment Pond Banks
1988 Reveg Interim
Acreage: .9
Slope: 35 deg
Exposure: variable

Sample Date: 13-17 Sept 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Chrysothamnus nauseosus	0.00	0.00	0.00	0.00	30.00	0.00
Eriogonum corymbosum	0.00	0.00	0.00	0.00	10.00	0.00
FORBS						
Aster chilensis	0.00	0.00	10.00	35.00	0.00	0.00
Convolvulus arvensis	0.00	0.00	0.00	0.00	0.00	0.00
Grindelia squarrosa	0.00	20.00	0.00	0.00	0.00	5.00
Halogeton glomeratus	30.00	0.00	0.00	0.00	0.00	0.00
Helianthus annuus	25.00	20.00	10.00	0.00	0.00	0.00
Malcomia africana	0.00	0.00	25.00	0.00	0.00	0.00
Salsola pestifer	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES						
Agropyron cristatum	0.00	0.00	0.00	0.00	0.00	0.00
Elymus cinereus	0.00	0.00	0.00	25.00	0.00	0.00
Elymus elymoides	0.00	0.00	0.00	0.00	0.00	0.00
Elymus lanceolatus	0.00	10.00	0.00	0.00	0.00	0.00
Elymus smithii	0.00	0.00	0.00	10.00	0.00	45.00
Elymus spicatus	0.00	0.00	0.00	0.00	25.00	0.00
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	0.00
COVER						
Total Living Cover	55.00	50.00	45.00	70.00	65.00	50.00
Litter	5.00	5.00	5.00	5.00	5.00	20.00
Bareground	10.00	5.00	5.00	5.00	5.00	5.00
Rock	30.00	40.00	45.00	20.00	25.00	25.00
% COMPOSITION						
Shrubs	0.00	0.00	0.00	0.00	61.54	0.00
Forbs	100.00	0.00	100.00	50.00	0.00	10.00
Grasses	0.00	0.00	0.00	50.00	38.46	90.00

7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
15.00	20.00	0.00	0.00	0.00	0.00	10.00	0.00	10.00
0.00	0.00	0.00	0.00	0.00	20.00	0.00	20.00	20.00
0.00	0.00	0.00	40.00	30.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	50.00	10.00	0.00	25.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
0.00	20.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00
25.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	25.00	0.00	0.00
0.00	30.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00	0.00	0.00	5.00	20.00	30.00
50.00	70.00	50.00	65.00	75.00	55.00	50.00	40.00	60.00
20.00	5.00	5.00	10.00	10.00	5.00	10.00	10.00	10.00
10.00	5.00	5.00	5.00	10.00	10.00	10.00	10.00	10.00
20.00	20.00	40.00	20.00	5.00	30.00	30.00	40.00	20.00
30.00	28.57	0.00	0.00	0.00	36.36	20.00	50.00	50.00
0.00	0.00	100.00	76.92	40.00	63.64	20.00	0.00	0.00
70.00	71.43	0.00	23.08	60.00	0.00	60.00	50.00	50.00

ENERGY WEST-COTTONWOOD MINE
Sediment Pond Banks
1988 Reveg Interim
Acreage: .9
Slope: 35 deg
Exposure: variable
Sample Date: 13-17 Sept 99

Mean	SDev	Freq	
			SHRUBS
5.67	9.10	33.33	*Chrysothamnus nauseosus*
4.67	8.06	26.67	*Eriogonum corymbosum*
			FORBS
7.67	14.01	26.67	*Aster chilensis*
0.67	2.49	6.67	*Convolvulus arvensis*
1.67	5.06	13.33	*Grindelia squarrosa*
7.67	14.70	26.67	*Halogeton glomeratus*
3.67	7.85	20.00	*Helianthus annuus*
1.67	6.24	6.67	*Malcomia africana*
0.67	2.49	6.67	*Salsola pestifer*
			GRASSES
2.33	6.02	13.33	*Agropyron cristatum*
2.33	6.55	13.33	*Elymus cinereus*
1.67	6.24	6.67	*Elymus elymoides*
2.33	6.55	13.33	*Elymus lanceolatus*
6.33	12.97	26.67	*Elymus smithii*
3.33	8.50	13.33	*Elymus spicatus*
4.33	8.73	26.67	*Stipa hymenoides*
			COVER
56.67	9.94		Total Living Cover
8.67	4.99		Litter
7.33	2.49		Bareground
27.33	10.31		Rock
			% COMPOSITION
18.43	21.80		Shrubs
37.37	39.68		Forbs
37.53	30.20		Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Ninth East Road Breakout

AREA: Cottonwood Mine (1988 Reveg. Area)

DATE: September 13-17, 1999

WORKERS: P. Collins, D. Collins

SLOPE: Variable

EXPOSURE: Variable

ANIMAL USE/DISTURBANCE:

EROSION: Negligible, controlled well by plants

COVER: (see quantitative data).

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus

Astragalus cicer
Aster chilensis
Melilotus officinalis

Cirsium sp.

Agropyron cristatum
Bromus inermis
Elymus lanceolatus
Elymus salinus
Elymus spicatus
Elymus smithii

NOTES:
1) We sampled for quantitative and qualitative data. For cover n=10.
2) Very few woody species.
3) Area looked in good condition.
4) Straw bales were in bad shape, but erosion is controlled by the established vegetation.
5) The site looked very good.
6) There was lots of forb and grass cover.

ENERGY WEST-COTTONWOOD MINE
Ninth East Breakout
1988 Reveg Area
Slope: variable
Exposure: variable

Sample Date: 13-17 Sept 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
FORBS						
Aster chilensis	5.00	50.00	25.00	25.00	30.00	10.00
Astragalus cicer	0.00	0.00	0.00	0.00	0.00	5.00
Melilotus officinalis	0.00	5.00	0.00	0.00	10.00	0.00
GRASSES						
Agropyron cristatum	35.00	0.00	0.00	10.00	5.00	0.00
Bromus inermis	10.00	0.00	10.00	0.00	0.00	10.00
Elymus salinus	0.00	0.00	0.00	0.00	0.00	0.00
Elymus lanceolatus	0.00	0.00	10.00	10.00	10.00	10.00
Elymus spicatus	0.00	10.00	0.00	0.00	0.00	0.00
Elymus smithii	5.00	0.00	5.00	10.00	0.00	10.00
COVER						
Total Living Cover	55.00	65.00	50.00	55.00	55.00	45.00
Litter	10.00	10.00	20.00	10.00	10.00	10.00
Bareground	10.00	5.00	5.00	10.00	10.00	10.00
Rock	25.00	20.00	25.00	25.00	25.00	35.00
% COMPOSITION						
Shrubs	0.00	0.00	0.00	0.00	0.00	0.00
Forbs	9.09	84.62	50.00	45.45	72.73	33.33
Grasses	90.91	15.38	50.00	54.55	27.27	66.67

ENERGY W
Ninth East B
1988 Reveg
Slope: variab
Exposure: va

7.00	8.00	9.00	10.00	Mean	SDev	Freq	Sample Date
							SHRUBS
							FORBS
35.00	10.00	15.00	25.00	23.00	12.88	100.00	*Aster chilens*
0.00	0.00	0.00	0.00	0.50	1.50	10.00	*Astragalus ci*
0.00	0.00	5.00	0.00	2.00	3.32	30.00	*Melilotus offi*
							GRASSES
0.00	0.00	0.00	25.00	7.50	11.88	40.00	*Agropyron cr*
0.00	10.00	0.00	0.00	4.00	4.90	40.00	*Bromus iner*
0.00	0.00	20.00	0.00	2.00	6.00	10.00	*Elymus salin*
30.00	15.00	0.00	20.00	10.50	9.07	70.00	*Elymus lanc*
0.00	0.00	10.00	0.00	2.00	4.00	20.00	*Elymus spic*
0.00	0.00	0.00	0.00	3.00	4.00	40.00	*Elymus smit*
							COVER
65.00	35.00	50.00	70.00	54.50	9.86		Total Living
10.00	5.00	20.00	20.00	12.50	5.12		Litter
10.00	10.00	10.00	5.00	8.50	2.29		Bareground
15.00	50.00	20.00	5.00	24.50	11.28		Rock
							% COMPOS
0.00	0.00	0.00	0.00	0.00	0.00		Shrubs
53.85	28.57	40.00	35.71	12.50	5.12		Forbs
46.15	71.43	60.00	64.29	8.50	2.29		Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
199

SITE NAME: Test Plots '88

AREA: Cottonwood Mine

DATE: September 13-17, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 35 deg.

EXPOSURE: E (S)

ANIMAL USE/DISTURBANCE:

EROSION: Slight to moderate in some areas

COVER: Similar to what was reported in 1994-98, the upper plots (T1 - T4) seemed to have more weedy spp. in the upper 1/2 of the plot. This could be over-spill from road salt above it.

NOTES: 1) See reference drawing below.

ROAD

T1* Hydro Mulch	T2* Mulch Blanket	T3* Hay & Netting	T4* No Mulch
T5** Hydro Mulch	T6** Mulch Blanket	T7** Hay & Netting	T8** No Mulch

* Non-irrigated plots

** Irrigated plots

*** Plots are 20' x 20' with 5' between

T1-T8 (quad placement)

X		X
	X^P	
X		X^P

[P] Production sample locations in previous years.

PLANT SPECIES PLANTED:

Amalanchier alnifolia
Atriplex canescens
Chrysothamnus nauseosus
Ephedra viridis
Pseudotsuga menziesii

Aster glaucodes
Linum lewisii
Melilotus officinalis
Sphaeralcea coccinea

Agropyron dasystachyum
Agropyron intermedium
Elymus smithii
Elymus spicatus
Oryzopsis hymenoides
Stipa comata

PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Eriogonum corymbosum
Atriplex confertifolia

Aster chilensis
Aster glaucodes
Chenopodium album
Grindelia squarrosa
Halogeton glomeratus
Kochia scoparia
Melilotus officinalis
Eriogonum sp.

Elymus cinereus
Elymus spicatus
Elymus lanceolatus

WOODY SPECIES DENSITY:

(NUMBER OF INDIVIDUALS PER ACRE)

PLOT #	1997	1998	1999
T1	3375.90	5217.63	8368.17
T2	1197.90	2327.97	2979.26
T3	762.30	1860.22	3155.19
T4	435.60	880.00	1409.13
T5	2722.50	9849.09	16324.81
T6	2287.90	1676.59	1882.51
T7	980.10	15320.60	902.30
T8	2504.70	3842.67	8533.24

METHODS:
1) Top half of test plot (T1-T4) was almost void of desirable species probably due to road salt.
2) Seemed like there were fewer grasses this year.
3) *Aster chilensis* seems to be out-competing everything else.
4) For cover we sampled in the locations shown on the diagram to stay away from plot lines. Therefore, our sample size was (n=5/subplot and n=40/plot).
5) For density we used pt. quarter method this year.
6) The subplots really should be restaked to separate them for sampling more easily.
5) Plots appeared to be in the same condition this year when compared to 1998, but worse than the years before that.

ENERGY WEST-COTTONWOOD MINE
TEST PLOTS '88
Test Plot #1 (T1)
Slope: 35 deg
Exposure: E(S)
Sample Date: 13-17 Aug 99

	1.00	2.00	3.00	4.00	5.00	Mean
SHRUBS						
Chrysothamnus nauseosus	10.00	5.00	20.00	15.00	0.00	10.00
Ephedra viridis	0.00	10.00	0.00	0.00	0.00	2.00
Eriogonum corymbosum	0.00	5.00	20.00	0.00	0.00	5.00
FORBS						
Aster chilensis	0.00	50.00	25.00	60.00	0.00	27.00
Halogeton glomeratus	0.00	0.00	0.00	0.00	20.00	4.00
Kochia scoparia	0.00	0.00	0.00	0.00	5.00	1.00
GRASSES						
Elymus lanceolatus	5.00	0.00	0.00	0.00	0.00	1.00
COVER						
Total Living Cover	15.00	70.00	65.00	75.00	25.00	50.00
Litter	35.00	5.00	25.00	5.00	5.00	15.00
Bareground	10.00	5.00	5.00	15.00	5.00	8.00
Rock	40.00	20.00	5.00	5.00	65.00	27.00
% COMPOSITION						
Shrubs	66.67	28.57	61.54	20.00	0.00	35.36
Forbs	0.00	71.43	38.46	80.00	100.00	57.98
Grasses	33.33	0.00	0.00	0.00	0.00	6.67

ENERGY WEST-COTTONWOOD MINE
TEST PLOTS '88
Test Plot #1 (T1)
Slope: 35 deg
Exposure: E(S)
Sample Date: 13-17 Aug 99

SDev	Freq	
		SHRUBS
7.07	80.00	*Chrysothamnus nauseosus*
4.00	20.00	*Ephedra viridis*
7.75	40.00	*Eriogonum corymbosum*
		FORBS
24.82	60.00	*Aster chilensis*
8.00	20.00	*Halogeton glomeratus*
2.00	20.00	*Kochia scoparia*
		GRASSES
2.00	20.00	*Elymus lanceolatus*
		COVER
24.90		Total Living Cover
12.65		Litter
4.00		Bareground
22.93		Rock
		% COMPOSITION
25.29		Shrubs
35.14		Forbs
13.33		Grasses

ENERGY WEST-COTTONWOOD MINE
TEST PLOTS '88
Test Plot #2 (T2)
Slope: 35 deg
Exposure: E(S)
Sample Date: 13-17 Aug 99

	1.00	2.00	3.00	4.00	5.00	Mean
SHRUBS						
Chrysothamnus nauseosus	0.00	45.00	15.00	5.00	10.00	15.00
FORBS						
Aster chilensis	15.00	0.00	45.00	0.00	30.00	18.00
Halogeton glomeratus	0.00	0.00	0.00	5.00	0.00	1.00
Kochia scoparia	5.00	0.00	0.00	5.00	0.00	2.00
GRASSES						
COVER						
Total Living Cover	20.00	45.00	60.00	15.00	40.00	36.00
Litter	10.00	5.00	5.00	10.00	5.00	7.00
Bareground	15.00	5.00	5.00	25.00	5.00	11.00
Rock	55.00	45.00	30.00	50.00	50.00	46.00
% COMPOSITION						
Shrubs	0.00	100.00	25.00	33.33	25.00	36.67
Forbs	100.00	0.00	75.00	66.67	75.00	63.33
Grasses	0.00	0.00	0.00	0.00	0.00	0.00

ENERGY WEST-COTTONWOOD MINE
TEST PLOTS '88
Test Plot #2 (T2)
Slope: 35 deg
Exposure: E(S)
Sample Date: 13-17 Aug 99

SDev	Freq	
		SHRUBS
15.81	80.00	*Chrysothamnus nauseosus*
		FORBS
17.49	60.00	*Aster chilensis*
2.00	20.00	*Halogeton glomeratus*
2.45	40.00	*Kochia scoparia*
		GRASSES
		COVER
16.55		Total Living Cover
2.45		Litter
8.00		Bareground
8.60		Rock
		% COMPOSITION
33.58		Shrubs
33.58		Forbs
0.00		Grasses

ENERGY WEST-COTTONWOOD MINE
TEST PLOTS '88
Test Plot #3 (T3)
Slope: 35 deg
Exposure: E(S)
Sample Date: 13-17 Sept 99

	1.00	2.00	3.00	4.00	5.00	Mean
SHRUBS						
Atriplex confertifolia	20.00	0.00	0.00	20.00	0.00	8.00
Chrysothamnus nauseosus	0.00	0.00	0.00	0.00	5.00	1.00
FORBS						
Aster chilensis	0.00	35.00	0.00	0.00	10.00	9.00
Halogeton glomeratus	10.00	10.00	0.00	0.00	0.00	4.00
Kochia scoparia	10.00	5.00	25.00	15.00	25.00	16.00
GRASSES						
COVER						
Total Living Cover	40.00	50.00	25.00	35.00	40.00	38.00
Litter	5.00	5.00	5.00	10.00	10.00	7.00
Bareground	5.00	5.00	10.00	20.00	10.00	10.00
Rock	50.00	40.00	60.00	35.00	40.00	45.00
% COMPOSITION						
Shrubs	50.00	0.00	0.00	57.14	12.50	23.93
Forbs	50.00	100.00	100.00	42.86	87.50	76.07
Grasses	0.00	0.00	0.00	0.00	0.00	0.00

ENERGY WEST-COTTONWOOD MINE
TEST PLOTS '88
Test Plot #3 (T3)
Slope: 35 deg
Exposure: E(S)
Sample Date: 13-17 Sept 99

SDev	Freq	
		SHRUBS
9.80	40.00	*Atriplex confertifolia*
2.00	20.00	*Chrysothamnus nauseosus*
		FORBS
13.56	40.00	*Aster chilensis*
4.90	100.00	*Halogeton glomeratus*
8.00	40.00	*Kochia scoparia*
		GRASSES
		COVER
8.12		Total Living Cover
2.45		Litter
5.48		Bareground
8.94		Rock
		% COMPOSITION
24.73		Shrubs
24.73		Forbs
0.00		Grasses

ENERGY WEST-COTTONWOOD MINE
TEST PLOTS'88
Test Plot #4 (T4)
Slope: 35 deg
Exposure: E(S)

Sample Date: 13-17 Sept 99	1.00	2.00	3.00	4.00	5.00	Mean
SHRUBS						
Atriplex confertifolia	10.00	0.00	30.00	0.00	0.00	8.00
Chrysothamnus nauseosus	0.00	0.00	10.00	0.00	0.00	2.00
Eriogonum corymbosum	0.00	0.00	0.00	0.00	25.00	5.00
FORBS						
Aster chilensis	0.00	5.00	0.00	0.00	5.00	2.00
Halogeton glomeratus	10.00	0.00	0.00	10.00	0.00	4.00
Kochia scoparia	0.00	45.00	5.00	20.00	5.00	15.00
Penstemon palmeri	0.00	0.00	0.00	0.00	5.00	1.00
GRASSES						
COVER						
Total Living Cover	20.00	50.00	45.00	30.00	40.00	37.00
Litter	5.00	10.00	15.00	10.00	10.00	10.00
Bareground	5.00	5.00	10.00	15.00	10.00	9.00
Rock	70.00	35.00	30.00	45.00	40.00	44.00
% COMPOSITION						
Shrubs	50.00	0.00	88.89	0.00	62.50	40.28
Forbs	50.00	100.00	11.11	100.00	37.50	59.72
Grasses	0.00	0.00	0.00	0.00	0.00	0.00

ENERGY WEST-COTTONWOOD MINE
TEST PLOTS'88
Test Plot #4 (T4)
Slope: 35 deg
Exposure: E(S)
Sample Date: 13-17 Sept 99

SDev	Freq	
		SHRUBS
11.66	40.00	*Atriplex confertifolia*
4.00	20.00	*Chrysothamnus nauseosus*
10.00	20.00	*Eriogonum corymbosum*
		FORBS
2.45	40.00	*Aster chilensis*
4.90	40.00	*Halogeton glomeratus*
16.43	80.00	*Kochia scoparia*
2.00	20.00	*Penstemon palmeri*
		GRASSES
		COVER
10.77		Total Living Cover
3.16		Litter
3.74		Bareground
13.93		Rock
		% COMPOSITION
35.20		Shrubs
35.20		Forbs
0.00		Grasses

ENERGY WEST-COTTONWOOD MINE
TEST PLOTS '88
Test Plot #5 (T5)
Slope: 35 deg
Exposure: E(S)
Sample Date: 13-17 Sept 99

	1.00	2.00	3.00	4.00	5.00	Mean
SHRUBS						
Atriplex confertifolia	40.00	0.00	0.00	0.00	0.00	8.00
Chrysothamnus nauseosus	0.00	0.00	10.00	10.00	10.00	6.00
Erigonum corymbosum	0.00	5.00	10.00	5.00	35.00	11.00
FORBS						
Aster chilensis	10.00	70.00	45.00	20.00	20.00	33.00
GRASSES						
Elymus lanceolatus	5.00	0.00	0.00	0.00	5.00	2.00
COVER						
Total Living Cover	55.00	75.00	65.00	35.00	70.00	60.00
Litter	25.00	5.00	25.00	10.00	5.00	14.00
Bareground	15.00	5.00	5.00	15.00	5.00	9.00
Rock	5.00	15.00	5.00	40.00	20.00	17.00
% COMPOSITION						
Shrubs	72.73	6.67	30.77	42.86	64.29	43.46
Forbs	18.18	93.33	69.23	57.14	28.57	53.29
Grasses	9.09	0.00	0.00	0.00	7.14	3.25

ENERGY WEST-COTTONWOOD MINE
TEST PLOTS '88
Test Plot #5 (T5)
Slope: 35 deg
Exposure: E(S)
Sample Date: 13-17 Sept 99

SDev	Freq	
		SHRUBS
16.00	20.00	*Atriplex confertifolia*
4.90	60.00	*Chrysothamnus nauseosus*
12.41	80.00	*Erigonum corymbosum*
		FORBS
21.82	100.00	*Aster chilensis*
		GRASSES
2.45	40.00	*Elymus lanceolatus*
		COVER
14.14		Total Living Cover
9.17		Litter
4.90		Bareground
12.88		Rock
		% COMPOSITION
23.69		Shrubs
27.26		Forbs
4.02		Grasses

ENERGY WEST-COTTONWOOD MINE
TEST PLOTS '88
Test Plot #6 (T6)
Slope: 35 deg
Exposure: E(S)

Sample Date: 13-17 Sept 99	1.00	2.00	3.00	4.00	5.00	Mean
SHRUBS						
Atriplex confertifolia	0.00	0.00	0.00	0.00	5.00	1.00
Chrysothamnus nauseosus	15.00	15.00	0.00	0.00	0.00	6.00
FORBS						
Aster chilensis	25.00	30.00	70.00	45.00	50.00	44.00
Grindelia squarrosa	0.00	0.00	0.00	5.00	0.00	1.00
GRASSES						
Elymus lanceolatus	5.00	0.00	0.00	5.00	0.00	2.00
Stipa hymenoides	0.00	10.00	0.00	0.00	5.00	3.00
COVER						
Total Living Cover	45.00	55.00	70.00	55.00	60.00	57.00
Litter	10.00	10.00	20.00	5.00	10.00	11.00
Bareground	35.00	20.00	5.00	10.00	10.00	16.00
Rock	10.00	15.00	5.00	30.00	20.00	16.00
% COMPOSITION						
Shrubs	33.33	27.27	0.00	0.00	8.33	13.79
Forbs	55.56	54.55	100.00	90.91	83.33	76.87
Grasses	11.11	18.18	0.00	9.09	8.33	9.34

ENERGY WEST-COTTONWOOD MINE
TEST PLOTS '88
Test Plot #6 (T6)
Slope: 35 deg
Exposure: E(S)
Sample Date: 13-17 Sept 99

SDev	Freq	
		SHRUBS
2.00	20.00	*Atriplex confertifolia*
7.35	40.00	*Chrysothamnus nauseosus*
		FORBS
15.94	100.00	*Aster chilensis*
2.00	20.00	*Grindelia squarrosa*
		GRASSES
2.45	40.00	*Elymus lanceolatus*
4.00	40.00	*Stipa hymenoides*
		COVER
8.12		Total Living Cover
4.90		Litter
10.68		Bareground
8.60		Rock
		% COMPOSITION
13.96		Shrubs
18.58		Forbs
5.82		Grasses

ENERGY WEST-COTTONWOOD MINE
TEST PLOTS '88
Test Plot #7 (T7)
Slope: 35 deg
Exposure: E(S)
Sample Date: 13-17 Sept 99

	1.00	2.00	3.00	4.00	5.00	Mean
SHRUBS						
Chrysothamnus nauseosus	0.00	15.00	5.00	0.00	0.00	4.00
FORBS						
Aster chilensis	35.00	15.00	35.00	30.00	50.00	33.00
Grindelia squarrosa	0.00	0.00	0.00	0.00	5.00	1.00
GRASSES						
Elymus cinereus	0.00	0.00	10.00	0.00	0.00	2.00
Elymus lanceolatus	0.00	10.00	0.00	5.00	10.00	5.00
Elymus spicatus	0.00	0.00	5.00	0.00	0.00	1.00
COVER						
Total Living Cover	35.00	40.00	55.00	35.00	65.00	46.00
Litter	5.00	5.00	5.00	5.00	10.00	6.00
Bareground	5.00	20.00	5.00	20.00	5.00	11.00
Rock	55.00	35.00	35.00	40.00	20.00	37.00
% COMPOSITION						
Shrubs	0.00	37.50	9.09	0.00	0.00	9.32
Forbs	100.00	37.50	63.64	85.71	84.62	74.29
Grasses	0.00	25.00	27.27	14.29	15.38	16.39

ENERGY WEST-COTTONWOOD MINE
TEST PLOTS '88
Test Plot #7 (T7)
Slope: 35 deg
Exposure: E(S)
Sample Date: 13-17 Sept 99

SDev	Freq	
		SHRUBS
5.83	40.00	*Chrysothamnus nauseosus*
		FORBS
11.22	100.00	*Aster chilensis*
2.00	20.00	*Grindelia squarrosa*
		GRASSES
4.00	20.00	*Elymus cinereus*
4.47	60.00	*Elymus lanceolatus*
2.00	20.00	*Elymus spicatus*
		COVER
12.00		Total Living Cover
2.00		Litter
7.35		Bareground
11.22		Rock
		% COMPOSITION
14.52		Shrubs
21.75		Forbs
9.66		Grasses

ENERGY WEST-COTTONWOOD MINE
TEST PLOTS '88
Test Plot #8 (T8)
Slope: 35 deg
Exposure: E(S)

Sample Date: 13-17 Sept 99	1.00	2.00	3.00	4.00	5.00	Mean
SHRUBS						
Atriplex confertifolia	0.00	0.00	0.00	8.00	0.00	1.60
Chrysothamnus nauseosus	5.00	0.00	10.00	7.00	15.00	7.40
Eriogonum corymbosum	0.00	0.00	15.00	20.00	0.00	7.00
FORBS						
Aster chilensis	25.00	5.00	20.00	5.00	25.00	16.00
GRASSES						
Elymus lanceolatus	10.00	20.00	5.00	0.00	0.00	7.00
Elymus smithii	0.00	5.00	0.00	0.00	0.00	1.00
Elymus spicatus	0.00	10.00	0.00	0.00	0.00	2.00
Stipa hymenoides	0.00	5.00	0.00	0.00	0.00	1.00
COVER						
Total Living Cover	40.00	45.00	50.00	40.00	40.00	43.00
Litter	15.00	20.00	20.00	10.00	5.00	14.00
Bareground	10.00	10.00	10.00	5.00	5.00	8.00
Rock	35.00	25.00	20.00	45.00	50.00	35.00
% COMPOSITION						
Shrubs	12.50	0.00	50.00	87.50	37.50	37.50
Forbs	62.50	11.11	40.00	12.50	62.50	37.72
Grasses	25.00	88.89	10.00	0.00	0.00	24.78

ENERGY WEST-COTTONWOOD MINE
TEST PLOTS '88
Test Plot #8 (T8)
Slope: 35 deg
Exposure: E(S)
Sample Date: 13-17 Sept 99

SDev	Freq	
		SHRUBS
3.20	20.00	*Atriplex confertifolia*
5.00	80.00	*Chrysothamnus nauseosus*
8.72	40.00	*Eriogonum corymbosum*
		FORBS
9.17	100.00	*Aster chilensis*
		GRASSES
7.48	60.00	*Elymus lanceolatus*
2.00	20.00	*Elymus smithii*
4.00	20.00	*Elymus spicatus*
2.00	20.00	Stipa hymenoides

	COVER
4.00	Total Living Cover
5.83	Litter
2.45	Bareground
11.40	Rock
	% COMPOSITION
30.62	Shrubs
22.70	Forbs
33.34	Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Cell #1

AREA: Cottonwood Mine Old Waste Rock Area (1983 Interim Reveg)

DATE: August 15-26, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 0-1 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE: slight to moderate

EROSION: Negligible

COVER: (see separate report for 1999 quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Artemisia tridentata
Atriplex canescens
Chrysothamnus nauseosus
Cercocarpus montanus
Gutierrezia sarothrae

Agropyron cristatum
Elymus lanceolatus
Elymus smithii
Stipa comata
Stipa hymenoides

WOODY SPECIES DENSITY:

	Individuals/Ac		
	1994	1995	1996
Artemisia tridentata	229.80		183.02
Atriplex canescens	804.29	1541.95	1342.18
Atriplex confertifolia	76.60		
Ceratoides lanata			61.01
Cercocarpus montanus	76.60		
Chrysothamnus nauseosus	153.20	626.42	305.04
Ephedra viridis			61.01
Gutierrezia sarothrae	957.48	2650.22	1708.22
Total	2297.97	4818.58	3660.48

NOTES:

1) Sampled qualitative data only in 1997 and 1998 but previous years' data have been retained for observation (see above).

2) However, in 1999 we sampled extensively for quantitative data. *A separate report has been written and submitted to Energy West for this area for a potential bond release application*.

3) For the quantitative data, we used transect lines and random numbers (see separate report for details).

4) Plot looks better each year.

5) Many shrubs are mature.

6) The density will show mostly broom snakeweed, which "masks" how much fourwing saltbush there is on site.

ENERGY WEST-COTTONWOOD MINE
Cell #1
Old Waste Rock (Interim Reveg '83)
Slope: 0-1 deg
Exposure: E

Sample Date: 15-26 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Atriplex canescens	0.00	0.00	0.00	0.00	0.00	10.00
Atriplex confertifolia	0.00	0.00	0.00	0.00	10.00	0.00
Cercocarpus ledifolius	0.00	0.00	0.00	0.00	0.00	0.00
Chrysothamnus nauseosus (C)	0.00	0.00	0.00	0.00	0.00	25.00
Gutierrezia sarothrae	30.00	30.00	10.00	0.00	30.00	0.00
FORBS						
Machaeranthera canescens	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES						
Agropyron cristatum	5.00	0.00	30.00	10.00	5.00	10.00
Elymus lanceolatus	0.00	0.00	5.00	10.00	5.00	0.00
Elymus smithii	0.00	5.00	5.00	10.00	0.00	10.00
Hilaria jamesii	0.00	0.00	0.00	0.00	0.00	0.00
Poa secunda	0.00	0.00	0.00	0.00	5.00	0.00
Stipa comata	0.00	0.00	0.00	0.00	0.00	10.00
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	0.00
COVER						
Total Living Cover	35.00	35.00	50.00	30.00	55.00	65.00
Litter	5.00	5.00	10.00	5.00	10.00	10.00
Bareground	30.00	10.00	15.00	10.00	15.00	15.00
Rock	30.00	50.00	25.00	55.00	20.00	10.00
% COMPOSITION						
Shrubs	85.71	85.71	20.00	0.00	72.73	53.85
Forbs	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	14.29	14.29	80.00	100.00	27.27	46.15

7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
20.00	0.00	10.00	55.00	5.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	10.00	0.00	0.00	0.00	5.00	0.00	0.00
10.00	15.00	20.00	5.00	20.00	20.00	5.00	15.00	55.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00
10.00	0.00	0.00	10.00	5.00	20.00	10.00	0.00	5.00
10.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00	5.00
0.00	20.00	5.00	0.00	5.00	0.00	0.00	0.00	5.00
5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00
0.00	10.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
55.00	50.00	55.00	85.00	40.00	40.00	30.00	35.00	70.00
30.00	5.00	10.00	5.00	10.00	10.00	5.00	5.00	10.00
10.00	5.00	10.00	5.00	10.00	10.00	10.00	10.00	10.00
5.00	40.00	25.00	5.00	40.00	40.00	55.00	50.00	10.00
54.55	30.00	81.82	70.59	62.50	50.00	33.33	42.86	78.57
0.00	0.00	0.00	0.00	12.50	0.00	0.00	0.00	0.00
45.45	70.00	18.18	29.41	25.00	50.00	66.67	57.14	21.43

ENERGY WEST-COTTONWOOD MINE
Cell #1
Old Waste Rock (Interim Reveg '83)
Slope: 0-1 deg
Exposure: E
Sample Date: 15-26 Aug 99`

Mean	SDev	Freq	
			SHRUBS
6.67	14.10	33.33	*Atriplex canescens*
0.67	2.49	6.67	*Atriplex confertifolia*
0.33	1.25	6.67	*Cercocarpus ledifolius*
2.67	6.55	20.00	*Chrysothamnus nauseosus (C)*
17.67	14.01	86.67	*Gutierrezia sarothrae*
			FORBS
0.33	1.25	6.67	Machaeranthera canescens
			GRASSES
5.00	7.75	46.67	*Agropyron cristatum*
5.33	5.62	60.00	*Elymus lanceolatus*
4.33	5.73	46.67	*Elymus smithii*
2.33	5.12	26.67	*Hilaria jamesii*
0.67	1.70	13.33	*Poa secunda*
1.67	4.35	13.33	*Stipa comata*
1.00	2.71	13.33	*Stipa hymenoides*
			COVER
48.67	15.43		Total Living Cover
9.00	6.11		Litter
11.67	5.68		Bareground
30.67	17.40		Rock
			% COMPOSITION
54.81	24.89		Shrubs
0.83	3.12		Forbs
44.35	25.34		Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Cell #2

AREA: Cottonwood Mine Old Waste Rock Area (1984 Interim Reveg)

DATE: August 15-26, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 0-1 deg.

EXPOSURE: E

AREA: ~ 1 acre

ANIMAL USE/DISTURBANCE:

EROSION: Negligible

COVER: (see separate report for 1999 quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex canescens
Atriplex confertifolia
Gutierrezia sarothrae
Halogeton glomeratus

Agropyron cristatum
Elymus cinereus
Elymus lanceolatus
Elymus spicatus
Elymus hispidus
Elymus smithii
Hilaria jamesii
Sitanion hystrix
Stipa hymenoides

DENSITY:

	Number/Acre			
	1994	1995	1996	1997
Artemisia tridentata			28.48	
Atriplex canescens	834.88	878.17	825.44	1460.84
Atriplex confertifolia	53.29	27.88	28.48	292.17
Chrysothamnus nauseosus	17.76	97.57	58.96	
Gutierrezia sarothrae	142.11	376.36	825.44	1753.01
Artemisia tridentata	17.76	27.88		
Total	1065.80	1393.92	1760.80	3506.02

PRODUCTION:	1997 (lbs/ac)
Herbaceous	290.47
Woody	657.45
Total	907.92

NOTES:

1) Sampled qualitative data only in 1998 but previous years' data have been retained for observation (see above).

2) However, in 1999 we sampled extensively for quantitative data. *A separate report has been written and submitted to Energy West for this area for a potential bond release application*.

3) For the quantitative data, we used transect lines and random numbers (see separate report for details).

4) Plot looks better each year.

5) Many shrubs are mature.

ENERGY WEST-COTTONWOOD MINE
Cell #2
Old Waste Rock (Interim Reveg '84)
Acreage: ~ 1.0
Slope: 0-1 deg
Exposure: E

Sample Date: 15-26 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Atriplex canescens	20.00	25.00	0.00	20.00	0.00	15.00
Gutierrezia sarothrae	10.00	10.00	20.00	15.00	20.00	15.00
FORBS						
Machaeranthera canescens	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES						
Agropyron cristatum	15.00	25.00	0.00	5.00	0.00	15.00
Elymus elymoides	0.00	0.00	0.00	0.00	0.00	0.00
Elymus hispidus	0.00	0.00	0.00	5.00	0.00	0.00
Elymus lanceolatus	0.00	10.00	0.00	5.00	0.00	0.00
Elymus smithii	0.00	0.00	20.00	5.00	10.00	5.00
Hilaria jamesii	0.00	0.00	0.00	0.00	0.00	0.00
Stipa comata	0.00	0.00	0.00	0.00	0.00	0.00
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	0.00
COVER						
Total Living Cover	45.00	70.00	40.00	55.00	30.00	50.00
Litter	10.00	10.00	10.00	10.00	10.00	15.00
Bareground	10.00	10.00	10.00	10.00	15.00	15.00
Rock	35.00	10.00	40.00	25.00	45.00	20.00
% COMPOSITION						
Shrubs	66.67	50.00	50.00	63.64	66.67	60.00
Forbs	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	33.33	50.00	50.00	36.36	33.33	40.00

7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
0.00	20.00	15.00	0.00	5.00	0.00	10.00	0.00	0.00
10.00	10.00	5.00	5.00	5.00	0.00	5.00	0.00	10.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
5.00	15.00	10.00	5.00	20.00	5.00	15.00	25.00	5.00
5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	5.00	25.00	0.00	10.00	0.00	5.00	0.00
0.00	0.00	0.00	5.00	0.00	10.00	0.00	0.00	20.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00
10.00	0.00	15.00	5.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	5.00	10.00	0.00	0.00	0.00
35.00	50.00	50.00	45.00	35.00	35.00	30.00	40.00	40.00
5.00	20.00	15.00	10.00	5.00	5.00	10.00	10.00	15.00
15.00	20.00	25.00	5.00	10.00	10.00	15.00	15.00	35.00
45.00	10.00	10.00	40.00	50.00	50.00	45.00	35.00	10.00
28.57	60.00	40.00	11.11	28.57	0.00	50.00	0.00	25.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.50
71.43	40.00	60.00	88.89	71.43	100.00	50.00	100.00	62.50

ENERGY WEST-COTTONWOOD MINE
Cell #2
Old Waste Rock (Interim Reveg '84)
Acreage: ~ 1.0
Slope: 0-1 deg
Exposure: E
Sample Date: 15-26 Aug 99

Mean	SDev	Freq	
			SHRUBS
8.67	9.21	53.33	*Atriplex canescens*
9.33	6.02	86.67	*Gutierrezia sarothrae*
			FORBS
0.33	1.25	6.67	*Machaeranthera canescens*
			GRASSES
11.00	8.00	86.67	*Agropyron cristatum*
0.33	1.25	6.67	*Elymus elymoides*
0.33	1.25	6.67	*Elymus hispidus*
4.33	6.55	46.67	*Elymus lanceolatus*
5.00	6.83	46.67	*Elymus smithii*
0.67	2.49	6.67	*Hilaria jamesii*
2.00	4.40	20.00	*Stipa comata*
1.33	2.87	20.00	*Stipa hymenoides*
			COVER
43.33	10.27		Total Living Cover
10.67	4.03		Litter
14.67	7.18		Bareground
31.33	15.11		Rock
			% COMPOSITION
40.01	22.51		Shrubs
0.83	3.12		Forbs
59.15	22.17		Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Cell #3

AREA: Cottonwood Mine Old Waste Rock Area (1985 Interim Reveg)

DATE: August 15-26, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 0-1 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE: Slight

EROSION: Negligible

COVER: (see separate report for 1999 quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens
Atriplex confertifolia
Ephedra viridis
Gutierrezia sarothrae

Agropyron cristatum
Elymus lanceolatus
Elymus smithii
Hilaria jamesii
Stipa hymenoides
Stipa comata

DENSITY:

	1994	1995	1996	1997
Atriplex canescens	1137.23	1836.38	1548.88	2342.27
Chrysothamnus nauseosus	101.09	135.03	55.32	
Gutierrezia sarothrae	277.99	621.13	1659.52	6558.36
Atriplex confertifolia		54.01		321.30
Cercocarpus ledifolius		54.01		
Yucca harrimaniae			55.32	
Ephedra viridis				156.15
Totals	1516.31	2700.56	3319.03	9369.08

PRODUCTION:

	1997 (lbs/ac)
Herbaceous	192.57
Woody	8.44
Total	201.01

NOTES:

1) Previous years' data have been retained for observation (see above).

2) In 1999 we sampled extensively for quantitative data. *A separate report has been written and submitted to Energy West for this area for a potential bond release application.*

3) For the quantitative data, we used transect lines and random numbers (see separate report for details).

4) Plot looks better each year.

5) Many shrubs are mature.

6) Diversity in the cover was best (in descending order: Cell 3, Cell 2, Cell 1).

7) Condition: excellent.

8) Site had good diversity of grasses.

ENERGY WEST-COTTONWOOD MINE
Cell #3
Old Waste Rock (Interim Reveg '85)
Slope: 0-1 deg
Exposure: E

Sample Date: 15-26 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Atriplex canescens	0.00	0.00	5.00	0.00	0.00	35.00
Gutierrezia sarothrae	10.00	10.00	10.00	30.00	15.00	10.00
FORBS						
GRASSES						
Agropyron cristatum	10.00	10.00	5.00	0.00	0.00	5.00
Elymus lanceolatus	0.00	15.00	0.00	0.00	0.00	0.00
Elymus smithii	5.00	0.00	0.00	0.00	0.00	0.00
Hilaria jamesii	5.00	0.00	0.00	0.00	0.00	0.00
Stipa comata	5.00	20.00	5.00	15.00	15.00	10.00
Stipa hymenoides	5.00	10.00	10.00	15.00	15.00	0.00
COVER						
Total Living Cover	40.00	65.00	35.00	60.00	45.00	60.00
Litter	5.00	10.00	5.00	10.00	10.00	15.00
Bareground	10.00	5.00	10.00	20.00	10.00	10.00
Rock	45.00	20.00	50.00	10.00	35.00	15.00
% COMPOSITION						
Shrubs	25.00	15.38	42.86	50.00	33.33	75.00
Forbs	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	75.00	84.62	57.14	50.00	66.67	25.00

7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
10.00	30.00	10.00	35.00	0.00	35.00	15.00	0.00	0.00
30.00	25.00	0.00	10.00	30.00	20.00	20.00	10.00	20.00

0.00	5.00	15.00	0.00	0.00	5.00	15.00	5.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00
0.00	0.00	10.00	5.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00
10.00	5.00	0.00	5.00	10.00	5.00	5.00	25.00	10.00
0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
55.00	70.00	40.00	55.00	40.00	65.00	55.00	55.00	40.00
20.00	5.00	10.00	5.00	5.00	10.00	10.00	10.00	15.00
10.00	5.00	10.00	10.00	5.00	5.00	5.00	10.00	10.00
15.00	20.00	40.00	30.00	50.00	20.00	30.00	25.00	35.00
72.73	78.57	25.00	81.82	75.00	84.62	63.64	18.18	50.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27.27	21.43	75.00	18.18	25.00	15.38	36.36	81.82	50.00

16.00	17.00	18.00	19.00	20.00	Mean	SDev	Freq
0.00	0.00	35.00	0.00	35.00	12.25	14.96	50.00
20.00	0.00	5.00	0.00	5.00	14.00	9.70	85.00
0.00	0.00	15.00	0.00	20.00	5.50	6.30	55.00
0.00	15.00	0.00	0.00	10.00	2.75	5.12	25.00
0.00	0.00	0.00	0.00	0.00	1.00	2.55	15.00
0.00	0.00	0.00	0.00	0.00	1.25	3.49	15.00
20.00	0.00	10.00	60.00	0.00	11.75	12.97	85.00
0.00	40.00	0.00	0.00	0.00	5.00	9.49	35.00
40.00	55.00	65.00	60.00	70.00	52.00	10.77	
10.00	10.00	10.00	15.00	5.00	9.67	4.27	
15.00	10.00	10.00	5.00	5.00	9.00	3.74	
35.00	25.00	15.00	20.00	20.00	29.33	12.50	
50.00	0.00	61.54	0.00	57.14	52.74	24.02	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	
50.00	100.00	38.46	100.00	42.86	47.26	24.02	

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Cell #4

AREA: Cottonwood Mine Old Waste Rock Area ('86 Interim Reveg)

DATE: August 15-26, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 0 - 1 deg

EXPOSURE: E

ANIMAL USE/DISTURBANCE: Much cattle use. Moderate deer and rabbit use.

EROSION: negligible

COVER: (see separate report for 1999 quantitative data)

DOMINANT PLANT SPECIES OBSERVED: (see also quantitative data)

Cercocarpus montanus
Gutierrezia sarothrae

Lactuca serriola
Machaeranthera grindelioides
Sphaeralcea grossulariifolia

Agropyron cristatum
Bromus tectorum
Elymus spicatus
Elymus smithii
Elymus hispidus
Elymus lanceolatus
Hilaria jamesii
Stipa comata

WOODY SPECIES DENSITY:

	Number/Acre			
	1995	1996	1997	1998
Atriplex canescens	43.56	116.16	92.93	69.70
Cercocarpus ledifolius	21.78			
Cercocarpus montanus			23.23	
Chrysothamnus nauseosus	32.67	46.46	23.23	23.23
Gutierrezia sarothrae	21.78	92.93	1045.44	278.78
TOTAL	119.79	255.55	1184.83	371.71

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	192.57		361.45
Woody	8.44		69.78
Total	201.01		431.23

NOTES:

1) This is the second year we saw a significant amount of galleta.

2) There was good grass cover, but not so for forbs and shrubs.

3) Previous years' data have been retained for observation (see above).

4) In 1999 we sampled extensively for quantitative data. *A separate report has been written and submitted to Energy West for this area for a potential bond release application.*

5) For the quantitative data, we used transect lines and random numbers (see separate report for details).

6) Plot looks better each year.

7) Many shrubs are mature.

ENERGY WEST-COTTONWOOD MINE
Cell #4
Old Waste Rock (Interim Reveg '86)
Slope: 0-1 deg
Exposure: NE

Sample Date: 15-26 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Atriplex canescens	0.00	0.00	0.00	0.00	0.00	0.00
Ephedra viridis	0.00	0.00	0.00	0.00	0.00	0.00
Gutierrezia sarothrae	0.00	0.00	0.00	0.00	0.00	0.00
FORBS						
Machaeranthera canescens	5.00	0.00	0.00	0.00	0.00	0.00
Sphaeralcea grossulariifolia	0.00	2.00	0.00	0.00	0.00	0.00
GRASSES						
Agropyron cristatum	0.00	8.00	0.00	20.00	0.00	0.00
Elymus lanceolatus	0.00	0.00	0.00	10.00	0.00	10.00
Elymus smithii	15.00	20.00	35.00	15.00	10.00	10.00
Hilaria jamesii	0.00	0.00	0.00	0.00	20.00	5.00
Stipa comata	5.00	5.00	25.00	0.00	5.00	10.00
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	0.00
COVER						
Total Living Cover	25.00	35.00	60.00	45.00	35.00	35.00
Litter	10.00	10.00	10.00	15.00	10.00	10.00
Bareground	35.00	15.00	5.00	15.00	10.00	10.00
Rock	30.00	40.00	25.00	25.00	45.00	45.00
% COMPOSITION						
Shrubs	0.00	0.00	0.00	0.00	0.00	0.00
Forbs	20.00	5.71	0.00	0.00	0.00	0.00
Grasses	80.00	94.29	100.00	100.00	100.00	100.00

7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
0.00	0.00	5.00	20.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
0.00	0.00	0.00	10.00	0.00	0.00	10.00	0.00	0.00
0.00	0.00	0.00	5.00	35.00	0.00	10.00	15.00	0.00
20.00	20.00	5.00	10.00	10.00	0.00	5.00	35.00	65.00
5.00	0.00	0.00	0.00	0.00	50.00	25.00	0.00	0.00
0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	20.00	25.00	45.00	45.00	60.00	50.00	50.00	65.00
5.00	5.00	10.00	10.00	15.00	20.00	20.00	10.00	5.00
10.00	10.00	10.00	20.00	5.00	5.00	5.00	5.00	5.00
60.00	65.00	55.00	25.00	35.00	15.00	25.00	35.00	25.00
0.00	0.00	40.00	44.44	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	16.67	0.00	0.00	0.00
100.00	100.00	60.00	55.56	100.00	83.33	100.00	100.00	100.00

16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	15.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
50.00	20.00	45.00	20.00	30.00	15.00	30.00	10.00	25.00
0.00	0.00	0.00	20.00	0.00	10.00	0.00	0.00	20.00
0.00	15.00	0.00	0.00	10.00	10.00	5.00	5.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00
50.00	50.00	45.00	40.00	40.00	50.00	35.00	40.00	45.00
15.00	10.00	10.00	15.00	15.00	10.00	10.00	10.00	20.00
5.00	10.00	10.00	10.00	15.00	10.00	15.00	15.00	10.00
30.00	30.00	35.00	35.00	30.00	30.00	40.00	35.00	25.00
0.00	30.00	0.00	0.00	0.00	0.00	0.00	37.50	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	70.00	100.00	100.00	100.00	100.00	100.00	62.50	100.00

25.00	26.00	27.00	28.00	29.00	30.00	Mean	SDev	Freq
0.00	0.00	0.00	0.00	0.00	0.00	0.83	3.67	6.67
0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.90	3.33
0.00	0.00	5.00	10.00	0.00	0.00	1.50	4.11	13.33
0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.90	3.33
0.00	0.00	0.00	0.00	0.00	0.00	0.40	1.82	6.67
0.00	0.00	20.00	10.00	10.00	20.00	3.93	6.58	30.00
0.00	0.00	0.00	0.00	0.00	35.00	4.17	9.14	26.67
25.00	25.00	15.00	25.00	20.00	0.00	21.00	14.28	93.33
20.00	5.00	5.00	0.00	5.00	0.00	6.33	11.18	40.00
0.00	0.00	0.00	0.00	5.00	0.00	3.67	5.76	36.67
0.00	10.00	0.00	0.00	0.00	0.00	0.67	2.49	6.67
45.00	40.00	45.00	45.00	40.00	55.00	42.83	10.46	
10.00	20.00	10.00	15.00	10.00	10.00	11.83	4.18	
10.00	10.00	10.00	15.00	10.00	20.00	11.33	6.05	
35.00	30.00	35.00	25.00	40.00	15.00	34.00	11.28	
0.00	0.00	11.11	22.22	0.00	0.00	6.18	13.36	
0.00	0.00	0.00	0.00	0.00	0.00	1.41	4.66	
100.00	100.00	88.89	77.78	100.00	100.00	92.41	13.52	

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Cell #5 '89 (Reseeded) 93

AREA: Cottonwood Mine Old Waste Rock Area (Interim Reveg)

DATE: August 15-26, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 0-1 deg

EXPOSURE: E

ANIMAL USE/DISTURBANCE: Used by deer and rabbits mostly

EROSION: Negligible

COVER: (see separate report for 1999 quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens

Kochia scoparia
Malcomia africana
Sisymbrium altissimum

Agropyron cristatum
Bromus tectorum
Elymus lanceolatus
Hordeum jubatum
Stipa comata

WOODY SPECIES DENSITY:

	Number/Acre		
	1995	1996	1998
Atriplex canescens	609.84	627.26	1068.67
Cercocarpus ledifolius	10.89		
Chrysothamnus nauseosus	10.89		
Gutierrezia sarothrae			69.70
TOTAL	631.62	627.26	1138.37

PRODUCTION:	1998 (lbs/ac)
Herbaceous	566.24
Woody	262.45
Total	828.69

NOTES:

1) Previous years' data have been retained for observation (see above).

2) In 1999 we sampled extensively for quantitative data. *A separate report has been written and submitted to Energy West for this area for a potential bond release application.*

3) For the quantitative data, we used transect lines and random numbers (see separate report for details).

4) Plot looks better each year.

5) Many shrubs are mature.

6) Shrub representation was "fair". Those shrubs present were large and mature. Not a lot of shrub cover, however.

7) Nearly no forb or weed cover, but good grass cover and diversity.

8) One area within the site was quite "weedy".

ENERGY WEST-COTTONWOOD MINE
Cell #5 '89
Old Waste Rock (Interim Reveg - Reseeded '93)
Slope: 0-1 deg
Exposure: E

Sample Date:15-26 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00	7.00
TREES & SHRUBS							
Atriplex canescens	0.00	0.00	20.00	5.00	5.00	15.00	5.00
Gutierrezia sarothrae	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FORBS							
Bassia hyssopifolia	15.00	10.00	0.00	25.00	0.00	0.00	0.00
Halogeton glomeratus	0.00	0.00	0.00	5.00	0.00	0.00	0.00
Kochia scoparia	5.00	5.00	0.00	0.00	0.00	0.00	0.00
GRASSES							
Agropyron cristatum	0.00	10.00	25.00	0.00	5.00	5.00	25.00
Bromus tectorum	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus lanceolatus	0.00	5.00	0.00	0.00	30.00	10.00	0.00
Elymus smithii	15.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus elymoides	0.00	5.00	0.00	5.00	0.00	0.00	0.00
Stipa comata	0.00	0.00	0.00	0.00	0.00	5.00	10.00
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COVER							
Total Living Cover	35.00	35.00	45.00	40.00	40.00	35.00	40.00
Litter	5.00	10.00	10.00	10.00	10.00	10.00	10.00
Bareground	50.00	30.00	20.00	20.00	20.00	35.00	20.00
Rock	10.00	25.00	25.00	30.00	30.00	20.00	30.00
% COMPOSITION							
Shrubs	0.00	0.00	44.44	12.50	12.50	42.86	12.50
Forbs	57.14	42.86	0.00	75.00	0.00	0.00	0.00
Grasses	42.86	57.14	55.56	12.50	87.50	57.14	87.50

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00
30.00	0.00	20.00	0.00	10.00	0.00	0.00	20.00	15.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30.00	20.00	20.00	45.00	10.00	10.00	10.00	20.00	30.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	10.00	0.00	0.00	0.00	30.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	25.00	10.00	10.00	25.00	5.00	30.00	5.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00
60.00	55.00	50.00	55.00	45.00	45.00	40.00	45.00	55.00
10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
10.00	10.00	20.00	15.00	20.00	30.00	20.00	15.00	15.00
20.00	25.00	20.00	20.00	25.00	15.00	30.00	30.00	20.00
50.00	0.00	40.00	0.00	22.22	0.00	0.00	44.44	27.27
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50.00	100.00	60.00	100.00	77.78	100.00	100.00	55.56	72.73

17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00
0.00	0.00	20.00	0.00	15.00	0.00	15.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30.00	0.00	20.00	30.00	15.00	15.00	25.00	20.00	10.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00
0.00	40.00	20.00	0.00	10.00	10.00	15.00	0.00	25.00
0.00	5.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
30.00	50.00	60.00	30.00	40.00	35.00	55.00	35.00	45.00
5.00	10.00	10.00	10.00	20.00	10.00	10.00	10.00	10.00
15.00	15.00	15.00	20.00	15.00	20.00	15.00	15.00	10.00
50.00	25.00	15.00	40.00	25.00	35.00	20.00	40.00	35.00
0.00	0.00	33.33	0.00	37.50	0.00	27.27	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	100.00	66.67	100.00	62.50	100.00	72.73	100.00	100.00

26.00	27.00	28.00	29.00	30.00	Mean	SDev	Freq
30.00	15.00	0.00	0.00	0.00	8.00	9.63	50.00
5.00	0.00	0.00	0.00	0.00	0.17	0.90	3.33
0.00	0.00	0.00	0.00	0.00	1.67	5.37	10.00
0.00	0.00	0.00	0.00	0.00	0.17	0.90	3.33
0.00	0.00	0.00	0.00	0.00	0.33	1.25	6.67
0.00	15.00	10.00	5.00	25.00	16.17	11.01	86.67
0.00	0.00	0.00	0.00	0.00	0.33	1.80	3.33
0.00	0.00	0.00	5.00	0.00	1.67	5.68	13.33
0.00	0.00	0.00	0.00	0.00	2.00	6.14	13.33
0.00	0.00	0.00	0.00	0.00	0.83	2.91	10.00
30.00	20.00	25.00	30.00	25.00	12.50	12.02	66.67
0.00	0.00	0.00	0.00	0.00	0.83	2.61	10.00
65.00	50.00	35.00	40.00	50.00	44.67	9.21	
10.00	10.00	10.00	10.00	10.00	10.00	2.24	
15.00	15.00	20.00	20.00	15.00	19.17	7.97	
10.00	25.00	35.00	30.00	25.00	26.17	8.73	
53.85	30.00	0.00	0.00	0.00	16.36	18.82	
0.00	0.00	0.00	0.00	0.00	5.83	17.99	
46.15	70.00	100.00	100.00	100.00	77.81	23.44	

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Cell #6 '89 (Reseeded) '93

AREA: Cottonwood Mine Waste Rock Area (Interim Reveg)

DATE: August 15-26, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 0-1 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE: Used intensively by deer and rabbits.

EROSION: Negligible

COVER: (see separate report for 1999 quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens

Kochia scoparia
Malcomia africana
Sisymbrium altissimum
Halogeton glomeratus

Agropyron cristatum
Bromus tectorum
Elymus lanceolatus
Hordeum jubatum
Stipa comata
Stipa hymenoides

WOODY SPECIES DENSITY:

	Individuals/Acre		
	1995	1996	1998
Atriplex canescens	500.94	627.26	696.96
Artemisia tridentata			441.41
Chrysothamnus nauseosus			23.23
Gutierrezia sarothrae	10.89		
TOTAL	511.83	627.26	1161.60

PRODUCTION:	1998 (lbs/ac)
Herbaceous	285.37
Woody	373.44
Total	658.81

NOTES:

1) Some areas looked good, while others looked poor (poorest near center of cell). Areas around parameter of cell looked good with good grass and shrub cover. This was similar to Cell 5, but a proportionate amount of the quadrats were placed randomly in each area (weedy and more desirable).

2) Previous density data was also included and are shown above for comparisons.

3) General condition was fair, but not as good as Cell 5.

4) In 1999 we sampled extensively for quantitative data. *A separate report has been written and submitted to Energy West for this area for a potential bond release application*.

5) For the quantitative data, we used transect lines and random numbers (see separate report for details).

ENERGY WEST-COTTONWOOD MINE
Cell #6 '89
Old Waste Rock (Interim Reveg - Reseeded '93)
Slope: 0-1 deg
Exposure: E

Sample Date:15-26 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00	7.00
TREES & SHRUBS							
Atriplex canescens	15.00	0.00	5.00	0.00	5.00	0.00	0.00
Gutierrezia sarothrae	0.00	2.00	0.00	0.00	0.00	5.00	5.00
FORBS							
Bassia hyssopifolia	0.00	0.00	0.00	30.00	0.00	0.00	0.00
Halogeton glomeratus	0.00	0.00	0.00	5.00	0.00	0.00	0.00
Kochia scoparia	0.00	0.00	0.00	5.00	0.00	0.00	0.00
GRASSES							
Agropyron cristatum	15.00	18.00	15.00	0.00	0.00	15.00	15.00
Bromus tectorum	0.00	0.00	10.00	0.00	30.00	10.00	20.00
Elymus lanceolatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus smithii	0.00	0.00	0.00	0.00	5.00	0.00	0.00
Elymus elymoides	0.00	0.00	0.00	0.00	0.00	5.00	0.00
Stipa comata	10.00	0.00	5.00	5.00	10.00	10.00	15.00
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COVER							
Total Living Cover	40.00	20.00	35.00	45.00	50.00	45.00	55.00
Litter	10.00	5.00	10.00	10.00	10.00	10.00	15.00
Bareground	10.00	10.00	15.00	15.00	10.00	5.00	5.00
Rock	40.00	65.00	40.00	30.00	30.00	40.00	25.00
% COMPOSITION							
Shrubs	37.50	10.00	14.29	0.00	10.00	11.11	9.09
Forbs	0.00	0.00	0.00	88.89	0.00	0.00	0.00
Grasses	62.50	90.00	85.71	11.11	90.00	88.89	90.91

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00
0.00	0.00	0.00	5.00	0.00	5.00	0.00	20.00	0.00
0.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	20.00	0.00	20.00	35.00	0.00	0.00	0.00	0.00
10.00	5.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00
10.00	20.00	0.00	35.00	15.00	15.00	0.00	0.00	0.00
0.00	0.00	10.00	0.00	0.00	0.00	25.00	20.00	35.00
0.00	5.00	15.00	0.00	0.00	10.00	10.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
0.00	0.00	0.00	5.00	0.00	15.00	15.00	10.00	10.00
0.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00
30.00	55.00	40.00	65.00	65.00	60.00	50.00	55.00	45.00
5.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
20.00	10.00	10.00	10.00	10.00	15.00	15.00	15.00	15.00
45.00	25.00	40.00	15.00	15.00	15.00	25.00	20.00	30.00
0.00	0.00	37.50	7.69	0.00	8.33	0.00	36.36	0.00
100.00	81.82	0.00	84.62	100.00	25.00	0.00	0.00	0.00
0.00	18.18	62.50	7.69	0.00	66.67	100.00	63.64	100.00

17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00
0.00	0.00	0.00	5.00	0.00	20.00	0.00	0.00	20.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20.00	10.00	35.00	20.00	35.00	20.00	45.00	25.00	10.00
15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15.00	20.00	10.00	10.00	5.00	15.00	20.00	25.00	20.00
0.00	20.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00
50.00	60.00	55.00	35.00	50.00	55.00	65.00	50.00	50.00
15.00	15.00	10.00	10.00	15.00	10.00	15.00	10.00	15.00
15.00	5.00	10.00	20.00	15.00	15.00	5.00	10.00	5.00
20.00	20.00	25.00	35.00	20.00	20.00	15.00	30.00	30.00
0.00	0.00	0.00	14.29	0.00	36.36	0.00	0.00	40.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	100.00	100.00	85.71	100.00	63.64	100.00	100.00	60.00

26.00	27.00	28.00	29.00	30.00	Mean	SDev	Freq
25.00	10.00	5.00	0.00	10.00	5.00	7.42	43.33
0.00	0.00	0.00	0.00	0.00	0.90	2.91	13.33
0.00	0.00	0.00	0.00	0.00	3.83	9.28	16.67
0.00	0.00	0.00	0.00	0.00	1.17	3.34	13.33
0.00	0.00	0.00	0.00	0.00	3.33	7.89	20.00
10.00	25.00	20.00	25.00	5.00	15.77	12.10	76.67
0.00	0.00	0.00	0.00	0.00	4.17	7.43	30.00
0.00	0.00	0.00	0.00	0.00	0.33	1.80	3.33
10.00	0.00	5.00	0.00	20.00	1.67	4.35	16.67
0.00	0.00	0.00	0.00	0.00	0.50	1.50	10.00
0.00	0.00	5.00	5.00	0.00	8.67	7.18	73.33
0.00	0.00	5.00	0.00	0.00	1.67	4.71	13.33
45.00	35.00	40.00	30.00	35.00	47.00	11.15	
10.00	10.00	5.00	10.00	10.00	10.50	2.69	
20.00	10.00	15.00	15.00	20.00	12.33	4.61	
25.00	45.00	40.00	45.00	35.00	30.17	11.51	
55.56	28.57	12.50	0.00	28.57	13.26	15.92	
0.00	0.00	0.00	0.00	0.00	16.01	34.00	
44.44	71.43	87.50	100.00	71.43	70.73	32.29	

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Cell #7 '92 Partial Cell #7 '93

AREA: Cottonwood Mine Old Waste Rock Area (Interim Reveg)

DATE: August 15-26, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 0 - 2 deg

EXPOSURE: E

ANIMAL USE/DISTURBANCE: Slight

EROSION: Negligible

COVER: (see separate report for 1999 quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens
Ceratoides lanata
Gutierrezia sarothrae

Kochia scoparia
Malcomia africana
Sisymbrium altissimum

Agropyron cristatum
Bromus tectorum
Elymus lanceolatus
Hordeum jubatum
Stipa comata
Stipa hymenoides

WOODY SPECIES DENSITY:

	Individuals/Acre		
	1995	1996	1998
Atriplex canescens	1591.94	2044.46	1184.83
Artemisia tridentata	255.64	23.23	46.46
Gutierrezia sarothrae			46.46
Ephedra viridis			23.23
TOTAL	1847.58	2067.65	1300.98

PRODUCTION:	1998 (lbs/ac)
Herbaceous	415.65
Woody	44.26
Total	459.91

NOTES:

1) Site beginning to improve. Unlike last year, there was good diversity of young shrubs and grasses this year.

2) Previous density data shown above for comparisons.

3) Used transect lines and sampled with a random number at right angle every 25 ft.

4) Sampled cover and frequency by ocular methods.

5) Sampled density using the point quarter method.

6) Sampled productivity by clipping, weighing and double sampling.

7) *A separate report has been written and submitted to Energy West for this area for a potential bond release application.*

ENERGY WEST-COTTONWOOD MINE
Cell #7 '92, Partial Cell #7 '93
Old Waste Rock (Interim Reveg - Reseeded '93)
Slope: 0-2 deg
Exposure: E

Sample Date: 16-21 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00	7.00
TREES & SHRUBS							
Artemisia tridentata	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Atriplex canescens	0.00	5.00	5.00	0.00	5.00	5.00	5.00
Ephedra viridis	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gutierrezia sarothrae	0.00	0.00	0.00	0.00	0.00	10.00	0.00
FORBS							
Halogeton glomeratus	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kochia scoparia	0.00	15.00	0.00	0.00	0.00	0.00	0.00
Machaeranthera canescens	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Salsola pestifer	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES							
Agropyron cristatum	0.00	5.00	10.00	10.00	0.00	0.00	0.00
Bromus tectorum	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus lanceolatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus smithii	15.00	0.00	10.00	0.00	0.00	10.00	0.00
Elymus spicatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus elymoides	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stipa comata	20.00	5.00	20.00	15.00	35.00	10.00	20.00
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COVER							
Total Living Cover	35.00	30.00	45.00	25.00	40.00	35.00	25.00
Litter	10.00	10.00	10.00	5.00	10.00	10.00	10.00
Bareground	10.00	20.00	15.00	20.00	20.00	20.00	15.00
Rock	45.00	40.00	30.00	50.00	30.00	35.00	50.00
% COMPOSITION							
Shrubs	0.00	16.67	11.11	0.00	12.50	42.86	20.00
Forbs	0.00	50.00	0.00	0.00	0.00	0.00	0.00
Grasses	100.00	33.33	88.89	100.00	87.50	57.14	80.00

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	5.00	5.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	10.00	10.00	10.00	10.00	0.00	30.00
15.00	50.00	35.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	0.00	0.00	0.00	0.00	10.00	10.00	35.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	5.00	5.00	20.00	5.00	25.00	5.00	5.00	0.00
0.00	0.00	0.00	5.00	30.00	0.00	10.00	0.00	0.00
45.00	65.00	65.00	35.00	50.00	50.00	40.00	40.00	35.00
10.00	10.00	20.00	10.00	10.00	5.00	10.00	10.00	10.00
10.00	5.00	5.00	10.00	15.00	5.00	15.00	15.00	20.00
35.00	20.00	10.00	45.00	25.00	40.00	35.00	35.00	35.00
0.00	0.00	30.77	0.00	10.00	10.00	12.50	0.00	14.29
0.00	7.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	92.31	69.23	100.00	90.00	90.00	87.50	100.00	85.71

17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00
0.00	0.00	0.00	5.00	5.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	5.00	5.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15.00	0.00	0.00	5.00	10.00	20.00	0.00	25.00	10.00
5.00	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	25.00	25.00	10.00	10.00	0.00	5.00	30.00
0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00
5.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	10.00	10.00	0.00	5.00	5.00	25.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	10.00	10.00	0.00
40.00	50.00	45.00	40.00	40.00	35.00	40.00	40.00	40.00
20.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
10.00	5.00	10.00	15.00	10.00	15.00	10.00	15.00	10.00
30.00	35.00	35.00	35.00	40.00	40.00	40.00	35.00	40.00
12.50	10.00	0.00	25.00	25.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	12.50	0.00	0.00	0.00	0.00
87.50	90.00	100.00	75.00	62.50	100.00	100.00	100.00	100.00

26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	5.00
0.00	0.00	0.00	5.00	5.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00
10.00	15.00	0.00	0.00	20.00	10.00	15.00	10.00	25.00
0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	10.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	5.00	0.00	15.00	10.00	30.00	10.00	15.00	0.00
0.00	5.00	55.00	0.00	0.00	5.00	10.00	15.00	0.00
35.00	35.00	55.00	30.00	40.00	45.00	45.00	50.00	50.00
10.00	20.00	10.00	15.00	10.00	10.00	10.00	10.00	15.00
35.00	25.00	20.00	20.00	20.00	25.00	10.00	25.00	10.00
20.00	20.00	15.00	35.00	30.00	20.00	35.00	15.00	25.00
0.00	0.00	0.00	16.67	12.50	0.00	22.22	0.00	20.00
0.00	14.29	0.00	16.67	0.00	0.00	0.00	0.00	0.00
100.00	85.71	100.00	66.67	87.50	100.00	77.78	100.00	80.00

35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00
5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	35.00	25.00	5.00	0.00	55.00	15.00	10.00
0.00	0.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	20.00	10.00	0.00	0.00	0.00	0.00	10.00	10.00
10.00	10.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00
15.00	15.00	10.00	20.00	25.00	10.00	0.00	10.00	10.00
15.00	5.00	0.00	0.00	0.00	0.00	0.00	10.00	10.00
45.00	50.00	55.00	45.00	35.00	50.00	60.00	45.00	40.00
20.00	15.00	20.00	10.00	20.00	20.00	15.00	15.00	10.00
10.00	15.00	15.00	25.00	20.00	10.00	20.00	30.00	10.00
25.00	20.00	10.00	20.00	25.00	20.00	5.00	10.00	40.00
11.11	0.00	0.00	0.00	0.00	0.00	8.33	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88.89	100.00	100.00	100.00	100.00	100.00	91.67	100.00	100.00

ENERGY WEST-COTTONWOOD MIN
Cell #7 '92, Partial Cell #7 '93
Old Waste Rock (Interim Reveg - Resee
Slope: 0-2 deg
Exposure: E
Sample Date: 16-21 Aug 99

44.00	45.00	Mean	SDev	Freq	
					TREES & SHRUBS
0.00	0.00	0.56	1.57	11.11	*Artemisia tridentata*
0.00	25.00	2.00	4.27	28.89	*Atriplex canescens*
0.00	0.00	0.44	1.42	8.89	*Ephedra viridis*
0.00	0.00	0.78	3.33	6.67	*Gutierrezia sarothrae*
					FORBS
0.00	0.00	0.11	0.74	2.22	*Halogeton glomeratus*
0.00	0.00	0.33	2.21	2.22	*Kochia scoparia*
0.00	0.00	0.22	1.03	4.44	*Machaeranthera canescens*
0.00	0.00	0.11	0.74	2.22	*Salsola pestifer*
					GRASSES
0.00	10.00	9.78	11.35	62.22	*Agropyron cristatum*
0.00	0.00	3.56	10.25	13.33	*Bromus tectorum*
20.00	0.00	0.78	3.33	6.67	*Elymus lanceolatus*
15.00	0.00	6.78	9.38	44.44	*Elymus smithii*
0.00	0.00	0.67	2.26	8.89	*Elymus spicatus*
0.00	0.00	1.11	3.48	13.33	*Elymus elymoides*
5.00	5.00	11.00	8.86	84.44	*Stipa comata*
10.00	0.00	4.67	9.68	35.56	*Stipa hymenoides*
					COVER
50.00	40.00	42.89	8.91		Total Living Cover
10.00	10.00	11.89	3.98		Litter
10.00	10.00	15.22	6.75		Bareground
30.00	40.00	30.00	10.95		Rock
					% COMPOSITION
0.00	62.50	9.03	12.96		Shrubs
0.00	0.00	2.25	8.12		Forbs
100.00	37.50	88.72	16.02		Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Berm 1

AREA: Cottonwood Mine Old Waste Rock Area (1983 Interim Reveg)

DATE: August 15-26, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 1-20 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE:

EROSION: Negligible

COVER: (see separate report for 1999 quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens
Chrysothamnus nauseosus
Gutierrezia sarothrae

Elymus lanceolatus
Agropyron cristatum
Elymus smithii
Stipa hymenoides

DENSITY:

	Individuals/Acre		
	1994	1995	1996
Atriplex canescens	325.36	457.38	441.41
Chrysothamnus nauseosus	859.88	1132.56	1417.15
Ephedra viridis	139.44	43.56	23.23
Gutierrezia sarothrae	197.54	98.01	696.96
Purshia tridentata	11.62		
Chrysothamnus viscidiflorus		10.89	
Total	1533.84	1742.40	2578.75

NOTES:

1) Sampled qualitatively only in 1997 and 1998, but I left the density of previous years for future comparisons.

2) Used random numbers to sample berms.

4) Sampled cover and frequency by ocular methods.

5) Sampled density using the point quarter method.

6) Sampled productivity by clipping, weighing and double sampling.

7) *A separate report has been written and submitted to Energy West for this area for a potential bond release application.*

ENERGY WEST-COTTONWOOD MINE
Berm #1
Old Waste Rock (Interim Reveg '83)
Slope: 1-20 deg
Exposure: E

Sample Date: 15-26 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Atriplex canescens	0.00	20.00	20.00	20.00	10.00	20.00
Chrysothamnus nauseosus (C)	25.00	15.00	0.00	0.00	0.00	0.00
Ephedra viridis	0.00	5.00	5.00	0.00	0.00	0.00
Gutierrezia sarothrae	0.00	0.00	0.00	0.00	0.00	0.00
FORBS						
Halogeton glomeratus	0.00	0.00	5.00	5.00	5.00	0.00
Malcomia africana	0.00	0.00	0.00	0.00	0.00	0.00
Salsola pestifer	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES						
Agropyron cristatum	20.00	0.00	5.00	10.00	5.00	10.00
Elymus smithii	0.00	0.00	15.00	0.00	0.00	0.00
Stipa comata	5.00	0.00	0.00	0.00	0.00	0.00
COVER						
Total Living Cover	50.00	40.00	50.00	35.00	20.00	30.00
Litter	10.00	10.00	10.00	10.00	5.00	10.00
Bareground	10.00	10.00	20.00	5.00	5.00	10.00
Rock	30.00	40.00	20.00	50.00	70.00	50.00
% COMPOSITION						
Shrubs	50.00	100.00	50.00	57.14	50.00	66.67
Forbs	0.00	0.00	10.00	14.29	25.00	0.00
Grasses	50.00	0.00	40.00	28.57	25.00	33.33

ENERGY W
Berm #1
Old Waste R
Slope: 1-20
Exposure: E

7.00	8.00	9.00	10.00	Mean	SDev	Freq		Sample Date
								SHRUBS
0.00	0.00	0.00	20.00	11.00	9.43	60.00		*Atriplex cane*
5.00	30.00	25.00	0.00	10.00	11.83	50.00		*Chrysotham*
0.00	0.00	0.00	0.00	1.00	2.00	20.00		*Ephedra virid*
0.00	0.00	0.00	10.00	1.00	3.00	10.00		Gutierrezia s
								FORBS
0.00	0.00	0.00	0.00	1.50	2.29	30.00		*Halogeton gl*
0.00	0.00	0.00	10.00	1.00	3.00	10.00		*Malcomia afr*
0.00	0.00	0.00	10.00	1.00	3.00	10.00		*Salsola pesti*
								GRASSES
40.00	5.00	0.00	0.00	9.50	11.72	70.00		*Agropyron cr*
0.00	0.00	0.00	0.00	1.50	4.50	10.00		*Elymus smit*
0.00	0.00	0.00	0.00	0.50	1.50	10.00		*Stipa comata*
								COVER
45.00	35.00	25.00	50.00	38.00	10.30			Total Living
10.00	5.00	10.00	5.00	8.50	2.29			Litter
20.00	10.00	15.00	5.00	11.00	5.39			Bareground
25.00	50.00	50.00	40.00	42.50	14.01			Rock
								% COMPOS
11.11	85.71	100.00	60.00	63.06	25.51			Shrubs
0.00	0.00	0.00	40.00	8.93	13.16			Forbs
88.89	14.29	0.00	0.00	28.01	26.29			Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Berm 2

AREA: Cottonwood Mine Old Waste Rock Area (1984 Interim Reveg)

DATE: August 15-26, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 0-20 deg.

EXPOSURE: E & N

ANIMAL USE/DISTURBANCE:

EROSION: Negligible

COVER: (see separate report for 1999 quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex confertifolia
Atriplex canescens
Cercocarpus montanus
Chrysothamnus nauseosus
Ephedra viridis
Gutierrezia sarothrae

Cryptantha sp.

Bromus tectorum
Elymus lanceolatus
Agropyron cristatum
Elymus smithii
Elymus elymoides
Poa secunda
Stipa hymenoides

DENSITY:

	Number/Acre			
	1994	1995	1996	1997
Artemisia tridentata			46.46	
Atriplex canescens	1917.30	3637.26	2990.88	4274.69
Atriplex confertifolia	406.70	304.94	348.48	232.32
Chrysothamnus nauseosus	34.86		23.23	
Ephedra viridis	11.62			
Brickellia microphylla		21.78		
Gutierrezia sarothrae	4241.30	1568.16	580.80	23.23
Total	6611.78	5532.12	3089.86	4530.24

PRODUCTION:

	1997 (lbs/ac)
Herbaceous	235.31
Woody	770.73
Total	1006.04

NOTES:

1) Half of the berm has been disturbed by a new road.

2) 1994, 1995,1996 and 1997 woody species density results were included for comparisons later.

3) The west side was mostly weedy species as a result of the disturbance.

4) The north side has a good stand of mature woody species, but low species diversity.

5) Used random numbers to sample berms.

6) Sampled cover and frequency by ocular methods.

7) Sampled density using the point quarter method.

8) Sampled productivity by clipping, weighing and double sampling.

9) *A separate report has been written and submitted to Energy West for this area for a potential bond release application.*

9) The 1997 production data has also been included for comparsion.

ENERGY WEST-COTTONWOOD MINE
Berm #2
Old Waste Rock (Interim Reveg '84)
Slope: 0-20 deg
Exposure: E & N

Sample Date: 15-26 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Atriplex canescens	20.00	25.00	25.00	0.00	30.00	10.00
Gutierrezia sarothrae	5.00	0.00	0.00	0.00	0.00	0.00
FORBS						
GRASSES						
Agropyron cristatum	20.00	20.00	25.00	50.00	40.00	50.00
Bromus tectorum	0.00	0.00	0.00	0.00	0.00	0.00
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	0.00
COVER						
Total Living Cover	45.00	45.00	50.00	50.00	70.00	60.00
Litter	25.00	20.00	10.00	10.00	10.00	20.00
Bareground	5.00	10.00	20.00	10.00	10.00	10.00
Rock	25.00	25.00	20.00	30.00	10.00	10.00
% COMPOSITION						
Shrubs	55.56	55.56	50.00	0.00	42.86	16.67
Forbs	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	44.44	44.44	50.00	100.00	57.14	83.33

ENERGY W
Berm #2
Old Waste R
Slope: 0-20
Exposure: E

7.00	8.00	9.00	10.00	Mean	SDev	Freq		Sample Date
								SHRUBS
20.00	25.00	40.00	15.00	21.00	10.44	90.00		*Atriplex cane*
0.00	0.00	0.00	0.00	0.50	1.50	10.00		*Gutierrezia s*
								FORBS
								GRASSES
40.00	25.00	20.00	10.00	30.00	13.23	100.00		*Agropyron cr*
5.00	0.00	0.00	0.00	0.50	1.50	10.00		*Bromus tect*
0.00	0.00	0.00	20.00	2.00	6.00	10.00		*Stipa hymen*
								COVER
65.00	50.00	60.00	45.00	54.00	8.60			Total Living
20.00	10.00	20.00	20.00	16.50	5.50			Litter
5.00	10.00	10.00	20.00	11.00	4.90			Bareground
10.00	30.00	10.00	15.00	18.50	8.08			Rock
								% COMPOS
30.77	50.00	66.67	33.33	40.14	19.18			Shrubs
0.00	0.00	0.00	0.00	0.00	0.00			Forbs
69.23	50.00	33.33	66.67	59.86	19.18			Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Berm 3

AREA: Cottonwood Mine Old Waste Rock Area (1985 Interim Reveg)

DATE: August 15-26, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 0-20 deg.

EXPOSURE: NE & SW

ANIMAL USE/DISTURBANCE:

EROSION: Negligible

COVER: (see separate report for 1999 quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex canescens
Cercocarpus montanus
Chrysothamnus nauseosus
Ephedra viridis
Gutierrezia sarothrae

Machaeranthera grindelioides

Agropyron cristatum
Elymus smithii
Elymus lanceolatus
Stipa comata
Stipa hymenoides

Page 2
Berm 3

DENSITY:

	Individuals/Acre			
	1994	1995	1996	1997
Artemisia tridentata			23.23	46.46
Atriplex canescens	3056.06	2384.91	1928.26	3856.82
Chrysothamnus nauseosus	11.62	10.89	23.23	23.23
Total	3067.68	2395.80	1974.72	3856.51

PRODUCTION:

	1997 (lbs/ac)
Herbaceous	473.83
Woody	1072.61
Total	1546.44

NOTES:

1) Used random numbers to sample berms.

2) Sampled cover and frequency by ocular methods.

3) Sampled density using the point quarter method.

4) Sampled productivity by clipping, weighing and double sampling.

5) *A separate report has been written and submitted to Energy West for this area for a potential bond release application.*

6) Had good mature, shrub cover, but fair to good grass cover entire length of berm.

7) Not much species diversity.

8) 1994, 1995,1996 and 1997 woody species density results were included for comparisons later.

9) The 1997 production data has also been included for comparison.

ENERGY WEST-COTTONWOOD MINE
Berm #3
Old Waste Rock (Interim Reveg '85)
Slope: 0-20 deg
Exposure: NE & SW
Sample Date: 15-26 Aug 99

1 thru 8 North Face

	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Atriplex canescens	40.00	25.00	25.00	0.00	70.00	20.00
Ephedra viridis	0.00	0.00	0.00	0.00	0.00	0.00
FORBS						
Sphaeralcea grossulariifolia	0.00	0.00	10.00	0.00	0.00	0.00
GRASSES						
Agropyron cristatum	10.00	25.00	0.00	30.00	0.00	10.00
Atriplex confertifolia	5.00	0.00	10.00	0.00	0.00	0.00
Bromus tectorum	0.00	0.00	0.00	0.00	0.00	0.00
Elymus smithii	0.00	0.00	0.00	10.00	0.00	10.00
Hilaria jamesii	10.00	0.00	0.00	0.00	0.00	0.00
Stipa hymenoides	0.00	0.00	10.00	0.00	0.00	10.00
COVER						
Total Living Cover	65.00	50.00	55.00	40.00	70.00	50.00
Litter	10.00	10.00	10.00	10.00	5.00	10.00
Bareground	10.00	10.00	5.00	20.00	20.00	10.00
Rock	15.00	30.00	30.00	30.00	5.00	30.00
% COMPOSITION						
Shrubs	61.54	50.00	45.45	0.00	100.00	40.00
Forbs	0.00	0.00	18.18	0.00	0.00	0.00
Grasses	38.46	50.00	36.36	100.00	0.00	60.00

9 thru 15 South Face

7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
25.00	25.00	40.00	70.00	70.00	35.00	80.00	45.00	30.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20.00	20.00	25.00	0.00	0.00	35.00	0.00	0.00	20.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50.00	45.00	65.00	70.00	70.00	70.00	80.00	75.00	50.00
20.00	25.00	10.00	10.00	10.00	20.00	10.00	10.00	10.00
15.00	20.00	10.00	10.00	10.00	5.00	5.00	10.00	25.00
15.00	10.00	15.00	10.00	10.00	5.00	5.00	5.00	15.00
50.00	55.56	61.54	100.00	100.00	50.00	100.00	100.00	60.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50.00	44.44	38.46	0.00	0.00	50.00	0.00	0.00	40.00

ENERGY WEST-COTTONWOOD MINE
Berm #3
Old Waste Rock (Interim Reveg '85)
Slope: 0-20 deg
Exposure: NE & SW
Sample Date: 15-26 Aug 99

Mean	SDev	Freq	
			SHRUBS
40.00	22.14	93.33	*Atriplex canescens*
2.00	7.48	6.67	*Ephedra viridis*
			FORBS
0.67	2.49	6.67	*Sphaeralcea grossulariifolia*
			GRASSES
13.00	12.22	60.00	*Agropyron cristatum*
1.00	2.71	13.33	*Atriplex confertifolia*
0.33	1.25	6.67	*Bromus tectorum*
1.33	3.40	13.33	*Elymus smithii*
0.67	2.49	6.67	*Hilaria jamesii*
1.33	3.40	13.33	*Stipa hymenoides*
			COVER
60.33	11.90		Total Living Cover
12.00	5.10		Litter
12.33	6.02		Bareground
15.33	9.57		Rock
			% COMPOSITION
64.94	28.48		Shrubs
1.21	4.54		Forbs
33.85	28.01		Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Berm 4

AREA: Cottonwood Mine Old Waste Rock Area ('86 Interim Reveg)

DATE: August 15-26, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 28 deg.

EXPOSURE: N, E

ANIMAL USE/DISTURBANCE:

EROSION: Negligible

COVER: (see separate report for 1999 quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens
Chrysothamnus nauseosus
Gutierrezia sarothrae
Ephedra viridis

Agropyron cristatum
Elymus lanceolatus
Elymus smithii
Stipa hymenoides

WOODY SPECIES DENSITY:

	Individuals/Acre			
	1995	1996	1997	1998
Atriplex canescens	196.02	836.35	92.93	243.94
Cercocarpus montanus			23.23	
Chrysothamnus nauseosus	87.12	139.39	394.94	278.78
Gutierrezia sarothrae			23.23	
Ephedra viridis	21.78	23.23	348.48	383.33
TOTAL	304.92	998.98	882.82	906.05

PRODUCTION:	1997	1998
	(lbs/ac)	
Herbaceous	722.08	731.98
Woody	83.88	435.99
Total	805.96	1167.97

NOTES:

1) Good cover, but poor spp. diversity.

2) Not many shrub spp., but those that were present were large and mature.

3) The map showed east and south side of the Cell 7 to sample this year for the berm.

4) Used random numbers to sample berms.

5) Sampled cover and frequency by ocular methods.

6) Sampled density using the point quarter method.

7) Sampled productivity by clipping, weighing and double sampling.

8) *A separate report has been written and submitted to Energy West for this area for a potential bond release application.*

9) 1995, 1996, 1997 and 1998 woody species density results were included for comparisons later.

10) The 1997-98 production data has also been included for comparison.

ENERGY WEST-COTTONWOOD MINE
Berm #4
Old Waste Rock (Interim Reveg '86)
Slope: 28 deg
Exposure: NE

Sample Date: 15-26 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Chrysothamnus nauseosus (A)	0.00	0.00	5.00	0.00	0.00	25.00
Ephedra viridis	0.00	5.00	0.00	10.00	0.00	0.00
FORBS						
Machaeranthera canescens	0.00	0.00	0.00	5.00	5.00	0.00
GRASSES						
Agropyron cristatum	35.00	15.00	25.00	10.00	0.00	25.00
Elymus smithii	10.00	35.00	0.00	25.00	30.00	0.00
Stipa comata	0.00	0.00	10.00	0.00	0.00	0.00
COVER						
Total Living Cover	45.00	55.00	40.00	50.00	35.00	50.00
Litter	20.00	15.00	10.00	15.00	10.00	15.00
Bareground	10.00	10.00	10.00	10.00	10.00	10.00
Rock	25.00	20.00	40.00	25.00	45.00	25.00
% COMPOSITION						
Shrubs	0.00	9.09	12.50	20.00	0.00	50.00
Forbs	0.00	0.00	0.00	10.00	14.29	0.00
Grasses	100.00	90.91	87.50	70.00	85.71	50.00

ENERGY WEST-COTTONWOOD MINE
Berm #4
Old Waste Rock (Interim Reveg '86)
Slope: 28 deg
Exposure: NE
Sample Date: 15-26 Aug 99

Mean	SDev	Freq	
			SHRUBS
5.00	9.13	33.33	*Chrysothamnus nauseosus (A)*
2.50	3.82	33.33	*Ephedra viridis*
			FORBS
1.67	2.36	33.33	*Machaeranthera canescens*
			GRASSES
18.33	11.43	83.33	*Agropyron cristatum*
16.67	14.04	66.67	*Elymus smithii*
1.67	3.73	16.67	*Stipa comata*
			COVER
45.83	6.72		Total Living Cover
14.17	3.44		Litter
10.00	0.00		Bareground
30.00	9.13		Rock
			% COMPOSITION
15.27	17.03		Shrubs
4.05	5.86		Forbs
80.69	16.36		Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: CTW Reference Area

AREA: Cottonwood Mine Old Waste Rock Area

DATE: August 15-26, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 1 - 5 deg

EXPOSURE: E

ANIMAL USE/DISTURBANCE:

EROSION: Slight, natural

COVER: (see separate report for 1999 quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Cercocarpus montanus
Ephedra viridis
Juniperus osteosperma
Opuntia polyacantha
Pinus edulis
Yucca harrimaniae

Lepidium montanum
Descurainia pinnata
Eriogonum bicolor
Euphorbia fendleri
Penstemon pachyphyllus
Cryptantha sp.

WOODY SPECIES DENSITY:

	Numbers/Acre		
	1994	1995	1996
Cercocarpus montanus	89.03	85.02	68.68
Ephedra viridis	168.17	233.79	196.23
Gutierrezia sarothrae	9.89	10.63	
Juniperus osteosperma	445.15	191.29	147.17
Opuntia polyacantha	89.03	63.76	68.68
Pinus edulis	326.44	435.71	284.53
Artemisia nova		10.63	
Yucca harrimaniae	59.35	42.51	19.62
TOTAL	1187.06	1062.70	784.91

NOTES:

1) Quantitative data only in 1997 and 1998, but previous data have been retained for comparison.

2) Used transects with random numbers to sample the area.

3) Sampled cover and frequency by ocular methods.

4) Sampled density using the point quarter method.

5) Sampled productivity by clipping, weighing and double sampling.

6) *A separate report has been written and submitted to Energy West for this area for a potential bond release application.*

ENERGY WEST-COTTONWOOD MINE
CTW Reference Area
Old Waste Rock Area
Slope 1-5 deg
Exposure: E
Sample Date: 23-27 Aug 99

	1.00	2.00	3.00	4.00	5.00	6.00
OVERSTORY						
Juniperus osteosperma	0.00	0.00	0.00	0.00	0.00	0.00
Pinus edulis	0.00	0.00	25.00	0.00	0.00	25.00
SHRUBS						
Cercocarpus montanus	0.00	0.00	0.00	15.00	0.00	0.00
Ephedra viridis	0.00	0.00	5.00	0.00	0.00	0.00
Gutierrezia sarothrae	0.00	0.00	0.00	0.00	5.00	0.00
Juniperus osteosperma	25.00	0.00	0.00	0.00	13.00	5.00
Opuntia polyacantha	0.00	0.00	0.00	0.00	0.00	0.00
Pinus edulis	0.00	15.00	5.00	10.00	0.00	10.00
FORBS						
Chaenactis douglasii	0.00	0.00	0.00	0.00	0.00	0.00
Cryptantha flava	0.00	0.00	0.00	0.00	0.00	0.00
Eriogonum bicolor	3.00	0.00	0.00	0.00	0.00	0.00
Euphorbia fendleri	0.00	0.00	0.00	0.00	0.00	0.00
Penstemon sp.	2.00	0.00	0.00	0.00	0.00	0.00
Physaria chambersii	0.00	0.00	0.00	0.00	0.00	0.00
Yucca harrimaniae	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES						
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	0.00
COVER						
Overstory (O)	0.00	0.00	25.00	0.00	0.00	25.00
Understory (U)	30.00	15.00	10.00	25.00	18.00	15.00
Litter	15.00	10.00	80.00	15.00	12.00	70.00
Bareground	15.00	10.00	5.00	10.00	20.00	5.00
Rock	40.00	65.00	5.00	50.00	50.00	10.00
% COMPOSITION						
Shrubs	83.33	100.00	100.00	100.00	100.00	100.00
Forbs	16.67	0.00	0.00	0.00	0.00	0.00
Grasses	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL COVER (O + U)	30.00	15.00	35.00	25.00	18.00	40.00

7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00	40.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	29.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	10.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	5.00	0.00	2.00	0.00
8.00	5.00	10.00	0.00	5.00	5.00	1.00	3.00	0.00
2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00	40.00
10.00	10.00	10.00	10.00	10.00	10.00	30.00	5.00	10.00
2.00	10.00	15.00	15.00	20.00	15.00	20.00	85.00	80.00
70.00	15.00	70.00	50.00	65.00	20.00	30.00	5.00	5.00
18.00	65.00	5.00	25.00	5.00	55.00	20.00	5.00	5.00
0.00	0.00	0.00	100.00	0.00	0.00	96.67	0.00	100.00
100.00	100.00	100.00	0.00	100.00	100.00	3.33	100.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	10.00	10.00	10.00	10.00	10.00	30.00	25.00	50.00

16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00
10.00	0.00	30.00	0.00	0.00	0.00	0.00	0.00	15.00
0.00	0.00	0.00	0.00	0.00	35.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00
0.00	0.00	0.00	0.00	23.00	0.00	30.00	0.00	35.00
0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	5.00	0.00	3.00	0.00	0.00	0.00
0.00	2.00	0.00	5.00	0.00	2.00	0.00	10.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	0.00	30.00	0.00	0.00	35.00	0.00	0.00	15.00
35.00	10.00	15.00	10.00	25.00	5.00	35.00	10.00	35.00
55.00	10.00	15.00	20.00	20.00	30.00	55.00	10.00	10.00
5.00	55.00	65.00	20.00	5.00	10.00	5.00	20.00	15.00
5.00	25.00	5.00	50.00	50.00	55.00	5.00	60.00	40.00
100.00	0.00	100.00	0.00	92.00	0.00	100.00	0.00	100.00
0.00	100.00	0.00	100.00	8.00	100.00	0.00	100.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45.00	10.00	45.00	10.00	25.00	40.00	35.00	10.00	50.00

25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00
25.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	40.00	50.00	0.00	0.00	15.00	10.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	10.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
35.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
0.00	5.00	0.00	0.00	0.00	0.00	10.00	9.00	0.00
0.00	0.00	0.00	10.00	0.00	15.00	0.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	5.00	0.00	5.00	0.00	0.00	0.00	3.00
0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	0.00	0.00	40.00	50.00	0.00	0.00	15.00	10.00
35.00	15.00	10.00	10.00	5.00	25.00	10.00	10.00	15.00
50.00	20.00	10.00	80.00	25.00	10.00	5.00	75.00	20.00
10.00	60.00	60.00	5.00	65.00	15.00	65.00	10.00	10.00
5.00	5.00	20.00	5.00	5.00	50.00	20.00	5.00	55.00
100.00	100.00	0.00	100.00	0.00	100.00	100.00	100.00	66.67
0.00	0.00	100.00	0.00	100.00	0.00	0.00	0.00	33.33
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60.00	15.00	10.00	50.00	55.00	25.00	10.00	25.00	25.00

34.00	35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00
0.00	0.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.00	0.00
0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	35.00	15.00	20.00	0.00	15.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	8.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
0.00	0.00	0.00	0.00	25.00	0.00	0.00	35.00	0.00
20.00	15.00	40.00	15.00	20.00	10.00	15.00	5.00	10.00
15.00	5.00	25.00	5.00	5.00	20.00	50.00	8.00	20.00
15.00	15.00	10.00	5.00	5.00	5.00	10.00	5.00	20.00
50.00	65.00	25.00	75.00	70.00	65.00	25.00	82.00	50.00
100.00	0.00	87.50	100.00	100.00	100.00	100.00	0.00	0.00
0.00	100.00	12.50	0.00	0.00	0.00	0.00	0.00	100.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00
20.00	15.00	40.00	15.00	45.00	10.00	15.00	40.00	10.00

43.00	44.00	45.00	46.00	47.00	48.00	49.00	50.00	51.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	30.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	20.00	15.00	0.00	0.00	0.00	0.00	15.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	5.00
5.00	0.00	0.00	50.00	15.00	0.00	35.00	20.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	3.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	30.00
10.00	20.00	15.00	50.00	35.00	10.00	35.00	35.00	10.00
25.00	20.00	65.00	10.00	10.00	15.00	10.00	55.00	70.00
55.00	10.00	10.00	25.00	45.00	55.00	35.00	5.00	10.00
10.00	50.00	10.00	15.00	10.00	20.00	20.00	5.00	10.00
100.00	100.00	100.00	100.00	71.43	0.00	100.00	100.00	50.00
0.00	0.00	0.00	0.00	28.57	100.00	0.00	0.00	50.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	20.00	15.00	50.00	35.00	10.00	45.00	35.00	40.00

52.00	53.00	54.00	55.00	56.00	57.00	58.00	59.00	60.00
0.00	0.00	0.00	0.00	30.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00
0.00	0.00	0.00	0.00	0.00	25.00	5.00	0.00	0.00
0.00	5.00	30.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00
0.00	10.00	0.00	0.00	20.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	10.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00
0.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	30.00	0.00	0.00	0.00	10.00
15.00	15.00	30.00	25.00	20.00	25.00	15.00	10.00	15.00
10.00	10.00	10.00	25.00	70.00	15.00	20.00	10.00	20.00
10.00	10.00	50.00	10.00	5.00	45.00	15.00	10.00	20.00
65.00	65.00	10.00	40.00	5.00	15.00	50.00	70.00	45.00
0.00	100.00	100.00	40.00	100.00	100.00	66.67	0.00	66.67
100.00	0.00	0.00	60.00	0.00	0.00	33.33	100.00	33.33
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15.00	15.00	30.00	25.00	50.00	25.00	15.00	10.00	25.00

61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00
0.00	0.00	0.00	0.00	0.00	35.00	0.00	0.00	0.00
35.00	0.00	0.00	25.00	15.00	0.00	25.00	35.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	10.00	10.00	0.00	0.00	0.00	0.00	0.00	25.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	25.00	0.00	0.00	5.00	10.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35.00	0.00	0.00	25.00	15.00	35.00	25.00	35.00	0.00
5.00	10.00	10.00	25.00	25.00	5.00	5.00	10.00	25.00
20.00	20.00	10.00	60.00	65.00	25.00	10.00	75.00	40.00
70.00	20.00	10.00	5.00	5.00	10.00	10.00	10.00	10.00
5.00	50.00	70.00	10.00	5.00	60.00	75.00	5.00	25.00
100.00	100.00	100.00	100.00	100.00	0.00	100.00	100.00	100.00
0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40.00	10.00	10.00	50.00	40.00	40.00	30.00	45.00	25.00

70.00	71.00	72.00	73.00	74.00	75.00	76.00	77.00	78.00
0.00	0.00	40.00	0.00	0.00	0.00	0.00	20.00	0.00
0.00	0.00	0.00	0.00	0.00	35.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	5.00	0.00	15.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	0.00	0.00	9.00	5.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	5.00	0.00	0.00	0.00	5.00	0.00	0.00
0.00	0.00	0.00	5.00	5.00	0.00	3.00	2.00	0.00
0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	1.00	0.00	0.00	2.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	40.00	0.00	0.00	35.00	0.00	20.00	0.00
25.00	10.00	5.00	20.00	10.00	15.00	10.00	5.00	20.00
65.00	10.00	20.00	50.00	10.00	75.00	10.00	20.00	10.00
5.00	55.00	70.00	10.00	25.00	5.00	70.00	55.00	10.00
5.00	25.00	5.00	20.00	55.00	5.00	10.00	20.00	60.00
100.00	0.00	0.00	70.00	50.00	100.00	0.00	60.00	0.00
0.00	100.00	100.00	30.00	50.00	0.00	100.00	40.00	100.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	10.00	45.00	20.00	10.00	50.00	10.00	25.00	20.00

79.00	80.00	81.00	82.00	83.00	84.00	85.00	86.00	87.00
0.00	0.00	0.00	0.00	0.00	25.00	0.00	0.00	0.00
0.00	10.00	10.00	0.00	0.00	0.00	20.00	25.00	0.00
30.00	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	15.00	50.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	20.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	10.00	10.00	0.00	0.00	25.00	20.00	25.00	0.00
30.00	30.00	15.00	50.00	10.00	10.00	10.00	5.00	20.00
5.00	45.00	70.00	10.00	20.00	10.00	10.00	80.00	50.00
20.00	5.00	5.00	10.00	10.00	10.00	20.00	5.00	5.00
45.00	20.00	10.00	30.00	60.00	70.00	60.00	10.00	25.00
100.00	100.00	100.00	100.00	100.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	100.00	100.00	100.00	100.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30.00	40.00	25.00	50.00	10.00	35.00	30.00	30.00	20.00

ENERGY WEST-COTTO
CTW Reference Area
Old Waste Rock Area
Slope 1-5 deg
Exposure: E
Sample Date: 23-27 Aug 9

88.00	89.00	90.00	Mean	SDev	Freq	
						OVERSTORY
0.00	0.00	0.00	2.83	8.50	11.11	*Juniperus osteosperma*
0.00	0.00	25.00	6.72	12.54	26.67	*Pinus edulis*
						SHRUBS
25.00	0.00	0.00	1.56	5.95	7.78	*Cercocarpus montanus*
0.00	0.00	0.00	2.10	6.10	14.44	*Ephedra viridis*
0.00	0.00	0.00	0.34	1.63	5.56	*Gutierrezia sarothrae*
0.00	0.00	0.00	2.57	7.12	16.67	*Juniperus osteosperma*
0.00	0.00	0.00	0.43	1.71	6.67	*Opuntia polyacantha*
0.00	10.00	5.00	6.30	11.06	37.78	*Pinus edulis*
						FORBS
0.00	0.00	0.00	0.03	0.31	1.11	*Chaenactis douglasii*
0.00	0.00	0.00	0.96	2.04	20.00	*Cryptantha flava*
0.00	0.00	0.00	1.21	2.61	23.33	*Eriogonum bicolor*
0.00	0.00	0.00	0.43	1.87	6.67	*Euphorbia fendleri*
0.00	0.00	0.00	0.18	0.69	7.78	*Penstemon sp.*
0.00	0.00	0.00	0.09	0.61	2.22	*Physaria chambersii*
0.00	25.00	0.00	1.06	4.31	6.67	*Yucca harrimaniae*
						GRASSES
0.00	0.00	0.00	0.06	0.52	1.11	*Stipa hymenoides*
						COVER
0.00	0.00	25.00	9.56	13.84		Overstory
25.00	35.00	5.00	17.31	10.52		Understory
10.00	35.00	10.00	28.41	24.07		Litter
10.00	10.00	10.00	22.06	21.32		Bareground
55.00	20.00	75.00	32.22	24.33		Rock
						% COMPOSITION
100.00	28.57	100.00	64.77	44.62		Shrubs
0.00	71.43	0.00	34.12	44.23		Forbs
0.00	0.00	0.00	1.11	10.48		Grasses
25.00	35.00	30.00	26.87	14.17		TOTAL COVER (O + U)

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: CTW Soil Pile (A,C)'94

AREA: Cottonwood Mine

DATE: August 23-27, 1999

WORKERS: P. Collins

SLOPE: 25 deg.

EXPOSURE: south

ANIMAL USE/DISTURBANCE: slight

EROSION: slight

COVER: (see quantitative data).

DOMINANT PLANT SPECIES OBSERVED:

Soil Pile A
Chrysothamnus nauseosus
Gutierrezia sarothrae

Halogeton glomeratus
Astragalus cicer

Elymus lanceolatus
Elymus smithii
Stipa hymenoides

Soil Pile B (removed)

Soil Pile C
Artemisia tridentata
Atriplex canescens
Atriplex confertifolia
Atriplex gardneri
Chrysothamnus nauseosus
Gutierrezia sarothrae

Astragalus cicer
Melilotus officinalis
Halogeton glomeratus
Hedysarum boreale

Elymus smithii
Stipa hymenoides

NOTES: 1) Quadrats numbers 1-7 were placed on Soil Pile C (nw side of the rock pile adjacent to the Texaco road), numbers 8-16 were placed on Soil Pile A (near Cells 1 and 2).

2) Quantitative and qualitative this year.

ENERGY WEST-COTTONWOOD MINE
CTW Soil Piles (A,C) 1994
Old Waste Rock Site
Slope: 1 thru 7 = Soil Pile C
Exposure:

Sample Date: 23-27 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00	7.00
TREES & SHRUBS							
Artemisia tridentata	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Atriplex confertifolia	0.00	0.00	0.00	5.00	0.00	0.00	5.00
Atriplex canescens	20.00	0.00	20.00	0.00	0.00	0.00	0.00
Atriplex gardneri	0.00	25.00	0.00	0.00	5.00	10.00	5.00
Chrysothamnus nauseosus var. c	0.00	0.00	0.00	0.00	15.00	0.00	0.00
Gutierrezia sarothrae	10.00	0.00	0.00	0.00	0.00	10.00	0.00
FORBS							
Astragalus cicer	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Halogeton glomeratus	0.00	0.00	0.00	10.00	5.00	0.00	0.00
Melilotus officinalis	0.00	0.00	0.00	5.00	0.00	0.00	0.00
GRASSES							
Elymus lanceolatus	5.00	10.00	0.00	0.00	0.00	0.00	0.00
Elymus smithii	0.00	0.00	9.00	5.00	0.00	0.00	0.00
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COVER							
Total Living Cover	35.00	35.00	30.00	25.00	25.00	20.00	10.00
Erosion Control Mat	25.00	25.00	25.00	25.00	60.00	20.00	25.00
Bareground	5.00	10.00	10.00	5.00	5.00	25.00	25.00
Rock	35.00	30.00	35.00	45.00	10.00	35.00	40.00
% COMPOSITION							
Shrubs	85.71	71.43	70.00	20.00	80.00	100.00	100.00
Forbs	0.00	0.00	0.00	60.00	20.00	0.00	0.00
Grasses	14.29	28.57	30.00	20.00	0.00	0.00	0.00

8 thru 16 = Soil Pile A

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00
25.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	5.00	0.00	0.00	0.00	10.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	15.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	10.00	10.00	5.00	5.00	0.00	20.00	0.00	10.00
5.00	0.00	20.00	5.00	5.00	35.00	0.00	5.00	0.00
30.00	25.00	30.00	15.00	15.00	35.00	20.00	25.00	25.00
15.00	5.00	20.00	10.00	20.00	10.00	20.00	35.00	5.00
10.00	5.00	20.00	10.00	20.00	20.00	10.00	10.00	5.00
45.00	65.00	30.00	65.00	45.00	35.00	50.00	30.00	65.00
83.33	0.00	0.00	0.00	0.00	0.00	0.00	40.00	0.00
0.00	0.00	0.00	33.33	33.33	0.00	0.00	40.00	60.00
16.67	100.00	100.00	66.67	66.67	100.00	100.00	20.00	40.00

ENERGY WEST-COTTONWOOD MINE
CTW Soil Piles (A,C) 1994
Old Waste Rock Site
Slope:
Exposure:
Sample Date: 23-27 Aug 99

Mean	SDev	Freq	
			TREES & SHRUBS
0.06	0.24	6.25	*Artemisia tridentata*
0.63	1.65	12.50	*Atriplex confertifolia*
2.50	6.61	12.50	*Atriplex canescens*
2.81	6.37	25.00	*Atriplex gardneri*
1.56	4.23	12.50	*Chrysothamnus nauseosus var. consimilis*
2.81	6.61	18.75	*Gutierrezia sarothrae*
			FORBS
0.94	2.63	12.50	*Astragalus cicer*
2.19	4.32	25.00	*Halogeton glomeratus*
0.31	1.21	6.25	*Melilotus officinalis*
			GRASSES
1.88	4.28	18.75	*Elymus lanceolatus*
4.63	5.67	50.00	*Elymus smithii*
4.69	9.26	37.50	*Stipa hymenoides*
			COVER
25.00	7.29		Total Living Cover
21.56	12.71		Erosion Control Mat
12.19	7.06		Bareground
41.25	14.42		Rock
			% COMPOSITION
40.65	40.50		Shrubs
15.42	21.82		Forbs
43.93	37.59		Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Road Slopes

AREA: Cottonwood Mine New Waste Rock Area (1990 Interim)

DATE: August 23-27, 1999

WORKERS: P. Collins, D. Collins

SLOPE: Variable

EXPOSURE: Variable

ANIMAL USE/DISTURBANCE: Slight

EROSION: Negligible

COVER: See quantitative data

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex canescens
Atriplex confertifolia
Ceratoides lanata
Chrysothamnus nauseosus

Medicago sativa
Melilotus officinalis
Lepidium montanum
Penstemon palmeri

Elymus lanceolatus
Elymus cinereus
Elymus spicatus
Stipa hymenoides

NOTES:
1) Most of the plant species were desirable and weeds were much less common this year (n=15).
2) We sampled on both sides of the road.
3) Penstemon and Gt. Basin wildrye were most common spp. in the road side drainages (wetter areas).
4) Good species diversity.
5) Site looked excellent this year.

ENERGY WEST-COTTONWOOD MINE
Road Slopes
New Waste Rock Site (1990)
Slope: variable
Exposure: variable

Sample Date: 23-27 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Artemisia nova	0.00	0.00	0.00	0.00	15.00	5.00
Artemisia tridentata	0.00	0.00	0.00	0.00	0.00	0.00
Atriplex canescens	10.00	0.00	0.00	15.00	0.00	0.00
Atriplex confertifolia	0.00	0.00	0.00	0.00	0.00	0.00
Ceratoides lanata	5.00	5.00	0.00	5.00	0.00	0.00
FORBS						
Medicago sativa	0.00	0.00	0.00	0.00	0.00	0.00
Melilotus officinalis	0.00	0.00	0.00	0.00	0.00	0.00
Penstemon palmeri	0.00	25.00	0.00	0.00	25.00	15.00
GRASSES						
Elymus cinereus	5.00	10.00	5.00	5.00	0.00	0.00
Elymus lanceolatus	10.00	10.00	15.00	10.00	0.00	10.00
Elymus smithii	0.00	0.00	0.00	5.00	0.00	0.00
Elymus spicatus	0.00	0.00	0.00	0.00	0.00	0.00
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	5.00
COVER						
Total Living Cover	30.00	50.00	20.00	40.00	40.00	35.00
Litter	25.00	10.00	10.00	10.00	10.00	10.00
Bareground	25.00	15.00	20.00	20.00	20.00	10.00
Rock	20.00	25.00	50.00	30.00	30.00	45.00
% COMPOSITION						
Shrubs	50.00	10.00	0.00	50.00	37.50	14.29
Forbs	0.00	50.00	0.00	0.00	62.50	42.86
Grasses	50.00	40.00	100.00	50.00	0.00	42.86

7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
0.00	5.00	0.00	0.00	0.00	0.00	5.00	0.00	30.00
0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	5.00	0.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
0.00	15.00	15.00	5.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	30.00	0.00	0.00	5.00	10.00	0.00
25.00	0.00	20.00	5.00	25.00	25.00	15.00	30.00	5.00
5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35.00	40.00	35.00	50.00	45.00	35.00	25.00	40.00	45.00
10.00	5.00	10.00	10.00	15.00	10.00	10.00	15.00	10.00
5.00	5.00	10.00	15.00	5.00	10.00	10.00	15.00	10.00
50.00	50.00	45.00	25.00	35.00	45.00	55.00	30.00	35.00
0.00	25.00	0.00	20.00	33.33	14.29	20.00	0.00	88.89
0.00	37.50	42.86	10.00	11.11	14.29	0.00	0.00	0.00
100.00	37.50	57.14	70.00	55.56	71.43	80.00	100.00	11.11

ENERGY WEST-COTTONWOOD MINE
Road Slopes
New Waste Rock Site (1990)
Slope: variable
Exposure: variable
Sample Date: 23-27 Aug

Mean	SDev	Freq	
			SHRUBS
4.00	8.00	33.33	*Artemisia nova*
0.67	2.49	6.67	*Artemisia tridentata*
2.33	4.42	26.67	*Atriplex canescens*
0.67	2.49	6.67	*Atriplex confertifolia*
2.00	2.45	40.00	*Ceratoides lanata*
			FORBS
0.33	1.25	6.67	*Medicago sativa*
0.33	1.25	6.67	*Melilotus officinalis*
6.67	9.25	40.00	*Penstemon palmeri*
			GRASSES
5.00	7.53	53.33	*Elymus cinereus*
13.67	9.21	86.67	*Elymus lanceolatus*
0.67	1.70	13.33	*Elymus smithii*
1.00	3.74	6.67	*Elymus spicatus*
0.33	1.25	6.67	*Stipa hymenoides*
			COVER
37.67	8.14		Total Living Cover
11.33	4.27		Litter
13.00	6.00		Bareground
38.00	10.77		Rock
			% COMPOSITION
24.22	23.88		Shrubs
18.07	21.62		Forbs
57.71	29.18		Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Topsoil Stockpiles

AREA: Cottonwood Mine New Waste Rock Area (1990 Interim)

DATE: August 23-27, 1999

WORKERS: P. Collins, D. Collins

SLOPE: Variable

EXPOSURE: Variable

ANIMAL USE/DISTURBANCE: Slight

EROSION: Slight

COVER: (See quantitative data)

DOMINANT PLANT SPECIES OBSERVED:
Artemisia nova
Atriplex canescens
Atriplex confertifolia
Ceratoides lanata
Chrysothamnus nauseosus
Gutierrezia sarothrae
Pinus edulis

Halogeton glomeratus
Medicago sativa
Penstemon palmeri
Salsola pestifer

Bromus tectorum
Elymus lanceolatus
Elymus cinereus
Elymus elymoides
Elymus smithii
Elymus spicatus
Stipa hymenoides

NOTES: 1) Sampled qualitatively and qualitatively this year.

2) We only sampled the topsoil pile near the road, but the maps now show two more piles. Sample these in 2000.

3) All areas had better representation of growth this year.

ENERGY WEST-COTTONWOOD MINE
Topsoil Stockpiles
New Waste Rock Site (1990)
Slope: variable
Exposure: variable

Sample Date: 23-27 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Artemisia nova	0.00	0.00	0.00	0.00	0.00	0.00
Atriplex canescens	0.00	0.00	5.00	5.00	0.00	0.00
Atriplex confertifolia	0.00	10.00	20.00	5.00	0.00	0.00
Ceratoides lanata	0.00	0.00	10.00	5.00	0.00	0.00
Gutierrezia sarothrae	0.00	0.00	0.00	0.00	0.00	5.00
FORBS						
Halogeton glomeratus	0.00	0.00	0.00	0.00	25.00	2.00
Medicago sativa	0.00	2.00	0.00	0.00	0.00	0.00
Salsola pestifer	0.00	0.00	0.00	0.00	5.00	3.00
GRASSES						
Bromus tectorum	0.00	0.00	0.00	5.00	0.00	0.00
Elymus cinereus	25.00	0.00	0.00	0.00	0.00	0.00
Elymus lanceolatus	25.00	28.00	5.00	20.00	0.00	0.00
Elymus spicatus	0.00	0.00	5.00	0.00	0.00	0.00
Elymus elymoides	0.00	0.00	0.00	5.00	5.00	25.00
COVER						
Total Living Cover	50.00	40.00	45.00	45.00	35.00	35.00
Litter	10.00	10.00	10.00	10.00	10.00	10.00
Bareground	5.00	15.00	15.00	20.00	20.00	35.00
Rock	35.00	35.00	30.00	25.00	35.00	20.00
% COMPOSITION						
Shrubs	0.00	25.00	77.78	33.33	0.00	14.29
Forbs	0.00	5.00	0.00	0.00	85.71	14.29
Grasses	100.00	70.00	22.22	66.67	14.29	71.43

7.00	8.00	9.00	10.00	Mean	SDev	Freq		
								ENERGY W
								Topsoil Stoc
								New Waste
								Slope: variab
								Exposure: va
								Sample Date
								SHRUBS
0.00	10.00	0.00	0.00	1.00	3.00	10.00		Artemisia no
10.00	10.00	10.00	0.00	4.00	4.36	50.00		Atriplex cane
0.00	0.00	10.00	5.00	5.00	6.32	50.00		Atriplex conf
0.00	0.00	0.00	5.00	2.00	3.32	30.00		Ceratoides la
0.00	0.00	0.00	0.00	0.50	1.50	10.00		Gutierrezia s
								FORBS
5.00	0.00	0.00	0.00	3.20	7.43	30.00		*Halogeton gl*
0.00	0.00	0.00	0.00	0.20	0.60	10.00		*Medicago sa*
0.00	0.00	0.00	0.00	0.80	1.66	20.00		*Salsola pesti*
								GRASSES
0.00	0.00	0.00	0.00	0.50	1.50	10.00		*Bromus tect*
0.00	0.00	0.00	0.00	2.50	7.50	10.00		*Elymus ciner*
0.00	0.00	20.00	15.00	11.30	10.87	60.00		*Elymus lanc*
0.00	0.00	0.00	0.00	0.50	1.50	10.00		*Elymus spic*
10.00	10.00	0.00	0.00	5.50	7.57	50.00		*Elymus elym*
								COVER
25.00	30.00	40.00	25.00	37.00	8.12			Total Living
10.00	10.00	10.00	5.00	9.50	1.50			Litter
10.00	20.00	10.00	10.00	16.00	8.00			Bareground
55.00	40.00	40.00	60.00	37.50	11.67			Rock
								% COMPOS
40.00	66.67	50.00	40.00	34.71	24.68			Shrubs
20.00	0.00	0.00	0.00	12.50	25.32			Forbs
40.00	33.33	50.00	60.00	52.79	24.67			Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Subsoil Piles

AREA: Cottonwood Mine New Waste Rock Area (1990 Interim)

DATE: August 23-27, 1999

WORKERS: P. Collins, D. Collins

SLOPE: Variable

EXPOSURE: Variable

ANIMAL USE/DISTURBANCE:

EROSION: Slight to moderate on unmulched north end.

COVER: (See quantitative data)

DOMINANT PLANT SPECIES OBSERVED:
Artemisia tridentata
Atriplex canescens
Atriplex confertifolia
Atriplex gardneri
Ceratoides lanata
Eriogonum corymbosum

Halogeton glomeratus
Machaeranthera canescens
Salsola pestifer
Malcomia africana

Bromus tectorum
Elymus lanceolatus
Elymus smithii

NOTES:

1) Qualitative and quantitative data this year. Quadrat numbers 1-4 were on the unmulched side; 5-8 were on the top and flat areas; 9-12 were located on the mulched areas.

2) Like 1997 and 1998 for these piles, if we listed by total desirable cover, it would be north (worse) to south (best).

3) Sloped areas that were left unmulched had about 90% weed cover; sloped areas that were mulched had less than 50% weeds. The best results were the flatter tops with mulch. They comprised less than 25% weeds -

- but in the depressions (gouges), there were nearly 100% desirable species.

4) The areas with erosion control mat has the best representation of shrub growth.

5) There was lots of Halogen on unmulched slopes.

6) Erosion was also beginning on the mulched slopes because the mulch is decomposing now.

ENERGY WEST-COTTONWOOD MINE
Subsoil Piles
New Waste Rock Site (1990)
Slope: variable
Exposure: variable
Sample Date: 23-27 Aug 99

	1 thru 4 Unmulched			5 thru 8 Top of Pile		
	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Atriplex canescens	0.00	0.00	0.00	0.00	0.00	0.00
Atriplex confertifolia	0.00	0.00	0.00	0.00	0.00	0.00
Atriplex gardneri	0.00	5.00	10.00	0.00	0.00	0.00
Ceratoides lanata	0.00	0.00	0.00	2.00	5.00	5.00
Eriogonum corymbosum	0.00	0.00	0.00	0.00	0.00	10.00
FORBS						
Halogeton glomeratus	25.00	20.00	10.00	10.00	0.00	0.00
Machaeranthera canescens	0.00	5.00	0.00	0.00	0.00	0.00
Malcomia africana	0.00	0.00	0.00	0.00	0.00	0.00
Salsola pestifer	0.00	5.00	0.00	0.00	0.00	0.00
GRASSES						
Elymus smithii	0.00	0.00	0.00	0.00	0.00	0.00
Elymus lanceolatus	0.00	0.00	5.00	3.00	30.00	20.00
COVER						
Total Living Cover	25.00	35.00	25.00	15.00	35.00	35.00
Litter	10.00	5.00	10.00	5.00	10.00	10.00
Bareground	60.00	55.00	60.00	75.00	45.00	50.00
Rock	5.00	5.00	5.00	5.00	10.00	5.00
% COMPOSITION						
Shrubs	0.00	14.29	40.00	13.33	14.29	42.86
Forbs	100.00	85.71	40.00	66.67	0.00	0.00
Grasses	0.00	0.00	20.00	20.00	85.71	57.14

9 thru 12 Sides Mulched

7.00	8.00	9.00	10.00	11.00	12.00	Mean	SDev	Freq
0.00	10.00	0.00	0.00	0.00	15.00	2.08	4.77	16.67
0.00	0.00	0.00	10.00	15.00	0.00	2.08	4.77	16.67
0.00	0.00	0.00	0.00	0.00	0.00	1.25	2.98	16.67
15.00	10.00	20.00	0.00	0.00	0.00	4.75	6.51	50.00
0.00	0.00	0.00	0.00	0.00	0.00	0.83	2.76	8.33
0.00	0.00	0.00	0.00	0.00	0.00	5.42	8.53	33.33
0.00	0.00	0.00	0.00	0.00	0.00	0.42	1.38	8.33
0.00	0.00	0.00	0.00	0.00	5.00	0.42	1.38	8.33
0.00	0.00	0.00	0.00	0.00	0.00	0.42	1.38	8.33
15.00	0.00	0.00	0.00	0.00	0.00	1.25	4.15	8.33
0.00	20.00	0.00	10.00	0.00	5.00	7.75	9.74	58.33
30.00	40.00	20.00	20.00	15.00	25.00	26.67	7.99	
10.00	10.00	25.00	10.00	10.00	5.00	10.00	5.00	
55.00	40.00	50.00	60.00	70.00	65.00	57.08	9.67	
5.00	10.00	5.00	10.00	5.00	5.00	6.25	2.17	
50.00	50.00	100.00	50.00	100.00	60.00	44.56	30.68	
0.00	0.00	0.00	0.00	0.00	20.00	26.03	36.12	
50.00	50.00	0.00	50.00	0.00	20.00	29.40	27.29	

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Sediment Pond Banks

AREA: Cottonwood Mine New Waste Rock Area (1990 Interim)

DATE: August 23-27, 1999

WORKERS: P. Collins, D. Collins

SLOPE: Variable

EXPOSURE: Variable

ANIMAL USE/DISTURBANCE: slight

EROSION: Negligible

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:
Artemisia nova
Artemisia tridentata
Atriplex canescens
Ceratoides lanata
Gutierrezia sarothrae

Penstemon palmeri

Agropyron cristatum
Elymus lanceolatus
Elymus cinereus
Elymus smithii

NOTES:

1) Fewer weedy species this year. It has improved each year.

2) Site looked good.

3) Sampled qualitatively and quantitatively this year (n=10).

ENERGY WEST-COTTONWOOD MINE
Sediment Pond Banks
New Waste Rock Site (1990)
Slope: variable
Exposure: variable

Sample Date: 23-27 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Artemisia nova	10.00	0.00	15.00	0.00	0.00	5.00
Atriplex canescens	5.00	5.00	0.00	20.00	0.00	0.00
Atriplex confertifolia	0.00	0.00	0.00	0.00	25.00	0.00
Ceratoides lanata	0.00	0.00	5.00	0.00	0.00	10.00
Gutierrezia sarothrae	0.00	0.00	0.00	5.00	0.00	5.00
FORBS						
Penstemon palmeri	0.00	0.00	5.00	5.00	0.00	0.00
GRASSES						
Elymus cinereus	5.00	5.00	0.00	0.00	0.00	5.00
Elymus lanceolatus	5.00	15.00	0.00	0.00	10.00	15.00
Elymus smithii	5.00	0.00	0.00	0.00	0.00	0.00
COVER						
Total Living Cover	30.00	25.00	25.00	30.00	35.00	40.00
Litter	10.00	10.00	5.00	10.00	10.00	10.00
Bareground	35.00	40.00	40.00	20.00	40.00	20.00
Rock	25.00	25.00	30.00	40.00	15.00	30.00
% COMPOSITION						
Shrubs	50.00	20.00	80.00	83.33	71.43	50.00
Forbs	0.00	0.00	20.00	16.67	0.00	0.00
Grasses	50.00	80.00	0.00	0.00	28.57	50.00

ENERGY W
Sediment Po
New Waste
Slope: variab
Exposure: va

7.00	8.00	9.00	10.00	Mean	SDev	Freq		Sample Date
								SHRUBS
0.00	0.00	0.00	15.00	4.50	6.10	40.00		*Artemisia no*
0.00	0.00	0.00	0.00	3.00	6.00	30.00		*Atriplex cane*
30.00	0.00	0.00	0.00	5.50	11.06	20.00		*Atriplex conf*
0.00	5.00	20.00	0.00	4.00	6.24	40.00		*Ceratoides la*
0.00	0.00	0.00	0.00	1.00	2.00	20.00		*Gutierrezia s*
								FORBS
0.00	0.00	0.00	0.00	1.00	2.00	20.00		*Penstemon*
								GRASSES
0.00	10.00	0.00	0.00	2.50	3.35	40.00		*Elymus ciner*
10.00	20.00	15.00	10.00	10.00	6.32	80.00		*Elymus lanc*
0.00	0.00	0.00	0.00	0.50	1.50	10.00		*Elymus smit*
								COVER
40.00	35.00	35.00	25.00	32.00	5.57			Total Living
5.00	10.00	20.00	10.00	10.00	3.87			Litter
35.00	40.00	15.00	15.00	30.00	10.49			Bareground
20.00	15.00	30.00	50.00	28.00	10.30			Rock
								% COMPOS
75.00	14.29	57.14	60.00	56.12	22.47			Shrubs
0.00	0.00	0.00	0.00	3.67	7.37			Forbs
25.00	85.71	42.86	40.00	40.21	27.30			Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Refuse Berm '91 (Final) - New Waste Rock Site

AREA: Cottonwood Mine

DATE: August 23-27, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 28 deg.

EXPOSURE: S.

ANIMAL USE/DISTURBANCE: Slight

EROSION: slight

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens
Atriplex confertifolia
Ceratoides lanata

Elymus lanceolatus

NOTES:
1) Although Berm `96 is the most recent revegetation accomplished, the shrubs appear more mature and the cover is greater than the `91 and `94 Berms. However, the shrubs in Berm `96 were almost exclusively fourwing saltbush whereas species diversity was greater on the other berms.

2) Site looks good.

3) Good density of shrubs and grasses, but few forbs.

4) Most of the litter on the data was erosion control mat.

5) Sampled qualitative and quantitatively this year.

ENERGY WEST-COTTONWOOD MINE
Refuse Berm 1991 (Final)
Waste Rock Site (1991)
Slope: 28 deg
Exposure: S

Sample Date: 23-27 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Atriplex canescens	5.00	25.00	0.00	15.00	5.00	0.00
Atriplex confertifolia	0.00	5.00	10.00	0.00	0.00	0.00
Ceratoides lanata	10.00	0.00	15.00	0.00	15.00	20.00
FORBS						
GRASSES						
Elymus lanceolatus	10.00	5.00	0.00	15.00	5.00	5.00
COVER						
Total Living Cover	25.00	35.00	25.00	30.00	25.00	25.00
Litter	10.00	5.00	10.00	10.00	50.00	5.00
Bareground	50.00	50.00	40.00	45.00	5.00	50.00
Rock	15.00	10.00	25.00	15.00	20.00	20.00
% COMPOSITION						
Shrubs	60.00	85.71	100.00	50.00	80.00	80.00
Forbs	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	40.00	14.29	0.00	50.00	20.00	20.00

ENERGY W
Refuse Berm
Waste Rock
Slope: 28 de
Exposure: S

7.00	8.00	9.00	10.00	Mean	SDev	Freq		Sample Date
								SHRUBS
0.00	5.00	0.00	0.00	5.50	7.89	50.00		*Atriplex cane*
0.00	0.00	0.00	0.00	1.50	3.20	50.00		*Atriplex conf*
25.00	20.00	20.00	20.00	14.50	8.20	80.00		*Ceratoides la*
								FORBS
								GRASSES
0.00	5.00	10.00	5.00	6.00	4.36	80.00		*Elymus lanc*
								COVER
25.00	30.00	30.00	25.00	27.50	3.35			Total Living
10.00	5.00	10.00	20.00	13.50	12.85			Litter
45.00	45.00	35.00	30.00	39.50	13.12			Bareground
20.00	20.00	25.00	25.00	19.50	4.72			Rock
								% COMPOS
100.00	83.33	66.67	80.00	78.57	15.17			Shrubs
0.00	0.00	0.00	0.00	0.00	0.00			Forbs
0.00	16.67	33.33	20.00	21.43	15.17			Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Refuse Berm '94 (Final) - New Waste Rock Site

AREA: Cottonwood Mine

DATE: August 23-27, 1999

WORKERS: P. Collins

SLOPE: 25 deg.

EXPOSURE: south

ANIMAL USE/DISTURBANCE: moderate

EROSION: slight

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Atriplex canescens
Ceratoides lanata

Melilotus officinalis

Hilaria jamesii
Hordeum jubatum
Elymus cinereus
Elymus lanceolatus

WOODY SPECIES DENSITY:

DENSITY	1997	1999
Individuals/Acre	22852.19	24885.26

NOTES: 1) See also notes for Refuse Berm `96.
2) Berms 91 and 94 seem to more grasses that 96 Berm. 94 was better than 91 with more diversity.
3) Unlike last year, we did not see galleta this year. Although Berm `96 is the most recent revegetation accomplished, the shrubs appear more mature and the cover is greater than the `91 and `94 Berms. However, the shrubs in Berm `96 were almost exclusively fourwing saltbush whereas species diversity was greater on the other berms.

ENERGY WEST-COTTONWOOD MINE
Refuse Berm '94 (Final)
Cottonwood Waste Rock Site 1991
Slope: 25 deg
Exposure: S

Sample Date: 23-27 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00	7.00
TREES & SHRUBS							
Atriplex canescens	5.00	10.00	0.00	5.00	5.00	5.00	10.00
Atriplex canescens	0.00	0.00	0.00	5.00	0.00	0.00	5.00
Atriplex gardneri	15.00	0.00	0.00	5.00	5.00	0.00	0.00
Ceratoides lanata	5.00	10.00	10.00	0.00	15.00	10.00	10.00
FORBS							
Meliotus officinalis	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES							
Elymus lanceolatus	5.00	10.00	15.00	15.00	0.00	5.00	5.00
Elymus smithii	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COVER							
Total Living Cover	30.00	30.00	25.00	30.00	25.00	20.00	30.00
Litter	5.00	5.00	10.00	10.00	10.00	10.00	10.00
Bareground	45.00	45.00	40.00	40.00	50.00	45.00	35.00
Rock	20.00	20.00	25.00	20.00	15.00	25.00	25.00
% COMPOSITION							
Shrubs	83.33	66.67	40.00	50.00	100.00	75.00	83.33
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	16.67	33.33	60.00	50.00	0.00	25.00	16.67

ENERGY WEST-COTTO
Refuse Berm '94 (Final)
Cottonwood Waste Rock S
Slope: 25 deg
Exposure: S
Sample Date: 23-27 Aug 9

8.00	9.00	10.00	Mean	SDev	Freq	
						TREES & SHRUBS
10.00	0.00	0.00	5.00	3.87	70.00	*Atriplex canescens*
10.00	10.00	0.00	3.00	4.00	40.00	*Atriplex canescens*
0.00	0.00	5.00	3.00	4.58	40.00	*Atriplex gardneri*
5.00	10.00	15.00	9.00	4.36	90.00	*Ceratoides lanata*
						FORBS
0.00	0.00	5.00	0.50	1.50	10.00	*Melilotus officinalis*
						GRASSES
5.00	10.00	5.00	7.50	4.61	90.00	*Elymus lanceolatus*
5.00	0.00	5.00	1.00	2.00	20.00	*Elymus smithii*
						COVER
35.00	30.00	35.00	29.00	4.36		Total Living Cover
10.00	20.00	10.00	10.00	3.87		Litter
25.00	35.00	25.00	38.50	8.08		Bareground
30.00	15.00	30.00	22.50	5.12		Rock
						% COMPOSITION
71.43	66.67	57.14	69.36	16.63		Shrubs
0.00	0.00	14.29	1.43	4.29		Forbs
28.57	33.33	28.57	29.21	16.13		Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Refuse Berm (seeded 1996)

AREA: Cottonwood Mine New Waste Rock Area (1990 Interim)

DATE: August 23-27, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 28 deg.

EXPOSURE: S & E

ANIMAL USE/DISTURBANCE: No obvious disturbance

EROSION: Negligible

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex canescens
Ceratoides lanata

Halogeton glomeratus
Salsola pestifer

Elymus lanceolatus

WOODY SPECIES DENSITY:

DENSITY	1997	1999
Individuals/Acre	5096.51	6348.68

NOTES:

1) Some areas has lots of weeds, whereas other areas had good shrub growth.

2) Site was more favorable for shrubs (Atca) compared to grasses and forbs.

3) For methods: cover random along a 200 ft transect (n=10). Density was by using point quarter method (n=8).

4) Although Berm `96 is the most recent revegetation accomplished, the shrubs appear more mature and the cover is greater than the `91 and `94 Berms. However, the shrubs in Berm `96 were almost exclusively fourwing saltbush whereas species diversity was greater on the other berms.

ENERGY WEST-COTTONWOOD MINE
Refuse Berm '96 (Final)
Cottonwood Waste Rock Site 1991
Slope: 28 deg
Exposure: S & E

Sample Date: 23-27 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00	7.00
TREES & SHRUBS							
Atriplex canescens	25.00	50.00	40.00	25.00	50.00	15.00	15.00
FORBS							
Melilotus officinalis	5.00	0.00	0.00	5.00	0.00	0.00	0.00
GRASSES							
Elymus lanceolatus	20.00	0.00	0.00	10.00	5.00	0.00	10.00
COVER							
Total Living Cover	50.00	50.00	40.00	40.00	55.00	15.00	25.00
Litter	20.00	20.00	50.00	20.00	5.00	10.00	25.00
Bareground	5.00	20.00	5.00	30.00	35.00	70.00	35.00
Rock	25.00	10.00	5.00	10.00	5.00	5.00	15.00
% COMPOSITION							
Shrubs	50.00	100.00	100.00	62.50	90.91	100.00	60.00
Forbs	10.00	0.00	0.00	12.50	0.00	0.00	0.00
Grasses	40.00	0.00	0.00	25.00	9.09	0.00	40.00

ENERGY WEST-COTTO
Refuse Berm '96 (Final)
Cottonwood Waste Rock S
Slope: 28 deg
Exposure: S & E
Sample Date: 23-27 Aug 9

8.00	9.00	10.00	Mean	SDev	Freq	
						TREES & SHRUBS
10.00	50.00	45.00	32.50	15.37	100.00	*Atriplex canescens*
						FORBS
0.00	0.00	0.00	1.00	2.00	20.00	*Melilotus officinalis*
						GRASSES
0.00	5.00	0.00	5.00	6.32	50.00	*Elymus lanceolatus*
						COVER
10.00	55.00	45.00	38.50	15.50		Total Living Cover
25.00	10.00	20.00	20.50	11.72		Litter
55.00	15.00	15.00	28.50	20.13		Bareground
10.00	20.00	20.00	12.50	6.80		Rock
						% COMPOSITION
100.00	90.91	100.00	85.43	18.84		Shrubs
0.00	0.00	0.00	2.25	4.53		Forbs
0.00	9.09	0.00	12.32	15.73		Grasses

COLOR
PHOTOGRAPHS

Cottonwood Mine - Old Fan Road '84 (Final)

Cottonwood Mine - Reference Area

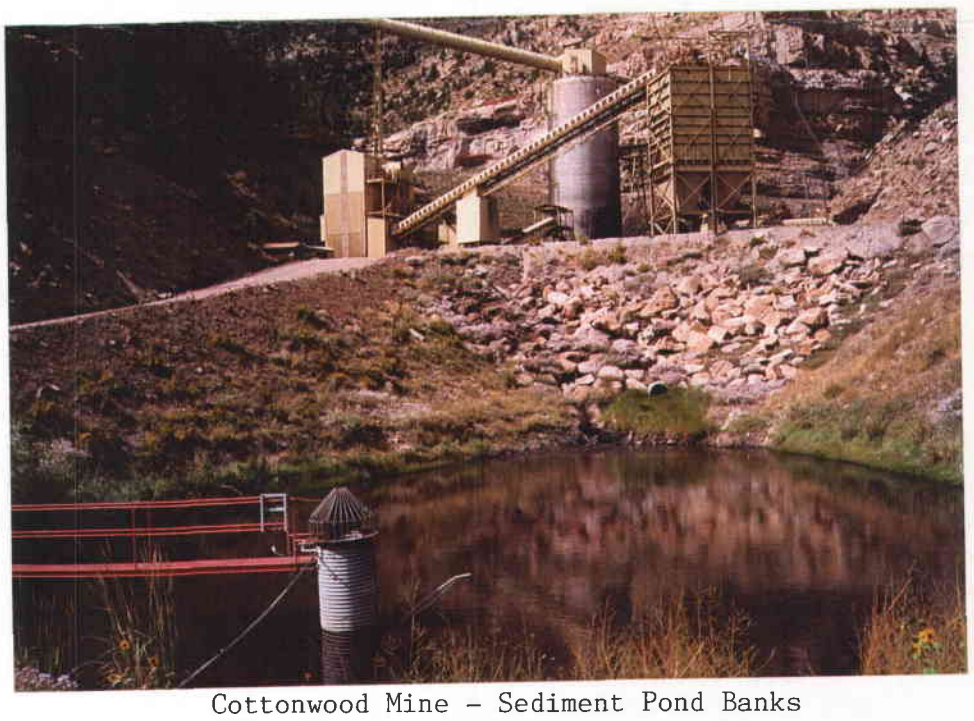
Cottonwood Mine - 4th East Road '86

Cottonwood Mine - Storage Yard Slope

Cottonwood Mine - Parking Lot Slope

Cottonwood Mine - Road/Silo Pad Slope

Cottonwood Mine - Tipple Area Slopes



Cottonwood Mine - Sediment Pond Banks

Cottonwood Mine - Ninth East Breakout '91

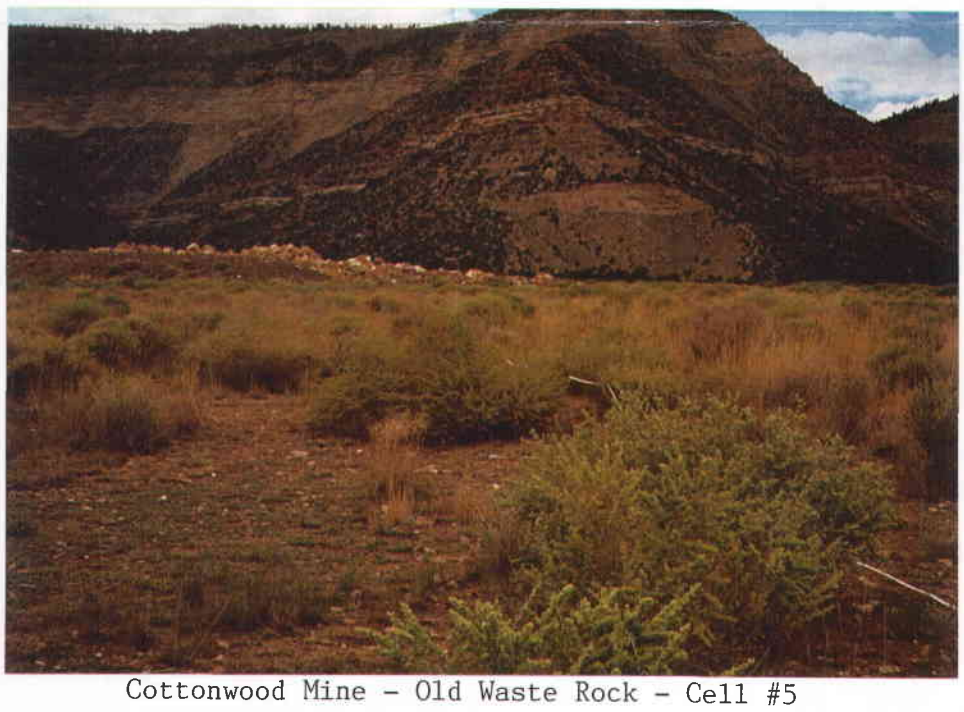
Cottonwood Mine - Test Plots '88

Cottonwood Mine - Old Waste Rock - Cell #1

Cottonwood Mine - Old Waste Rock - Cell #2

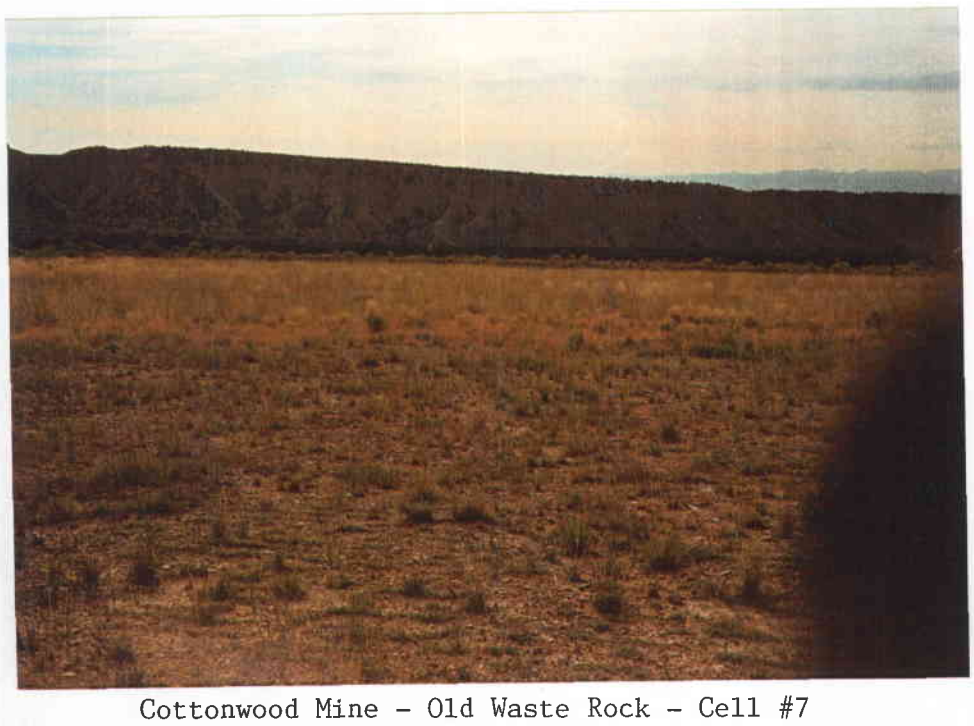
Cottonwood Mine - Old Waste Rock - Cell #3

Cottonwood Mine - Old Waste Rock - Cell #4

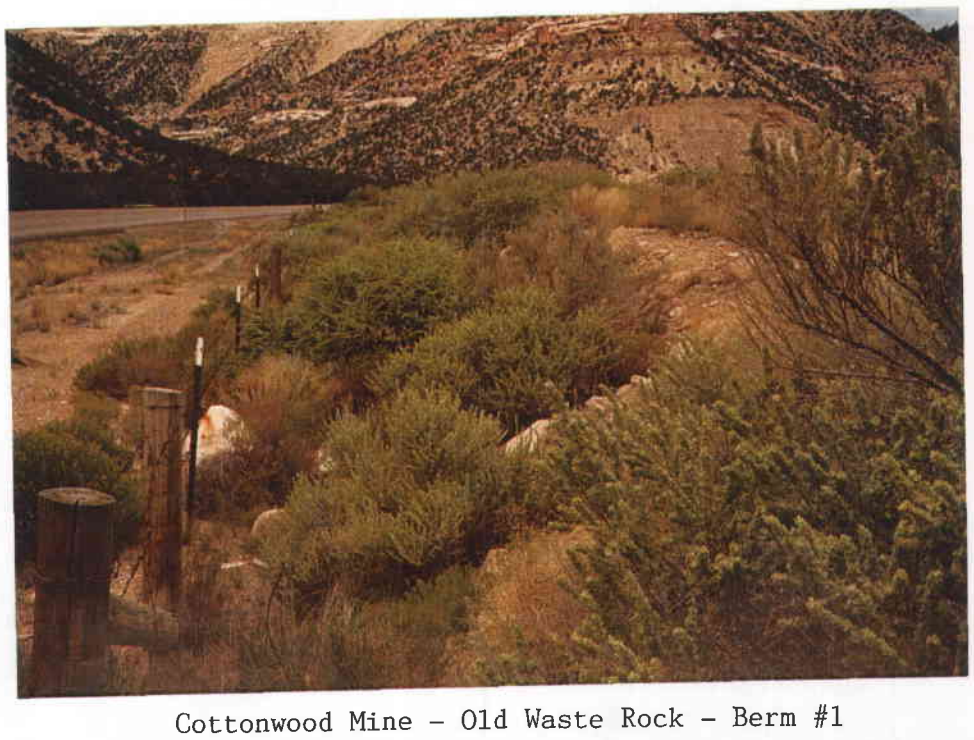


Cottonwood Mine - Old Waste Rock - Cell #5

Cottonwood Mine - Old Waste Rock - Cell #6

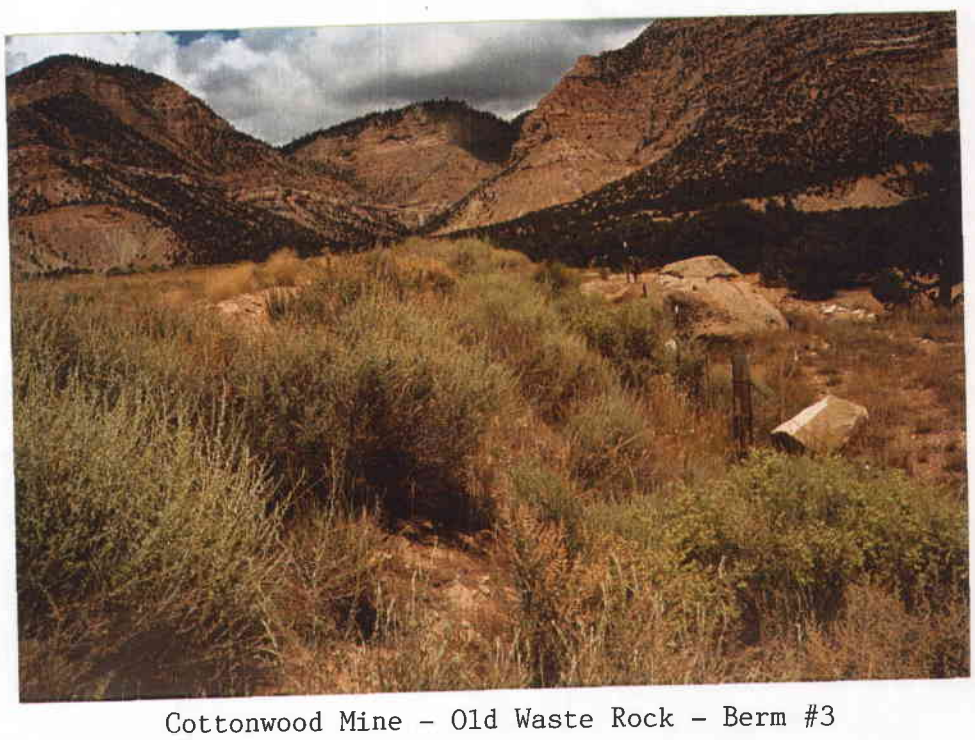


Cottonwood Mine - Old Waste Rock - Cell #7



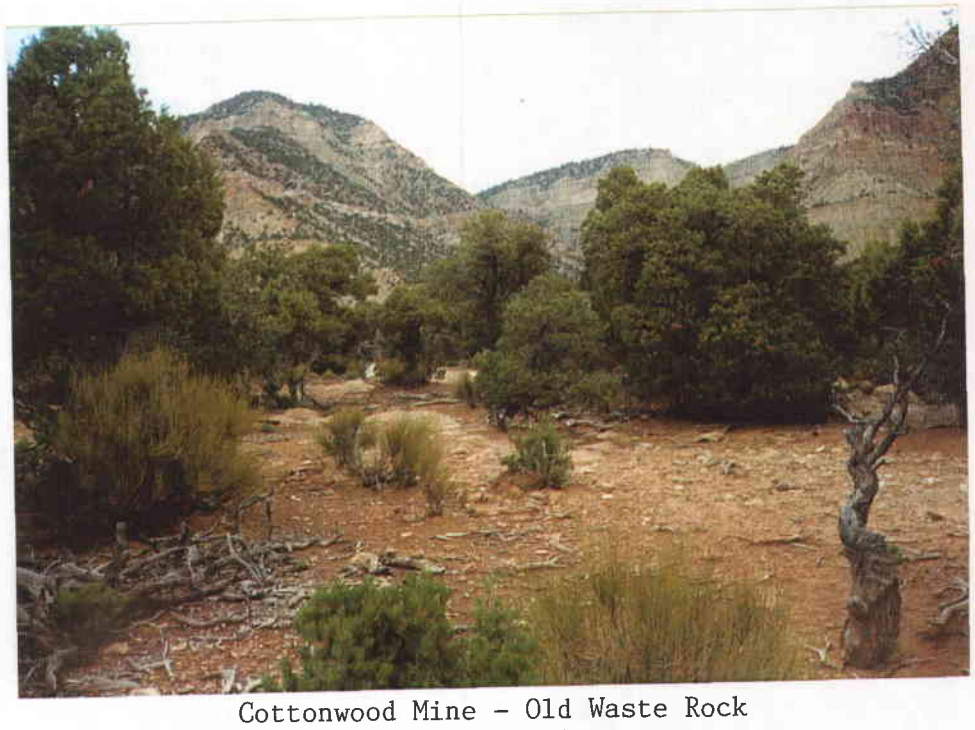
Cottonwood Mine - Old Waste Rock - Berm #1

Cottonwood Mine - Old Waste Rock - Berm #2



Cottonwood Mine - Old Waste Rock - Berm #3

Cottonwood Mine - Old Waste Rock - Berm #4



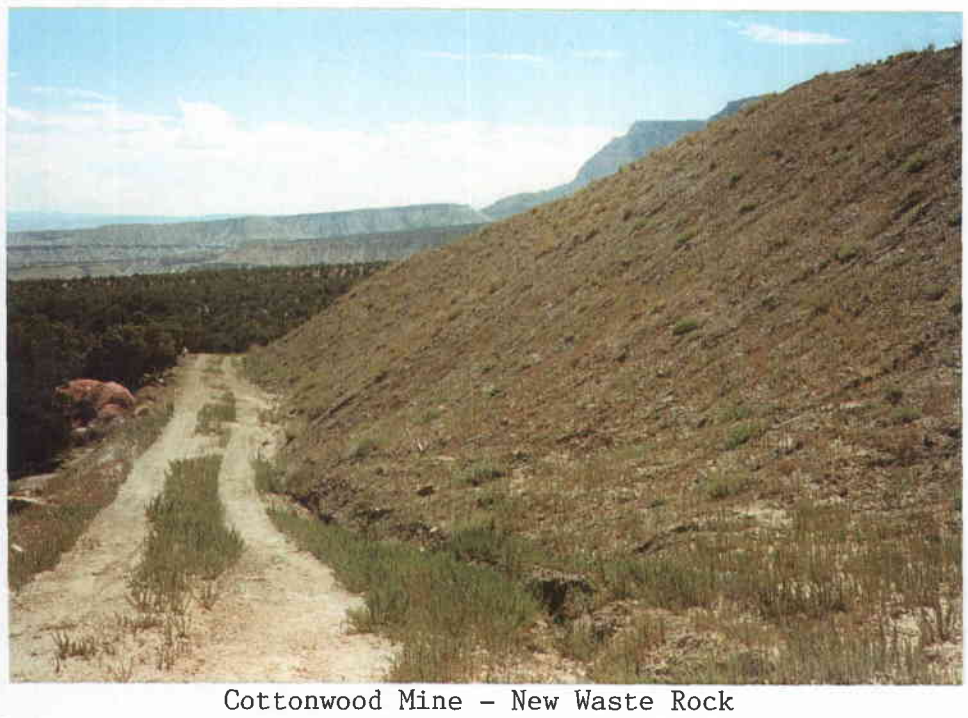
Cottonwood Mine - Old Waste Rock
CTW Reference Area

Cottonwood Mine - CTW Soil Piles (A) '94
Old Waste Rock

Cottonwood Mine - CTW Soil Piles (C) '94
Old Waste Rock

Cottonwood Mine - New Waste Rock
Road Slopes

Cottonwood Mine - New Waste Rock
Topsoil Stockpiles



Cottonwood Mine - New Waste Rock
Subsoil Stockpile

Cottonwood Mine - New Waste Rock
Sediment Pond Banks

Cottonwood Mine - New Waste Rock
Refuse Berm - '91 Bottom - '94, '96 Top

Cottonwood Mine - New Waste Rock
Refuse Berm '91 (Final)

Cottonwood Mine - New Waste Rock
Refuse Berm '94 (Final)

Cottonwood Mine - New Waste Rock
Refuse Berm '96 (Final)

PACIFICORP/ENERGY WEST
VEGETATION MONITORING
1999

VOLUME II

VEGETATION MONITORING REPORTS FOR THE COTTONWOOD MINE, DES-BEE-DOVE, DEER CREEK MINE, TRAIL MOUNTAIN MINE, COTTONWOOD CANYON & RILDA CANYON

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Report Date
March 2000

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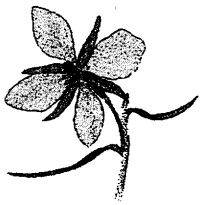
DES-BEE-DOVE AREA



ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Beehive Yard Slope

AREA: Des-Bee-Dove (1988 Reveg. Area)

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 20-50 deg.

EXPOSURE: SE

AREA: 1.6 acres

ANIMAL USE/DISTURBANCE:

EROSION: Negligible

COVER: (No quantitative data were recorded this year)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens
Atriplex confertifolia
Chrysothamnus nauseosus
Gutierrezia sarothrae

Halogeton glomeratus
Penstemon palmeri

Agropyron cristatum
Elymus lanceolatus
Elymus smithii
Elymus spicatus
Elymus cinereus

Beehive Yard Slope

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
Total	3000		6865.06

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	600.00		600.00
Woody	600.00		600.00
Total	1200.00		1200.00

NOTES:

1) Qualitative sampling only was done this year. We did not sample for density and production in 1999, but previous data has been retained for observation (see above).

2) This area seems to look better than it ever has. Good species diversity.

3) Good density of woody species presently established.

4) The chain link fence covering the ground is still holding earth well.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Beehive Road Berm

AREA: Des-Bee-Dove (1988 Reveg. Area)

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 30 deg

AREA SIZE: .1 acre

EXPOSURE: Variable

ANIMAL USE/DISTURBANCE: Heavy cattle use.

EROSION: Negligible

COVER: (No quantitative data were recorded this year)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Chrysothamnus nauseosus
Eriogonum corymbosum
Ephedra viridis

Halogeton glomeratus
Penstemon palmeri

Elymus cinereus
Elymus lanceolatus
Elymus salinus

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
Chrysothamnus nauseosus	3963.96		4835.16
Eriogonum corymbosum	87.12		174.24
Atriplex confertifolia	827.64		958.32
Total	4399.56		5967.72

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	22.31		51.31
Woody	314.55		446.17
Total	336.86		497.48

NOTES: 1) Qualitative sampling only was done this year. We did <u>not</u> sample for density and production in 1999, but previous data has been retained for observation (see above).

2) There was a better representation of desirable species this year. There were still some weedy species though.

3) This area supported mostly woody plant spp., some grass and few weeds.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Deseret Road Berm

AREA: Des-Bee-Dove (1988 Reveg. Area)

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 6-10 deg.

EXPOSURE: E

AREA: .2 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Slight

COVER: (No quantitative data taken this year)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Chrysothamnus nauseosus

Bassia hyssopifolia
Halogeton glomeratus
Kochia scoparia

Elymus cinereus
Elymus lanceolatus
Elymus elymoides

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
Chrysothamnus nauseosus	418.20		453.02
Atriplex confertifolia	243.95		104.54
Total	662.15		557.56

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	76.74		80.31
Woody	119.57		148.13
Total	196.31		228.44

NOTES: 1) Qualitative sampling only was done this year. We did <u>not</u> sample for density and production in 1999, but previous data has been retained for observation (see above).

2) Much of the vegetation was disturbed due to roadside maintenance.

3) The site seemed to still be weedy, but there was not much change from last year.

4) As previous three years', most of the herbaceous spp. were weedy exotic species.

5) Good shrub density in some areas.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Portal Road Berm

AREA: Des-Bee-Dove (1988 Reveg. Area)

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 30 deg.

EXPOSURE: SW

AREA: .1 acre

ANIMAL USE/DISTURBANCE: Slight

EROSION: Negligible

COVER: (No quantitative data were recorded this year)

DOMINANT PLANT SPECIES OBSERVED:
Atriplex confertifolia
Atriplex gardneri
Chrysothamnus nauseosus
Eriogonum corymbosum

Bassia hyssopifolia
Halogeton glomeratus

Agropyron cristatum
Elymus salinus
Elymus spicatus
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
Chrysothamnus nauseosus	2588.72		2140.66
Atriplex confertifolia	3036.76		1493.49
Eriogonum corymbosum	149.35		149.35
Total	6621.14		3783.50

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	53.54		275.35
Woody	585.12		650.13
Total	638.66		925.48

NOTES: 1) Qualitative sampling only was done this year. We did <u>not</u> sample for density and production in 1999, but previous data has been retained for observation (see above).

2) As mentioned last year, the inside of the berm had been scraped for road maintenance. That's why it's so sparse and weedy.

3) Because of maintenance procedures, there were weeds inside the berm and desirable spp. on the top and outside.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Bathhouse Road Berm

AREA: Des-Bee-Dove (1988 Interim Reveg. Area)

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 30 deg.

EXPOSURE: SW

AREA: .1 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (No quantitative data this year)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Chrysothamnus nauseosus

Penstemon palmeri
Kochia scoparia

Elymus cinereus
Elymus lanceolatus
Elymus elymoides

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
Chrysothamnus nauseosus	3783.51		2538.93
Eriogonum corymbosum			49.78
Atriplex confertifolia	199.32		448.05
Total	3982.64		3036.75

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	124.93		99.01
Woody	638.55		616.78
Total	558.35		715.79

NOTES: 1) Qualitative sampling only was done this year. We did <u>not</u> sample for density and production in 1999, but previous data has been retained for observation (see above).

2) Site looked very good with patches of desirable species and patches of weeds, but mostly desirables.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Tipple Slope

AREA: Des-Bee-Dove (1988 Reveg. Area)

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 40-45 deg.

EXPOSURE: Variable

AREA: .4 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Slight considering how steep the slope is!

COVER: (No quantitative data recorded this year.)

DOMINANT PLANT SPECIES OBSERVED:
Atriplex confertifolia
Chrysothamnus nauseosus
Eriogonum corymbosum

Halogeton glomeratus
Penstemon palmeri

Elymus cinereus
Elymus lanceolatus
Elymus salinus
Stipa hymenoides

WOODY SPECIES DENSITY:*	1997	(no./ac)	1998
Total	2500		~2500

PRODUCTION:*	1997	(lbs/ac)	1998
Herbaceous	300.00		350.00
Woody	300.00		350.00
Total	600.00		~700.00

* by LDS methods

NOTES: 1) The slope's vegetation looked good - excellent considering the steepness of the slope.

2) Qualitative sampling only was done this year. We did <u>not</u> sample for density and production in 1999, but previous data has been retained for observation (see above).

3) Some coal fines were mixed in soils/spoils.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Sediment Storage Slope

AREA: Des-Bee-Dove (1988 Interim Reveg. Area)

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 3 - 5 deg.

EXPOSURE: S SE

AREA: 4.4 acres

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Like last year, there was some slight to moderate erosion in localized areas.

COVER: (No quantitative data taken this year)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex gardneri
Chrysothamnus nauseosus
Eriogonum corymbosum
Sarcobatus vermiculatus
Suaeda torreyana

Halogeton glomeratus
Malcomia africana
Suaeda calceoliformis

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
Atriplex confertifolia			132.76
Atriplex gardneri	1988.95		1725.93
Suaeda torreyana	795.58		663.82
Sarcobatus vermiculatus	159.12		1194.88
Chrysothamnus nauseosus	159.12		1593.17
Atriplex corrugata	79.56		
Total	3182.33		5310.56

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	64.75		71.39
Woody	1237.09		1025.15
Total	1301.84		1096.54

NOTES: 1) As last year, there was poor grass and forb cover this year. Some patchy areas had lot of weeds.

2) Qualitative sampling only was done this year. We did not sample for density and production in 1999, but previous data has been retained for observation (see above).

3) We didn't see many grasses this year.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Sediment Pond Banks

AREA: Des-Bee-Dove (1988 Interim Reveg Area)

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 30 deg.

EXPOSURE: E & W

AREA: .9 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Slight

COVER: (No quantitative data taken this year)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Atriplex gardneri
Chrysothamnus nauseosus

Malcomia africana
Machaeranthera canescens

Agropyron cristatum
Elymus lanceolatus
Hordeum jubatum

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
Chrysothamnus nauseosus	3912.52		7781.63
Atriplex gardneri	1214.23		2593.88
Atriplex confertifolia	134.91		
Gutierrezia sarothrae	134.91		
Total	5396.57		10375.51

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	111.90		76.38
Woody	582.69		810.84
Total	694.59		887.21

NOTES: 1) Qualitative sampling only was done this year. We did not sample for density and production in 1999, but previous data has been retained for observation (see above).

2) Site looked fair to excellent, depending on specific area. The north faces were excellent. The west and east faces were fair. The south faces were often bare.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Beehive Substation Slope

AREA: Des-Bee-Dove (1986 Reveg. Area)

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 35 deg.

EXPOSURE: S

AREA: .1 acre

ANIMAL USE/DISTURBANCE: Slight

EROSION: Slight erosion on some areas of the slope.

COVER: (no quantitative data this year)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Chrysothamnus nauseosus

Penstemon palmeri

Agropyron cristatum
Elymus lanceolatus
Elymus salinus
Elymus cinereus
Elymus hispidus
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
Chrysothamnus nauseosus	5158.51		3484.80
Atriplex confertifolia	224.28		232.32
Total	5882.79		3717.12

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	124.33		133.43
Woody	489.15		618.21
Total	613.48		751.64

NOTES: 1) Qualitative sampling only was done this year. We did not sample for density and production in 1999, but previous data has been retained for observation (see above).

2) Site continues to look very good for cover and diversity.

3) Diversity of grass and shrub was good, but there were few forbs.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Sediment Pond Area

AREA: Des-Bee-Dove (1985 Reveg. Area)

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 0-10 deg.

EXPOSURE: S

AREA: .7 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (no quantitative data taken this year)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex canescens
Atriplex confertifolia
Chrysothamnus nauseosus
Chrysothamnus viscidiflorus
Gutierrezia sarothrae
Sarcobatus vermiculatus

Agropyron cristatum
Elymus salinus
Elymus spicatus
Hilaria jamesii
Stipa hymenoides

WOODY SPECIES DENSITY:	1997 (no./ac)
Chrysothamnus nauseosus	518.81
Atriplex canescens	4669.27
Sarcobatus vermiculatus	518.81
Atriplex confertifolia	2075.23
Gutierrezia sarothrae	12970.18
Total	20752.29

PRODUCTION:	1997 (lbs/ac)
Herbaceous	77.04
Woody	794.27
Total	871.31

NOTES: 1) We sampled qualitatively this year, but left the above 1997 quantitative data for future comparisons.

2) Site looked excellent.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Bathhouse Slope

AREA: Des-Bee-Dove (1984 Reveg. Area)

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 25 deg.

EXPOSURE: Variable

AREA: 2.3 acre

ANIMAL USE/DISTURBANCE: There is slight erosion in some areas.

EROSION: Negligible

COVER: Qualitative data only

DOMINANT PLANT SPECIES OBSERVED:
Atriplex canescens
*Chrysothamnus nauseosus**
Eriogonum corymbosum

Aster glaucodes
Sisymbrium altissimum

Agropyron cristatum
Elymus lanceolatus
Elymus smithii
Elymus salinus
Elymus hispidus
Elymus cinereus
Stipa hymenoides

NOTES:

1) Sampled only qualitatively again this year.

2) Like last year, this site was in "excellent" condition.

3) Vegetative cover remains good & diverse.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Materials Yard Slope

AREA: Des-Bee-Dove (1984 Reveg. Area)

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 20-25 deg.

EXPOSURE: SE

AREA: 1.1 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Mostly negligible.

COVER: (qual, data only)

DOMINANT PLANT SPECIES OBSERVED:
Atriplex confertifolia
Atriplex gardneri
*Chrysothamnus nauseosus**

Aster chilensis

Bromus tectorum
Elymus cinereus
*Elymus lanceolatus**
*Elymus smithii**
Elymus spicatus
Stipa hymenoides

* dominants

NOTES: 1) Sampled for qualitative data only this year.

2) Site looked "excellent" again this year.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Test Plot (1989)

AREA: Des-Bee-Dove

DATE: September 20-24, 1999

WORKERS: P. Collins

SLOPE: 26 deg.

EXPOSURE: S

AREA: .6 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Moderate

COVER: (no quantitative data this year)

PLANT SPECIES PLANTED:

Atriplex canescens
Atriplex corrugata
Atriplex confertifolia
Ceratoides lanata
Kochia prostrata

Linum lewisii
Melilotus officinalis
Sphaeralcea coccinea

Elymus lanceolatus
Elymus smithii
Elymus cinereus
Stipa hymenoides
Sporobolus airoides

PLANT SPECIES OBSERVED:

Sarcobatus vermiculatus
Suaeda torreyana
Atriplex canescens
Atriplex gardneri
Atriplex confertifolia

Bassia hyssopifolia
Kochia scoparia
Halogeton glomeratus

West Side

WOODY SPECIES DENSITY:	1998 (no./ac)
Atriplex confertifolia	311.37
Atriplex gardneri	103.79
Atriplex canescens	726.54
Sarcobatus vermiculatus	932.12
Suaeda torreyana	2075.81
Total	4151.63

PRODUCTION:	1998 (lbs/ac)
Herbaceous	0.00
Woody	394.41
Total	394.41

East Side

WOODY SPECIES DENSITY:	1998 (no./ac)
Atriplex gardneri	4.26
Atriplex canescens	7.10
Sarcobatus vermiculatus	18.47
Suaeda torreyana	26.99
Total	589.43

PRODUCTION:	1998 (lbs/ac)
Herbaceous	38.16
Woody	0.00
Total	38.16

NOTES: 1) Sampled west side, then the east side.

2) Qualitative sampling only was done this year. We did not sample for density and production in 1999, but previous data has been retained for observation (see above).

3) West side looked better, esp. summer seepweed, possibly because it's not as steep.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Beehive Slope(reseeded in Jan. 1997)

AREA: Des-Bee-Dove (1988 Reveg. Area)

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 20-50 deg.

EXPOSURE: SE

AREA: 1.6 acres

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Slight to moderate

COVER: (No quantitative data were recorded this year)

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Ceratoides lanata

Penstemon palmeri

Agropyron cristatum
Elymus salinus
Elymus lanceolatus
Stipa hymenoides

NOTES:

1) Qualitative sampling only was done this year.

2) Cover and diversity looked very good this year - better than last year.

3) Some areas looked better than other areas.

4) Site slope will probably hold well now.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Subsoil Pile at Sediment Pond (Jan)

AREA: Des-Bee-Dove (1985 Reveg. Area)

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: Sideslope ~ 28 deg., top ~ 1 deg.

EXPOSURE: var.

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (no quantitative data taken this year, ~ 30%)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex gardneri
Chrysothamnus nauseosus
Ephedra viridis

Eriogonum (annual)
*Astragalus cicer**
Salsola pertifer
Machaeranthera canescens
Malcomia africana

Elymus salinus
Hilaria jamesii

* dominant desirable species.

NOTES: 1) We sampled qualitatively this year.

2) Approx. 50% were weedy species.

3) The top of pile had a few grasses, but not many. The side-slope were mostly shrub species.

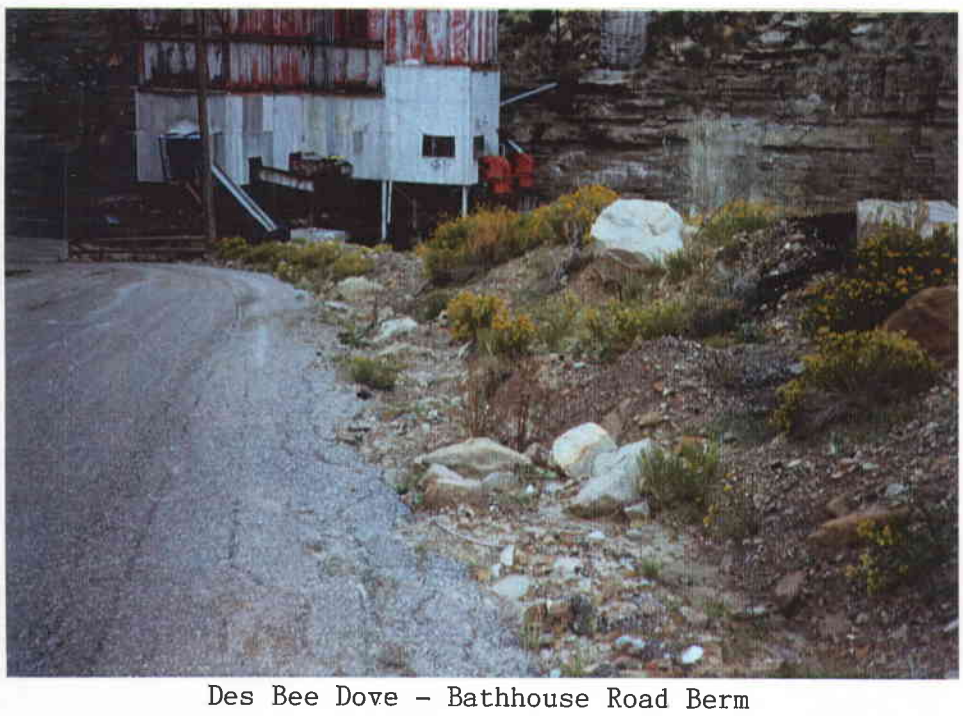
COLOR PHOTOGRAPHS

Des Bee Dove - Beehive Yard Slope

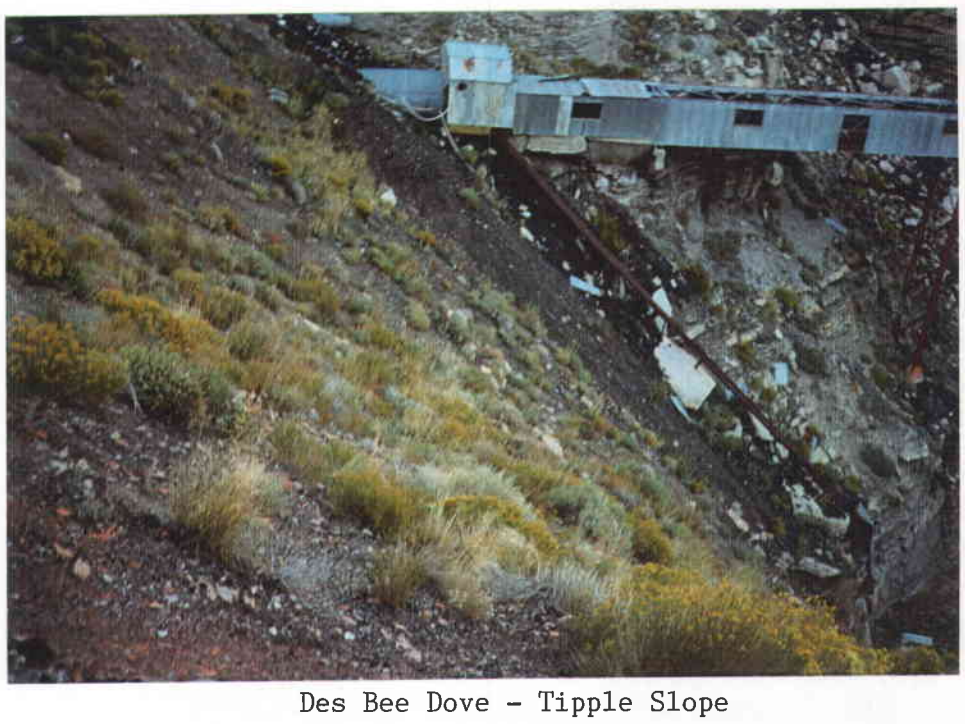
Des Bee Dove - Beehive Road Berm

Des Bee Dove - Deseret Road Berm

Des Bee Dove - Portal Road Berm



Des Bee Dove - Bathhouse Road Berm



Des Bee Dove - Tipple Slope

Des Bee Dove - Sediment Pond Banks

Des Bee Dove - Beehive Substation Slope

Des Bee Dove - Sediment Pond Area

Des Bee Dove - Bathhouse Slope

Des Bee Dove - Material Yard Slope

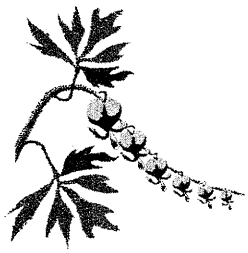
Des Bee Dove - Test Plot '89

Des Bee Dove - Beehive Slope Reseed Jan. '97

Des Bee Dove - Subsoil Pile at Sed. Pond

PULL

DEER CREEK AREA



ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Riparian Reference Area

AREA: Deer Creek

DATE: September 27-30, 1999

WORKERS: P. Collins

SLOPE: 2 - 3 deg.

EXPOSURE: Variable

ANIMAL USE/DISTURBANCE: Used extensively, no severe disturbance.

EROSION: Normal

COVER: (overstory plus understory >50%)

DOMINANT PLANT SPECIES OBSERVED:

Abies concolor
Acer negundo
Chrysothamnus nauseosus
Cornus sericea
Mahonia repens
Populus angustifolia
Rosa woodsii
Salix sp.

*Aster foliaceous**

Agrostis stolonifera
Dactylis glomerata
Elymus canadensis

NOTES: 1) Qualitative sampling this year.

2) This is the first time we have visited this site.

3) To locate, find a t-post on the side of the road in a more open area. This was past a more coaly area approximately 200' down from "Temporary Storage Area" and it can be seen as one walks down the road.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Mixed Conifer Reference Area

AREA: Deer Creek

DATE: September 27-30, 1999

WORKERS: P. Collins

SLOPE: 15-25 deg.

EXPOSURE: WSW

ANIMAL USE/DISTURBANCE: Used by wildlife, mostly deer sign.

EROSION: Normal

COVER: (qualitative estimate ~45%)

DOMINANT PLANT SPECIES OBSERVED:

Pseudotsuga menziesii
Mahonia repens
Symphoricarpos oreophilus
Amalanchier utahensis
Juniperus scopulorum
Pinus edulis
Abies lasiocarpa
Chrysothamnus depressus
Pachystima myrsinites
*Eriogonum corymbosum**
Chrysothamnus nauseosus
Brickellia microphylla

Aster foliaceous
Linum lewisii
Machaeranthera canescens
Castilleja sp.

*Elymus salinus**
*Elymus spicatus**

NOTES:
1) Qualitative sampling this year.
2) This is the first time I have visited this site.
3) To locate, I found the SW t-post marking the area north of the adjacent drainage.
4) The was a good representation of Spruce/Fir/Grass, but it was mostly more open. This is an ambitious standard but a good reference area.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Pinyon-Juniper Reference Area

AREA: Deer Creek

DATE: September 27-30, 1999

WORKERS: P. Collins

SLOPE: 28 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE: Used by wildlife, mostly deer and rabbit sign present.

EROSION: Normal

COVER: (qualitative estimate ~40%)

DOMINANT PLANT SPECIES OBSERVED:

Amalanchier utahensis
Cercocarpus oreophilus
Chrysothamnus nauseosus
*Ephedra viridis**
Eriogonum corymbosum
*Juniperus osteosperma**
*Pinus edulis**
Symphoricarpos oreophilus

Aster foliaceous
Castilleja sp.
Galium bifolium
Machaeranthera grindelioides
Stanleya pinnata

Bromus carinatus
*Elymus salinus**
Stipa hymenoides

* Dominant species

NOTES:

1) Qualitative sampling this year.

2) This was the first time I had visited this site.

3) Good for a PJ stand and reference area, but I should compare it visually with areas that will be reclaimed to meet these standards in the future.

4) I met with C. Semborski and G. Davis beforehand to help me locate the site. I used an aerial photograph to find the site, but I never did find t-posts marking it. So, I assumed it was above the "Permeter Boundary" marker. To get there I walked through more of a Mtn. Brush/PJ community to a more classic PJ area. The transition between the two appears to be where the Reference Area is on the photo. Calling it a PJ Reference area is satisfactory however.

5) There was much good understory cover (shrub & grass) for a PJ community.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: C2 Conveyor (IU 132-190) '93

AREA: Deer Creek Mine Area

DATE: September 27-30, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 8 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible on flatter area, moderate on slopes

COVER: (no quantitative data this year)

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Ephedra viridis
Eriogonum corymbosum
Gutierrezia sarothrae
Juniperus osteosperma
Yucca harrimaniae

Aster chilensis

Elymus lanceolatus
Elymus cinereus
Stipa hymenoides
Stipa comata

WOODY SPECIES DENSITY:	1997 (no./ac)
Chrysothamnus nauseosus	278.78
Gutierrezia sarothrae	487.87
Yucca harrimaniae	69.70
Juniperus osteosperma	348.48
Amalanchier utahensis	348.48
Eriogonum corymbosum	627.26
Total	975.74

NOTES: 1) A sediment control area was constructed within this site (see photograph). This created some disturbance. Surrounding area looked very good. I do not recall this in last years' study, but I was using 1998 maps this year so I'm not certain.

2) Qualitative sampling only was done this year. We did <u>not</u> sample for density 1999, but previous data has been retained for observation (see above).

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Riparian Areas

AREA: Deer Creek Mine Area

DATE: September 27-30, 1999

WORKERS: P. Collins

SLOPE: 1 to 5 deg.

EXPOSURE: Variable

AREA: < .5 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (No quantitative data taken this year)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Clematis sp.
Rosa woodsii
Prunus virginiana
Chrysothamnus nauseosus
Sambucus caerulea

Aster chilensis
Medicago sativa

Agropyron cristatum
Elymus elongatus
Elymus cinereus
Elymus hispidus
Elymus spicatus
Stipa hymenoides
Poa pratensis

NOTES: 1) Qualitative data only again this year.

2) The south area is across from the transfer site.

3) Both areas were <5% weeds this year.

4) To locate, there is an opening just north of the riparian area (.4 mi. from coal storage road turn off) on the west side of the road.

4) Site looked excellent, nearly weed free now.

5) Most of the species observed were found in both riparian areas.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Sediment Pond Dam

AREA: Deer Creek Mine Area

DATE: September 27-30, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 1 - 25 deg.

EXPOSURE: Variable

AREA: < 2 acres

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (qualitative data only)

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Eriogonum corymbosum

Aster foliaceous
Grindelia squarrosa
Kochia scoparia
Halogeton glomeratus

Elymus smithii
Elymus cinereus
Elymus lanceolatus
Hordeum jubatum

NOTES:
1) Qualitative data only this year.
2) Pond has been disturbed by modifications to it.
3) As noted last year, recent disturbance has influenced the vegetation which is now comprised mostly of "weedy" species.
4) The top areas have a fair representation of desirable species with some bare areas.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Temp. Sediment Basin

AREA: Deer Creek Mine Area

DATE: September 27-30, 1999

WORKERS: P. Collins

SLOPE: 1-2 deg.

EXPOSURE: Variable

AREA: < 1 acre.

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (qualitative data only)

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Populus angustifolia

Aster chilensis
Grindelia squarrosa
Astragalus cicer
Salsola pestifer

Elymus cinereus
Elymus spicatus
Elymus smithii
Elymus lanceolatus
Hordeum jubatum

NOTES: 1) As mentioned last year, there was a good representation of desirable and less weedy spp. The site appears to be improving over time.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Roadside Areas

AREA: Deer Creek (1990 Reveg. Area)

DATE: September 27-30, 1999

WORKERS: P. Collins

SLOPE: 5 deg.

EXPOSURE: NE

AREA: < 1 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Nearly negligible.

COVER: (qualitative data only)

DOMINANT PLANT SPECIES OBSERVED:

Aster chilensis
Grindelia squarrosa
Eriogonum corymbosum
Chrysothamnus nauseosus

Grindelia squarrosa
Astragalus cicer
Melilotus officinalis

Agropyron cristatum
Bromus inermis
Elymus junceus
Elymus smithii
Elymus lanceolatus
Elymus cinereus
Hordeum jubatum
Stipa hymenoides

NOTES: 1) Sampled east and west side of the road for qualitative data.
2) Mostly desirable species again this year.
3) Good diversity of grasses, but not many shrubs.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Gate Area Slope

AREA: Deer Creek (1990 Reveg. Area)

DATE: September 27-30, 1999

WORKERS: P. Collins

SLOPE: 20 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Still some erosion this, but considering the angle of the slope, it's not bad.

COVER: (qualitative data only)

DOMINANT PLANT SPECIES OBSERVED:
Chrysothamnus nauseosus

Aster chilensis
Astragalus cicer
Grindelia squarrosa
Halogeton glomeratus
Medicago sativa
Penstemom palmeri

Elymus cinereus
Elymus lanceolatus
Elymus spicatus
Elymus smithii
Hordeum jubatum

NOTES: 1) Qualitative data only recorded this year. Site looked in good condition considering the slope angle.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
19989

SITE NAME: Fan Road Slopes

AREA: Deer Creek (1989 Reveg. Area)

DATE: September 27-30, 1999

WORKERS: P. Collins, D. Collins

SLOPE: Variable

EXPOSURE: Variable

AREA: 1.1 acres

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (qualitative only this year)

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus

Aster chilensis
Salsola pestifer

Agropyron cristatum
Bromus tectorum
Elymus elymoides
Elymus lanceolatus
Elymus smithii
Elymus spicatus
Elymus salinus
Elymus cinereus
Hordeum jubatum
Stipa hymenoides

WOODY SPECIES DENSITY:	1998 (no./ac)
Chrysothamnus nauseosus	48.38
Ribes aureum	1.27
Sambucus caerulea	1.27
Total	50.92

PRODUCTION:	1998 (lbs/ac)
Herbaceous	944.61
Woody	0.00
Total	944.61

NOTES:

1) Area and species diversity looked good. Similar species observed as noted last year.

2) Sample density and production estimates done previously are shown above.

3) There were very few woody species here.

4) By the way the map looked, we considered everything on the south side of road (left as you walk up) the Fan Road Slopes.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Refuse Pile & Berm

AREA: Deer Creek (1988 Reveg. Area)

DATE: September 27-30, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 27 deg.

EXPOSURE: NE 300 deg.

AREA: 4.0 acres

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible in most areas, but moderate in the areas with sparse vegetation.

COVER: (qualitative data only this year)

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Chrysothamnus viscidiflorus
Eriogonum corymbosum

Aster chilensis
Halogeton glomeratus
Machaeranthera canescens
Medicago sativa
Penstemon palmeri
Salsola pestifer

Agropyron cristatum
Bromus inermis
Elymus lanceolatus
Elymus smithii
Elymus spicatus
Elymus cinereus
Hordeum jubatum
Stipa hymenoides

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
Chrysothamnus nauseosus	1583.61		1481.29
Eriogonum corymbosum	1339.98		888.78
Total	2923.59		2370.07

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	323.84		499.31
Woody	278.53		254.80
Total	602.37		754.11

NOTES: 1) Qualitative sampling only was done this year. We did not sample for density and production in 1999, but previous data has been retained for observation (see above).

2) Like previous years, patchy areas of weeds and some of desirable species.

3) Area looked "good". Little or no change from last year.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Rock Slide and Berm

AREA: Deer Creek

DATE: September 27-30, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 53+ deg.

EXPOSURE: W

AREA: .5 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (Qualitative data only)

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Eriogonum corymbosum

Aster chilensis
Halogeton glomeratus
Malcomia africana

Agropyron cristatum
Elymus smithii
Elymus lanceolatus
Elymus cinereus
Elymus spicatus

WOODY SPECIES DENSITY:	1998 (no./ac)
Chrysothamnus nauseosus	59.57
Eriogonum corymbosum	297.86
Total	357.43

PRODUCTION:	1998 (lbs/ac)
Herbaceous	333.98
Woody	2.96
Total	336.94

NOTES: 1) Methods: Qualitative data only this year. We did not sample for density and production in 1999, but previous data has been retained for observation.

2) The vegetative cover is sparse where erosion repair work has been implemented.

3) The steep slide area appears to have constant erosion problems.

4) Berm has some severe erosion with bare soil and no vegetation, but other areas looked good.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Water Plant Slope

AREA: Deer Creek (1988 Reveg. Area)

DATE: September 27-30, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 38 deg.

EXPOSURE: NE, 320

ANIMAL USE/DISTURBANCE:

EROSION: Slight

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Chrysothamnus nauseosus
Eriogonum corymbosum

*Aster chilensis**
Machaeranthera canescens

Agropyron cristatum
Elymus cinereus
Elymus elymoides
Elymus lanceolatus
Elymus salinus
Elymus smithii
Elymus spicatus
Elymus hymenoides
Hordeum jubatum

WOODY SPECIES DENSITY:	1997	1998
	(no./ac)	
Amalanchier utahensis		13.99
Chrysothamnus nauseosus	414.71	517.66
Rosa woodsii	13.41	13.99
Eriogonum corymbosum	107.28	13.99
Total	3328.68	559.63

PRODUCTION:	1997	1998
	(lbs/ac)	
Herbaceous	372.38	623.42
Woody	47.56	101.01
Total	419.94	724.43

NOTES:

1) We sampled qualitatively this year, but retained data from previous years (shown above).

2) Some areas had a fair representation of woody species while other areas had more forbs and grasses.

3) There was some disturbance in the area that looked like it was being prepared for seeding.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Pipeline

AREA: Deer Creek (1986 Reveg. Area)

DATE: September 27-30, 1999

WORKERS: P. Collins

SLOPE: 5 - 30 deg.

EXPOSURE: Variable

AREA: 3.5 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (qualitative data only, est. at approx. 45% living cover)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Chrysothamnus nauseosus
Eriogonum corymbosum
Gutierrezia sarothrae
Juniperus osteosperma
Pinus edulis
Populus angustifolia
Salix sp.

Artemisia dracunculus
Aster chilensis
Aster foliaceous
Castilleja sp.
Grindelia squarrosa
Halogeton glomeratus
Kochia scoparia
Machaeranthera canescens
Malcomia africana
Medicago sativa
Melilotus officinalis
Penstemon palmeri
Salsola pestifer

Elymus cinereus
Bromus tectorum
Elymus lanceolatus
Elymus spicatus
Agropyron cristatum
Elymus hispidus
Bromus tectorum
Elymus cinereus
Stipa hymenoides
Hordeum jubatum

WOODY SPECIES DENSITY:	1997		1998
		(no./ac)	
Atriplex confertifolia			34.68
Brickellia microphylla	199.19		
Chrysothamnus nauseosus	1314.66		1317.66
Eriogonum corymbosum	318.71		34.68
Gutierrezia sarothrae	39.84		69.35
Juniperus osteosperma	119.51		
Pseudotsuga menziesii	39.84		34.68
Rhus trilobata	39.84		69.35
Total	2071.59		1803.10

PRODUCTION:	1997		1998
		(lbs/ac)	
Herbaceous	389.24		616.01
Woody	383.40		547.18
Total	772.64		1163.19

NOTES: 1) Qualitative sampling only was done this year. We did not sample for density and production in 1999, but previous data has been retained for observation (see above).

2) There were patchy areas of weeds when the pipeline went near the main road, probably due to road salt.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Deer Canyon

AREA: Deer Creek (1986 Reveg. Area)

DATE: September 27-30, 1999

WORKERS: P. Collins

SLOPE: 15-20 deg.

EXPOSURE: E

AREA: .1 acre

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (qualitative data only this year)

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Cercocarpus ledifolius

Aster chilensis
Cirsium sp.
Machaeranthera canescens

Agropyron cristatum
Dactylis glomeratus
Elymus spicatus
Elymus lanceolatus
Elymus cinereus
Elymus salinus
Elymus smithii
Poa pratensis

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
Chrysothamnus nauseosus	2684.28		2199.59
Rosa woodsii			95.63
Eriogonum corymbosum	116.71		
Total	2800.99		2295.22

PRODUCTION:	1997	(lbs/ac)	1998
Herbaceous	520.82		535.83
Woody	146.64		209.31
Total	667.46		747.13

NOTES: 1) Qualitative sampling only was done this year. We did not sample for density and production in 1999, but previous data has been retained for observation (see above).

2) Site looked excellent.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Reference Area (Atriplex)

AREA: Deer Creek Waste Rock

DATE: September 23-27

WORKERS: P. Collins

SLOPE: 10-20 deg

EXPOSURE: v

ANIMAL USE/DISTURBANCE: M

EROSION: N

COVER: (qualitative data only)

DOMINANT PLANT SPECIES OBSERVED:

*Atriplex gardneri**
Atriplex confertifolia
Chrysothamnus nauseosus
Artemisia nova
Eriogonum corymbosum

Halogeton glomeratus

Stipa hymenoides

NOTES: 1) Qualitative sampling this year.

2) After revisited another map later, I discovered I may have been about 200 ft or so west of where the reference area was originally marked. However, this would make no difference in the qualitative notes above.

3) Drainages had more grass and black sagebrush.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Access Road Slopes

AREA: Deer Creek Waste Rock Site (1989 Interim Reveg. Area)

DATE: August 23-27, 1999

WORKERS: P. Collins

SLOPE: 20 - 25 deg.

EXPOSURE: Variable

AREA: Part of 5 acres

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Cut slopes has moderate erosion and sparse vegetation. There was much denser cover and woody species on the fill slopes with much less erosion.

COVER: (no quantitative data recorded this year)

DOMINANT PLANT SPECIES OBSERVED:

Fill Slopes

Artemisia nova
Artemisia tridentata
Atriplex confertifolia
Atriplex canescens
Atriplex gardneri
Ceratoides lanata
Chrysothamnus nauseosus
Eriogonum corymbosum
Juniperus osteosperma
Sarcobatus vermiculatus

Penstemon palmeri

Elymus cinereus
Elymus lanceolatus
Elymus spicatus
Sporobolus airoides
Stipa hymenoides

Cut Slopes

Atriplex canescens
Atriplex confertifolia
Atriplex gardneri
Chrysothamnus nauseosus
Eriogonum corymbosum

Eriogonum subreniforme
Halogeton glomeratus
Salsola pestifer

Elymus lanceolatus

WOODY SPECIES DENSITY:	1998 (no./ac)
Artemisia tridentata	66.30
Atriplex confertifolia	397.79
Atriplex gardneri	530.38
Ceratoides lanata	331.49
Chrysothamnus nauseosus	1723.75
Eriogonum corymbosum	66.30
Sarcobatus vermiculatus	66.30
Total	3182.31

PRODUCTION:	1998 (lbs/ac)
Herbaceous	191.03
Woody	517.05
Total	708.08

NOTES: 1) Qualitative sampling only was done this year. We did not sample for density and production in 1999, but previous data has been retained for observation (see above).

2) The cut slopes had about 50:50 weeds to desirable species.

3) The fill slope had >90% desirable species.

4) Therefore, the fill slopes looked much better than the cut slopes (from a vegetation stand point). Or, the fill slopes looked "good", whereas, the cut slope looked "poor".

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Phase I Berm

AREA: Deer Creek Waste Rock Site (1989 Final Reveg. Area)

DATE: August 23-27, 1999

WORKERS: P. Collins

SLOPE: 0-29 deg.

EXPOSURE: Variable

AREA: 4 Acres

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (No quantitative data this year)

DOMINANT PLANT SPECIES OBSERVED: (see quantitative data)
Atriplex gardneri
Atriplex canescens
Ceratoides lanata
Chrysothamnus viscidiflorus
Chrysothamnus nauseosus
Sarcobatus vermiculatus

Halogeton glomeratus
Kochia scoparia
Machaeranthera canescens
Malcomia africana
Penstemon palmeri
Salsola pestifer

Agropyron cristatum
Elymus cinereus
Elymus lanceolatus
Elymus salinus
Hordeum jubatum
Poa secunda
Stipa hymenoides

WOODY SPECIES DENSITY:	1998 (no./ac)
Artemisia tridentata	538.29
Atriplex gardneri	942.01
Atriplex canescens	201.86
Chrysothamnus nauseosus	1413.01
Sarcobatus vermiculatus	134.57
Total	3229.74

PRODUCTION:	1998 (lbs/ac)
Herbaceous	519.62
Woody	278.14
Total	797.76

NOTES: 1) Qualitative sampling only was done this year. We did not sample for density and production in 1999, but previous data has been retained for observation (see above).

2) Shrub and grass establishment is improving

3) Continues to be large patches of areas dominated by weeds. About 30% of the cover was "desirable" spp. and 70% of poor cover and weedy species.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Drain Field (Reconstruction `97)

AREA: Deer Creek

DATE: September 27-30, 1999

WORKERS: P. Collins

SLOPE: 2 - 3 deg.

EXPOSURE: N

ANIMAL USE/DISTURBANCE: The was a hole in the area that could be dangerous to wildlife.

EROSION: Negligible

COVER: (est. 20-75% depending on the area)

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus

Grindelia squarrosa
Aster chilensis
Melilotus officinalis
Salsola pestifer
Artemisia dracunculus
Xanthium pennsylvanica
Malcomia africana
Cirsium sp.
Penstemon palmeri
Astragalus cicer

Stipa hymenoides
Elymus cinereus
Elymus lanceolatus
Elymus spicatus

NOTES:
1) Qualitative sampling this year.
2) This is the first time we have visited this site. To locate it, it is 0.5 miles south of northern riparian area.
3) Site generally looked "good" with approx. 25% weeds.
4) There were some patchy "weedy" areas and patchy "desirable" species areas.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Phase I Diversion

AREA: Deer Creek Waste Rock Site (1989 Final Reveg. Area)

DATE: August 23-27, 1999

WORKERS: P. Collins

SLOPE: 5 deg.

EXPOSURE: Variable

AREA: 4 acres

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Negligible

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex gardneri
Atriplex confertifolia
Artemisia tridentata
Gutierrezia sarothrae
Sarcobatus vermiculatus

Penstemon palmeri

Agropyron cristatum
Sporobolus airoides
Elymus lanceolatus
Elymus cinereus
Stipa hymenoides

WOODY SPECIES DENSITY:

DENSITY	1998	1999
Individuals/Acre	1572.58	1825.22

BIOMASS PRODUCTION:

POUNDS/ACRE

PRODUCTION	1998	1999
Herbaceous	182.45	355.70
Woody	185.52	165.60
Total	367.96	501.30

NOTES:

1) Site looks better overall.

2) Used random numbers to sample berms.

3) Sampled cover and frequency by ocular methods.

4) Sampled density using the point quarter method.

5) Sampled productivity by clipping, weighing and double sampling.

ENERGY WEST-DEER CREEK
Phase I Diversion
Waste Rock Site
1989 Final Reveg
Acreage: Part of 5 acres
Slope: 5 deg
Exposure: variable

Sample Date: 23-27 Aug 99	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00
SHRUBS									
Artemisia tridentata	0.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00
Atriplex confertifolia	0.00	0.00	0.00	0.00	7.00	0.00	0.00	0.00	0.00
Atriplex gardneri	0.00	0.00	0.00	25.00	8.00	5.00	0.00	0.00	0.00
Chrysothamnus nauseosus (C)	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FORBS									
Machaeranthera canescens	5.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
Penstemon palmeri	5.00	5.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
GRASSES									
Elymus cinereus	0.00	0.00	15.00	0.00	0.00	0.00	0.00	10.00	0.00
Elymus lanceolatus	0.00	15.00	10.00	5.00	5.00	0.00	5.00	45.00	50.00
Elymus salinus	0.00	0.00	0.00	20.00	0.00	20.00	0.00	0.00	0.00
Elymus smithii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
Elymus spicatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poa secunda	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sporobolus airoides	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stipa hymenoides	0.00	0.00	0.00	0.00	10.00	10.00	0.00	0.00	0.00
COVER									
Total Living Cover	45.00	20.00	40.00	50.00	40.00	35.00	5.00	60.00	50.00
Litter	5.00	5.00	5.00	10.00	5.00	5.00	5.00	5.00	5.00
Bareground	45.00	55.00	45.00	35.00	45.00	55.00	60.00	30.00	40.00
Rock	5.00	20.00	10.00	5.00	10.00	5.00	30.00	5.00	5.00
% COMPOSITION									
Shrubs	22.22	0.00	37.50	50.00	37.50	14.29	0.00	0.00	0.00
Forbs	22.22	25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00
Grasses	55.56	75.00	62.50	50.00	37.50	85.71	100.00	100.00	100.00

ENERGY WEST-DEER CREEK
Phase I Diversion
Waste Rock Site
1989 Final Reveg
Acreage: Part of 5 acres
Slope: 5 deg
Exposure: variable
Sample Date: 23-27 Aug 99

10.00	11.00	12.00	Mean	SDev	Freq	
						SHRUBS
0.00	0.00	0.00	1.25	4.15	8.33	*Artemisia tridentata*
0.00	0.00	0.00	0.58	1.93	8.33	*Atriplex confertifolia*
0.00	30.00	0.00	5.67	10.12	33.33	*Atriplex gardneri*
0.00	0.00	0.00	0.83	2.76	8.33	*Chrysothamnus nauseosus (C)*
						FORBS
0.00	0.00	0.00	0.83	1.86	16.67	*Machaeranthera canescens*
0.00	0.00	0.00	1.25	2.17	25.00	*Penstemon palmeri*
						GRASSES
0.00	0.00	20.00	3.75	6.81	25.00	*Elymus cinereus*
0.00	25.00	10.00	14.17	16.44	75.00	*Elymus lanceolatus*
0.00	0.00	0.00	3.33	7.45	16.67	*Elymus salinus*
0.00	0.00	0.00	0.45	1.44	8.33	*Elymus smithii*
30.00	10.00	0.00	3.33	8.50	16.67	*Elymus spicatus*
0.00	0.00	0.00	0.42	1.38	8.33	*Poa secunda*
0.00	0.00	0.00	1.67	5.53	8.33	*Sporobolus airoides*
0.00	0.00	20.00	3.33	6.24	25.00	*Stipa hymenoides*
						COVER
30.00	65.00	50.00	40.83	16.05		Total Living Cover
4.00	4.00	5.00	5.25	1.48		Litter
65.00	30.00	40.00	45.42	10.89		Bareground
1.00	1.00	5.00	8.50	8.09		Rock
						% COMPOSITION
0.00	46.15	0.00	17.31	19.47		Shrubs
0.00	0.00	0.00	6.02	10.44		Forbs
100.00	53.85	100.00	76.68	22.77		Grasses

COLOR PHOTOGRAPHS

Deer Creek Mine - Roadside Areas

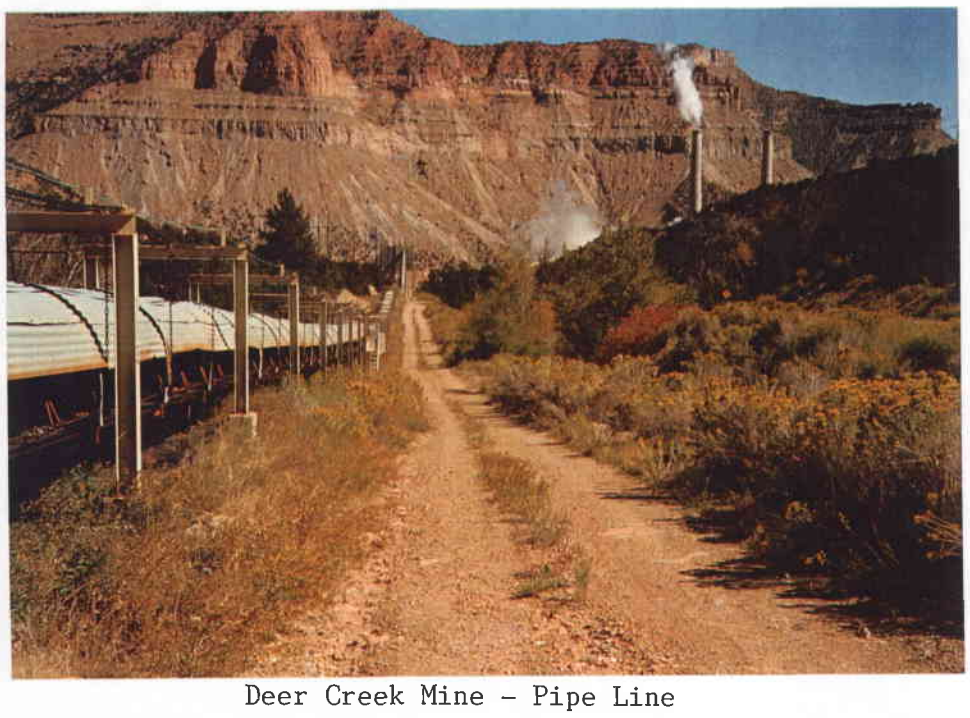
Deer Creek Mine - Gate Areas Slope

Deer Creek Mine - Fan Road Slope

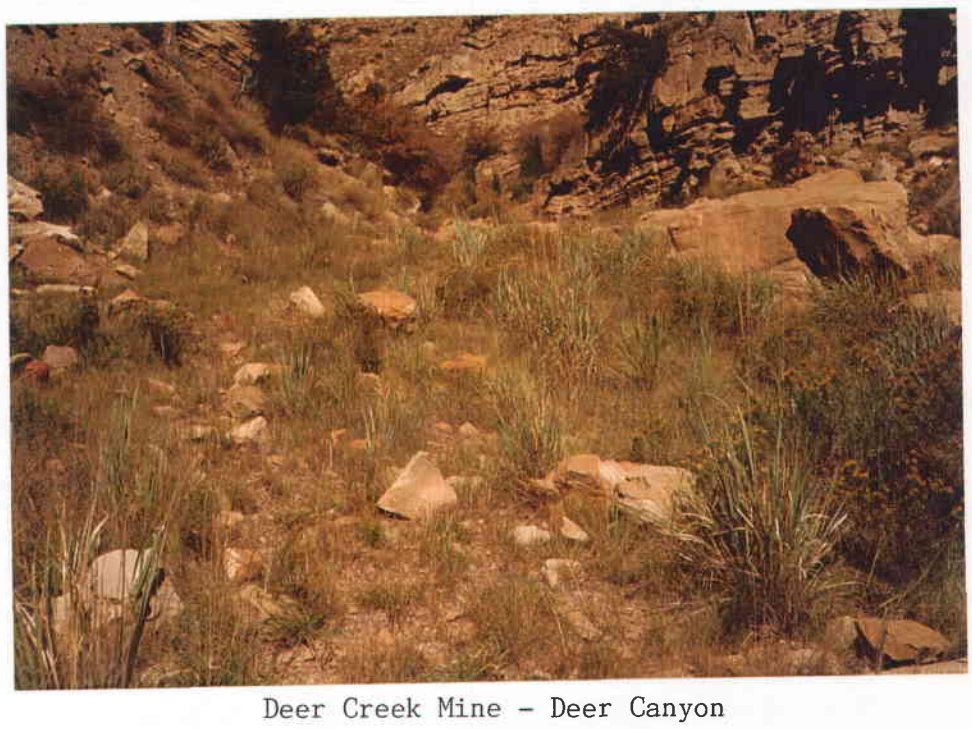
Deer Creek Mine - Refuse Pile and Berm

Deer Creek Mine - Rockslide and Berm

Deer Creek Mine - Water Plant Slope



Deer Creek Mine - Pipe Line



Deer Creek Mine - Deer Canyon

Deer Creek Mine - Riparian Reference Area

Deer Creek Mine - Mixed Conifer Reference Area

Deer Creek Mine - Pinyon Juniper Reference Area

Deer Creek Mine - C2 Conveyor (IU 132-190) '93

Deer Creek Mine - Riparian Areas (South)

Deer Creek Mine - Riparian Areas (North)

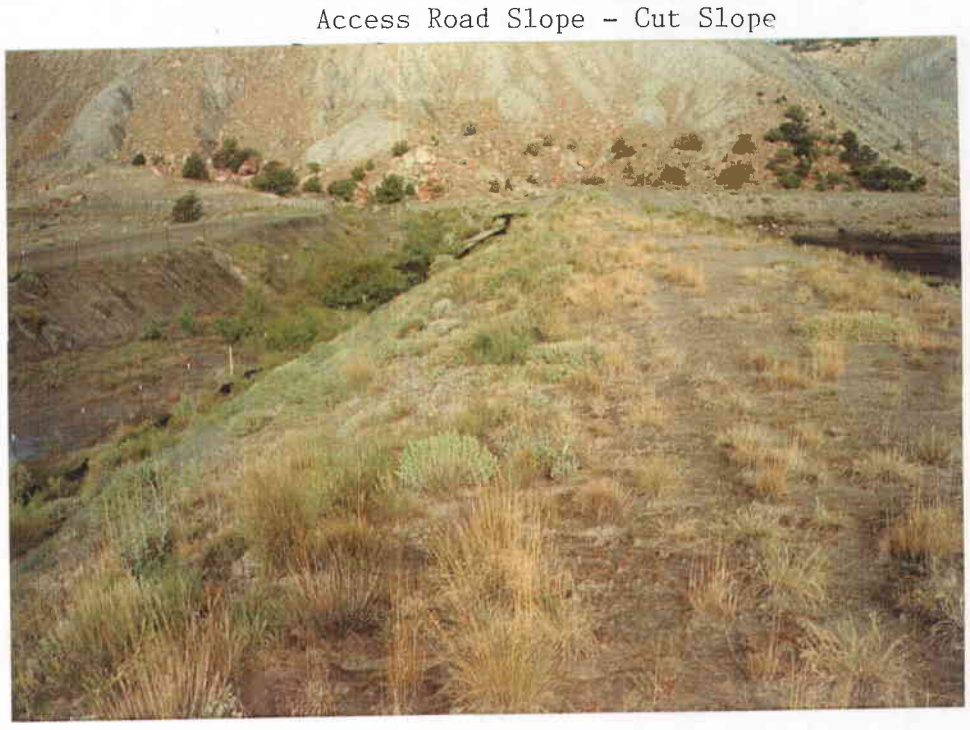
Deer Creek Mine- Sediment Pond Dam

Deer Creek Mine - Temp. Sediment Basin

Deer Creek Mine - Waste Rock
Reference Area

Deer Creek Mine - Waste Rock
Access Road Slope - Cut Slope

Deer Creek Mine - Waste Rock
Access Road Slopes - Fill Slopes



Deer Creek - Waste Rock
Phase I Berm

Deer Creek Mine - Waste Rock
Drain Field '97

Deer Creek Mine - Phase I Diversion '89

PULL

TRAIL MOUNTAIN MINE AREA

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Reference Area (Grassland/Shrub)

AREA: Trail Mountain Mine Area

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

EXPOSURE: W

ANIMAL USE/DISTURBANCE: Yes, normal use.

EROSION: Negligible

COVER: (No quantitative data recorded this year)

DOMINANT PLANT SPECIES OBSERVED:

Amalanchier utahensis
Artemisia tridentata
Chrysothamnus nauseosus
Purshia tridentata

Achillea millefolium
Aster foliaceus
Astragalus spp.
Linum lewisii
Penstemon spp.
Lomatium nuttallii

Elymus salinus
Stipa hymenoides

NOTES:

1) This is the first time I've visited this area for many years. I did the original work for Trail Mountain Mine in 1983 (report date December 1983). Energy West had revised one of my old maps for their reports.

2) I believe the Reference Area was just below the outcrops and above Sediment Pond Outslopes (see photograph).

3) Recorded qualitative data only.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Sediment Pond Outslope

AREA: Trail Mountain Mine Area

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 25 deg.

EXPOSURE: E&S

ANIMAL USE/DISTURBANCE: Slight

EROSION: Slight

COVER: (no quantitative data recorded this year)

DOMINANT PLANT SPECIES OBSERVED:

Atriplex confertifolia
Artemisia tridentata
Chrysothamnus nauseosus

Aster foliaceus

Agropyron cristatum
Elymus cinereus
Elymus junceus
Elymus lanceolatus

WOODY SPECIES DENSITY:	1998 (no./ac)
Artemisia tridentata	58.08
Atriplex confertifolia	58.08
Chrysothamnus nauseosus	116.12
Total	232.32

NOTES:
1) Qualitative sampling only was done this year. We did not sample for density in 1999, but previous data has been retained for observation (see above).
2) East slope (north half) was mostly weedy species (Hagl).
3) East slope (south half) was mostly desirable species.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Parking Lot Extension (`96)

AREA: Trail Mountain Mine Area

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 20 deg.

EXPOSURE: NW

ANIMAL USE/DISTURBANCE: Negligible

EROSION: Slight

COVER: (no quantitative data recorded this year)

DOMINANT PLANT SPECIES OBSERVED:

Aster foliaceus

*Elymus cinereus**
Elymus smithii
Elymus lanceolatus

* dominant species

WOODY SPECIES DENSITY:	1998 (no./ac)
(No species in belts)	0.00
Total	0.00

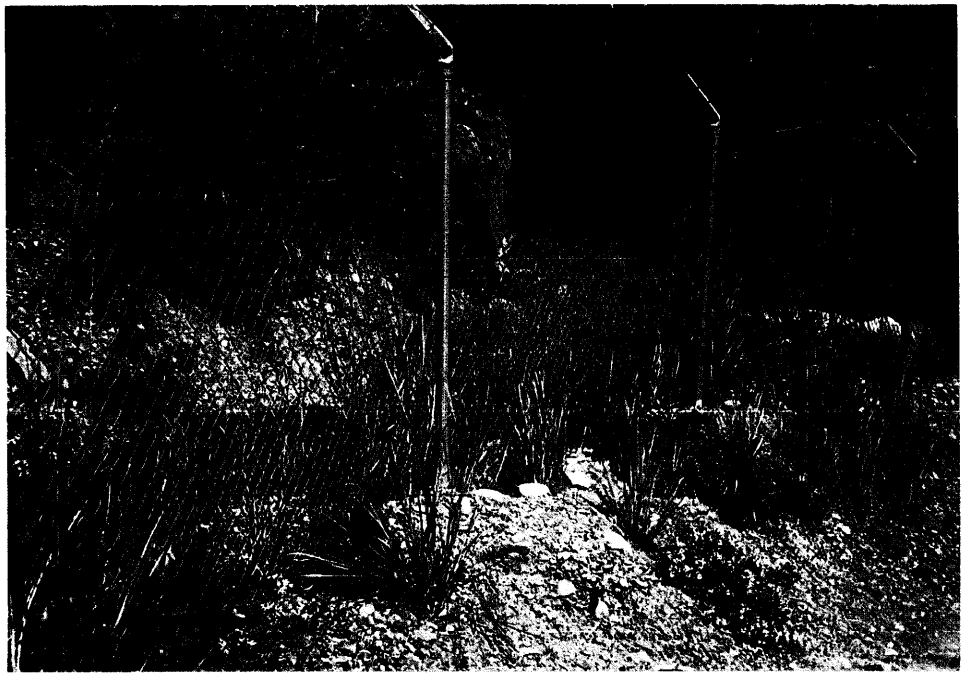
NOTES:
1) Qualitative sampling only was done this year. We did not sample for density in 1999, but previous data has been retained for observation (see above).

2) Silt fences remain in good condition.

COLOR
PHOTOGRAPHS

Trail Mountain Mine - Reference Area

Trail Mountain Mine - Trail Sed. Pond Outslope '93



Trail Mountain Mine - Trail Mtn. Parking Ext. '96

COTTONWOOD CANYON AREA

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Reclaimed Slope (old,`81)

AREA: Cottonwood Fan Portal Area

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 35 deg.

EXPOSURE: W

ANIMAL USE/DISTURBANCE: Slight to moderate

EROSION: Slight, natural patterns.

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex canescens
Atriplex confertifolia
Chrysothamnus nauseosus

Aster foliaceous

Agropyron cristatum
Elymus lanceolatus
Elymus salinus
Elymus junceus
Elymus cinereus

NOTES: 1) Area continues to look excellent.

2) Took cover measurement using transect lines (n=20).

ENERGY WEST - COTTONWOOD FAN PORTAL
Reclaimed Slope
Exposure: W
Slope: 35 deg.

Sample Date: 20-24 Sept 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Artemisia tridentata	0.00	5.00	5.00	50.00	5.00	15.00
Atriplex canescens	30.00	0.00	0.00	0.00	0.00	15.00
Chrysothamnus nauseosus	0.00	10.00	5.00	0.00	0.00	0.00
FORBS						
Aster foliaceus	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES						
Agropyron cristatum	0.00	0.00	0.00	0.00	10.00	0.00
Elymus cinereus	20.00	20.00	35.00	20.00	30.00	10.00
Elymus smithii	0.00	0.00	0.00	0.00	0.00	0.00
Elymus spicatus	0.00	0.00	0.00	0.00	0.00	10.00
COVER						
Total Living Cover	50.00	35.00	45.00	70.00	45.00	50.00
Litter	5.00	5.00	5.00	10.00	10.00	20.00
Bareground	10.00	5.00	5.00	5.00	10.00	5.00
Rock	35.00	55.00	45.00	15.00	35.00	25.00
% COMPOSITION						
Shrubs	60.00	42.86	22.22	71.43	11.11	60.00
Forbs	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	40.00	57.14	77.78	28.57	88.89	40.00

7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
20.00	0.00	0.00	0.00	5.00	5.00	0.00	10.00	0.00
0.00	0.00	0.00	50.00	0.00	15.00	0.00	0.00	20.00
0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00
0.00	40.00	20.00	0.00	0.00	0.00	30.00	15.00	0.00
5.00	0.00	0.00	0.00	5.00	20.00	0.00	10.00	25.00
0.00	10.00	8.00	15.00	20.00	10.00	0.00	20.00	0.00
0.00	10.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	60.00	35.00	65.00	30.00	50.00	45.00	55.00	45.00
10.00	5.00	15.00	10.00	10.00	10.00	5.00	5.00	5.00
10.00	10.00	5.00	5.00	10.00	10.00	5.00	5.00	15.00
55.00	25.00	45.00	20.00	50.00	30.00	45.00	35.00	35.00
80.00	0.00	0.00	76.92	16.67	40.00	33.33	18.18	44.44
0.00	66.67	57.14	0.00	0.00	0.00	66.67	27.27	0.00
20.00	33.33	42.86	23.08	83.33	60.00	0.00	54.55	55.56

16.00	17.00	18.00	19.00	20.00	Mean	SDev	Freq
40.00	0.00	0.00	0.00	5.00	8.25	13.44	55.00
0.00	5.00	0.00	20.00	0.00	7.75	13.18	35.00
0.00	0.00	0.00	0.00	0.00	1.50	3.91	15.00
10.00	0.00	0.00	0.00	25.00	7.00	11.98	30.00
5.00	0.00	0.00	0.00	0.00	4.00	7.00	35.00
0.00	10.00	40.00	20.00	20.00	15.40	11.11	80.00
0.00	0.00	0.00	0.00	0.00	0.85	2.59	10.00
0.00	25.00	0.00	0.00	0.00	1.75	5.76	10.00
55.00	40.00	40.00	40.00	50.00	46.50	10.97	
5.00	10.00	10.00	10.00	5.00	8.50	3.91	
10.00	5.00	5.00	5.00	5.00	7.25	2.95	
30.00	45.00	45.00	45.00	40.00	37.75	10.89	
72.73	12.50	0.00	50.00	10.00	36.12	26.76	
18.18	0.00	0.00	0.00	50.00	14.30	24.13	
9.09	87.50	100.00	50.00	40.00	49.58	26.82	

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Soil Piles

AREA: Cottonwood Fan Portal Area

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 35 deg.

EXPOSURE: Variable

ANIMAL USE/DISTURBANCE:

EROSION: Slight

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Atriplex canescens
Atriplex confertifolia
Brickellia scabra
Chrysothamnus nauseosus
Eriogonum corymbosum

Aster foliaceous
Astragalus chilensis
Linum lewisii
Kochia scoparia
Melilotus officinalis
Malcomia africana
Cirsium sp.

Agropyron cristatum
Elymus cinereus
Elymus lanceolatus
Elymus smithii
Elymus elymoides
Elymus junceus

NOTES:

1) Recorded cover this year.

2) Subsoil Pile - Quadrats 1-9 were in the more bare areas that looked liked it had not been seeded. Erosion was common here. Quadrats 10-14 were in the more vegetated area of the Subsoil Pile. This vegetation was more mature (older) and established. Negligible erosion was noted here (see photographs).

3) Topsoil Pile - Quadrats 15-20 were located here. Vegetation looked excellent this year. All data were combined to show the mean cover.

ENERGY WEST - COTTONWOOD FAN PORTAL
Soil Piles
Exposure: Variable
Slope: 35 deg.
Sample Date: 20-24 Sept 99

1 thru 9 Subsoil (Bare)

	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Artemisia tridentata	0.00	0.00	0.00	0.00	0.00	0.00
Atriplex confertifolia	0.00	0.00	0.00	0.00	0.00	0.00
Chrysothamnus nauseosus	0.00	0.00	0.00	0.00	0.00	0.00
FORBS						
Aster foliaceus	5.00	0.00	0.00	0.00	0.00	0.00
Cirsium sp.	0.00	0.00	0.00	0.00	0.00	0.00
Halogeton glomeratus	5.00	0.00	0.00	0.00	0.00	0.00
Kochia scoparia	0.00	0.00	10.00	5.00	0.00	0.00
Linum lewisii	0.00	3.00	0.00	0.00	0.00	0.00
Malcomia africana	0.00	0.00	0.00	0.00	0.00	0.00
Melilotus officinalis	0.00	0.00	0.00	0.00	5.00	0.00
GRASSES						
Agropyron cristatum	0.00	0.00	0.00	0.00	0.00	0.00
Elymus cinereus	0.00	0.00	0.00	0.00	0.00	0.00
Elymus junceus	0.00	0.00	0.00	0.00	0.00	0.00
Elymus lanceolatus	0.00	0.00	0.00	0.00	0.00	0.00
Elymus smithii	0.00	2.00	0.00	0.00	5.00	10.00
COVER						
Total Living Cover	10.00	5.00	10.00	5.00	10.00	10.00
Litter	5.00	3.00	5.00	5.00	3.00	5.00
Bareground	60.00	85.00	65.00	75.00	75.00	60.00
Rock	25.00	7.00	20.00	15.00	12.00	25.00
% COMPOSITION						
Shrubs	0.00	0.00	0.00	0.00	0.00	0.00
Forbs	100.00	60.00	100.00	100.00	50.00	0.00
Grasses	0.00	40.00	0.00	0.00	50.00	100.00

7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	15.00	15.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	30.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	10.00	0.00	35.00	50.00	0.00	45.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00
0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00
0.00	15.00	0.00	10.00	15.00	0.00	0.00	0.00	0.00
15.00	15.00	10.00	50.00	40.00	35.00	50.00	45.00	65.00
5.00	5.00	5.00	10.00	10.00	5.00	5.00	25.00	5.00
65.00	65.00	65.00	25.00	30.00	25.00	5.00	5.00	10.00
15.00	15.00	20.00	15.00	20.00	35.00	40.00	25.00	20.00
0.00	0.00	0.00	50.00	50.00	0.00	0.00	66.67	0.00
100.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	30.77
0.00	100.00	0.00	50.00	50.00	100.00	100.00	33.33	69.23

16.00	17.00	18.00	19.00	20.00	Mean	SDev	Freq
0.00	25.00	0.00	0.00	5.00	2.00	5.79	15.00
0.00	0.00	0.00	0.00	0.00	1.50	4.50	10.00
0.00	0.00	0.00	0.00	0.00	1.75	6.57	10.00
60.00	10.00	10.00	0.00	0.00	5.00	13.32	25.00
0.00	0.00	0.00	0.00	5.00	0.25	1.09	5.00
0.00	0.00	0.00	0.00	0.00	0.25	1.09	5.00
0.00	0.00	0.00	0.00	0.00	1.75	3.96	20.00
0.00	0.00	0.00	0.00	0.00	0.15	0.65	5.00
0.00	0.00	0.00	0.00	0.00	0.50	1.50	10.00
0.00	0.00	0.00	0.00	0.00	0.25	1.09	5.00
0.00	0.00	0.00	10.00	0.00	0.75	2.38	10.00
10.00	25.00	20.00	45.00	5.00	12.25	17.35	45.00
0.00	0.00	15.00	0.00	0.00	1.50	4.50	10.00
0.00	0.00	0.00	0.00	0.00	0.25	1.09	5.00
0.00	0.00	0.00	0.00	0.00	2.85	5.08	30.00
70.00	60.00	45.00	55.00	15.00	31.00	21.94	
5.00	25.00	10.00	10.00	10.00	8.05	6.11	
5.00	5.00	5.00	10.00	50.00	39.50	28.59	
20.00	10.00	40.00	25.00	25.00	21.45	8.78	
0.00	41.67	0.00	0.00	33.33	12.08	21.65	
85.71	16.67	22.22	0.00	33.33	39.94	41.46	
14.29	41.67	77.78	100.00	33.33	47.98	37.46	

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Reference Area

AREA: Cottonwood Fan Portal Area

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 33 deg.

EXPOSURE: W

ANIMAL USE/DISTURBANCE: Slight to moderate

EROSION: Slight, natural patterns.

COVER: (qualitative data only)

DOMINANT PLANT SPECIES OBSERVED:

Amalanchier utahensis
Atriplex confertifolia
Chrysothamnus nauseosus
Ephedra viridis
Juniperus osteosperma
Mahonia repens
Pinus edulis

Cryptantha sp.
Galium bifolium
Stanleya pinnata
Machaeranthera canescens

Elymus salinus
Stipa hymenoides

NOTES: 1) Recorded cover (n=20).

2) Reference Area continues to look excellent.

3) There was some disturbance in the area. Some Douglas Fir trees has fallen possibly pushed over by fallen rocks??

ENERGY WEST - COTTONWOOD FAN PORTAL
Reference Area
Exposure: West
Slope: 33 deg.

Sample Date: 20-24 Sept 99	1.00	2.00	3.00	4.00	5.00	6.00
OVERSTORY						
Pinus edulis	0.00	0.00	0.00	30.00	5.00	0.00
UNDERSTORY						
SHRUBS						
Chrysothamnus nauseosus	0.00	0.00	0.00	0.00	0.00	0.00
Ephedra viridis	0.00	0.00	30.00	0.00	0.00	0.00
Eriogonum corymbosum	0.00	0.00	0.00	0.00	0.00	0.00
Pinus edulis	0.00	0.00	0.00	5.00	5.00	10.00
FORBS						
Cryptantha flava	0.00	5.00	0.00	0.00	5.00	0.00
Stanleya pinnata	0.00	0.00	0.00	0.00	0.00	10.00
GRASSES						
Elymus salinus	35.00	20.00	0.00	10.00	10.00	10.00
Stipa hymenoides	0.00	0.00	0.00	0.00	5.00	0.00
COVER						
Overstory	0.00	0.00	0.00	30.00	5.00	0.00
Understory	35.00	25.00	30.00	15.00	25.00	30.00
Litter	10.00	10.00	5.00	20.00	45.00	10.00
Bareground	10.00	20.00	10.00	5.00	5.00	30.00
Rock	45.00	45.00	55.00	60.00	25.00	30.00
% COMPOSITION						
Shrubs	0.00	0.00	100.00	33.33	20.00	33.33
Forbs	0.00	20.00	0.00	0.00	20.00	33.33
Grasses	100.00	80.00	0.00	66.67	60.00	33.33

7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00
0.00	0.00	0.00	0.00	35.00	0.00	0.00	0.00	0.00
0.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	25.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40.00	30.00	20.00	25.00	5.00	25.00	30.00	20.00	30.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00
0.00	0.00	0.00	0.00	35.00	0.00	0.00	0.00	0.00
40.00	35.00	35.00	25.00	5.00	35.00	30.00	45.00	40.00
45.00	20.00	5.00	5.00	5.00	10.00	25.00	5.00	10.00
5.00	35.00	15.00	5.00	5.00	5.00	5.00	5.00	5.00
10.00	10.00	45.00	65.00	85.00	50.00	40.00	45.00	45.00
0.00	14.29	42.86	0.00	0.00	28.57	0.00	55.56	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	85.71	57.14	100.00	100.00	71.43	100.00	44.44	100.00

16.00	17.00	18.00	19.00	20.00	Mean	SDev	Freq
20.00	0.00	0.00	0.00	0.00	4.50	10.36	20.00
0.00	0.00	0.00	0.00	5.00	1.00	3.39	10.00
0.00	0.00	0.00	5.00	5.00	3.50	8.23	25.00
0.00	0.00	30.00	0.00	0.00	1.50	6.54	5.00
0.00	0.00	0.00	5.00	0.00	1.75	3.27	25.00
0.00	5.00	0.00	0.00	0.00	0.75	1.79	15.00
0.00	0.00	0.00	0.00	0.00	0.50	2.18	5.00
25.00	25.00	0.00	25.00	25.00	20.50	10.94	90.00
0.00	0.00	0.00	5.00	0.00	1.00	2.55	15.00

20.00	0.00	0.00	0.00	0.00	4.50	10.36
25.00	30.00	30.00	40.00	35.00	30.50	8.93
25.00	45.00	25.00	5.00	5.00	16.75	13.81
5.00	5.00	5.00	10.00	10.00	10.00	8.51
45.00	20.00	40.00	45.00	50.00	42.75	17.35
0.00	0.00	100.00	25.00	28.57	24.08	30.34
0.00	16.67	0.00	0.00	0.00	4.50	9.44
100.00	83.33	0.00	75.00	71.43	71.42	30.73

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: CFP Tube Conveyor Area (1996 Seeding)

AREA: Trail Mtn. Mine/Cottonwood Fan Portal Area

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 28 deg.

EXPOSURE: W, N, S.

ANIMAL USE/DISTURBANCE: None

EROSION: Negligible. Rocks in area seem to be greatly enhancing erosion control.

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Aster foliaceus
Hedysarum boreale
Salsola pestifer
Melilotus officinalis

Elymus spicatus
Elymus lanceolatus
Elymus cinereus
Elymus smithii
Stipa hymenoides

WOODY SPECIES DENSITY:	1998 (no./ac)
Atriplex gardneri	217.80
Artemisia tridentata	43.56
Total	261.36

NOTES:

1) We sampled randomly over area for cover (n=10).

2) We did not sample woody species density this year, but I left the previous years' data for observation.

3) This year the area was represented mostly by a few grasses and yellow sweetclover.

4) In 1997 the area was dominated by yellow sweetclover, whereas 1998 we didn't see much of it. As stated above there was a lot in 1999.

ENERGY WEST - COTTONWOOD FAN PORTAL
CFP Tube Conveyor (Reseed 1996)
Exposure: W,N,S
Slope: 28 deg.

Sample Date: 20-24 Sept 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
FORBS						
Aster foliaceus	5.00	0.00	0.00	0.00	5.00	5.00
Melilotus officinalis	55.00	35.00	35.00	10.00	15.00	5.00
Salsola pestifer	0.00	0.00	0.00	0.00	0.00	5.00
GRASSES						
Elymus cinereus	0.00	5.00	0.00	0.00	0.00	0.00
Elymus spicatus	0.00	0.00	10.00	0.00	0.00	0.00
Elymus lanceolatus	0.00	0.00	0.00	0.00	0.00	0.00
Elymus smithii	0.00	0.00	0.00	25.00	10.00	20.00
Stipa hymenoides	5.00	0.00	0.00	0.00	5.00	0.00
COVER						
Total Living Cover	65.00	40.00	45.00	35.00	35.00	35.00
Litter	5.00	5.00	5.00	5.00	5.00	5.00
Bareground	20.00	30.00	25.00	40.00	45.00	40.00
Rock	10.00	25.00	25.00	20.00	15.00	20.00
% COMPOSITION						
Shrubs	0.00	0.00	0.00	0.00	0.00	0.00
Forbs	92.31	87.50	77.78	28.57	57.14	42.86
Grasses	7.69	12.50	22.22	71.43	42.86	57.14

ENERGY W
CFP Tube C
Exposure:
Slope: 28 de

7.00	8.00	9.00	10.00	Mean	SDev	Freq		Sample Date
								SHRUBS
								FORBS
0.00	0.00	0.00	0.00	1.50	2.29	30.00		*Aster foliace*
40.00	35.00	10.00	0.00	24.00	17.29	90.00		*Melilotus offi*
15.00	0.00	0.00	45.00	6.50	13.61	30.00		*Salsola pesti*
								GRASSES
0.00	5.00	0.00	0.00	1.00	2.00	20.00		*Elymus ciner*
0.00	0.00	0.00	0.00	1.00	3.00	10.00		*Elymus spic*
0.00	5.00	0.00	0.00	0.50	1.50	10.00		*Elymus lanc*
0.00	5.00	45.00	5.00	11.00	14.11	60.00		*Elymus smit*
0.00	0.00	10.00	0.00	2.00	3.32	30.00		*Stipa hymen*
								COVER
55.00	50.00	65.00	50.00	47.50	11.01			Total Living
5.00	10.00	15.00	5.00	6.50	3.20			Litter
15.00	30.00	10.00	25.00	28.00	10.77			Bareground
25.00	10.00	10.00	20.00	18.00	6.00			Rock
								% COMPOS
0.00	0.00	0.00	0.00	0.00	0.00			Shrubs
100.00	70.00	15.38	90.00	66.15	27.60			Forbs
0.00	30.00	84.62	10.00	33.85	27.60			Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Belt Portal (`96)

AREA: Cottonwood Fan Portal Area

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: Variable deg.

EXPOSURE: SSW

ANIMAL USE/DISTURBANCE: Slight

EROSION: Slight

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Artemisia tridentata
Chrysothamnus nauseosus
Rosa woodsii

Elymus cinereus
Elymus salinus

WOODY SPECIES DENSITY:	1998 (no./ac)
Artemisia tridentata	217.80
Brickelia microphylla	43.56
Chrysothamnus nauseosus	740.52
Mahonia repens	130.68
Rosa woodsii	43.56
Total	1172.12

NOTES:
1) Methods: Random number for quadrat placement.
2) We did not sample for density in 1999, but previous data has been retained for observation (see above).
3) Site looked very good this year.
4) Lots of boulders.

ENERGY WEST - COTTONWOOD FAN PORTAL
Belt Portal 1996
Exposure: S,S,W
Slope: Variable
Sample Date: 20-24 Sept 99

	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
Artemisia tridentata	0.00	0.00	15.00	0.00	0.00	0.00
FORBS						
Aster foliaceus	15.00	0.00	0.00	0.00	0.00	0.00
Machaeranthera canescens	0.00	0.00	0.00	0.00	0.00	0.00
GRASSES						
Elymus cinereus	25.00	35.00	0.00	50.00	15.00	40.00
Elymus salinus	0.00	0.00	0.00	0.00	0.00	0.00
Stipa hymenoides	0.00	0.00	0.00	0.00	0.00	0.00
COVER						
Total Living Cover	40.00	35.00	15.00	50.00	15.00	40.00
Litter	10.00	10.00	5.00	5.00	10.00	10.00
Bareground	5.00	5.00	5.00	5.00	5.00	5.00
Rock	45.00	50.00	75.00	40.00	70.00	45.00
% COMPOSITION						
Shrubs	0.00	0.00	100.00	0.00	0.00	0.00
Forbs	37.50	0.00	0.00	0.00	0.00	0.00
Grasses	62.50	100.00	0.00	100.00	100.00	100.00

ENERGY W
Belt Portal 1
Exposure: S
Slope: Varia

7.00	8.00	9.00	10.00	Mean	SDev	Freq	Sample Date
							SHRUBS
0.00	0.00	0.00	0.00	1.50	4.50	10.00	*Artemisia trid*
							FORBS
0.00	0.00	0.00	0.00	1.50	4.50	10.00	*Aster foliace*
5.00	0.00	0.00	0.00	0.50	1.50	10.00	*Machaerant*
							GRASSES
25.00	30.00	20.00	45.00	28.50	14.15	90.00	*Elymus ciner*
10.00	0.00	0.00	0.00	1.00	3.00	10.00	*Elymus salin*
0.00	0.00	5.00	0.00	0.50	1.50	10.00	*Stipa hymen*
							COVER
40.00	30.00	25.00	45.00	33.50	11.41		Total Living
25.00	25.00	5.00	5.00	11.00	7.35		Litter
15.00	5.00	5.00	5.00	6.00	3.00		Bareground
20.00	40.00	65.00	45.00	49.50	15.56		Rock
							% COMPOS
0.00	0.00	0.00	0.00	10.00	30.00		Shrubs
12.50	0.00	0.00	0.00	5.00	11.46		Forbs
87.50	100.00	100.00	100.00	85.00	30.52		Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Portal Diesel (`96)

AREA: Cottonwood Fan Portal Area

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 43 deg.

EXPOSURE: SW

ANIMAL USE/DISTURBANCE: Slight

EROSION: Slight

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED:

Aster foliaceus
Melilotus officinales

Elymus cinereus
Elymus junceus
Elymus smithii
Elymus lanceolatus
Stipa hymenoides

WOODY SPECIES DENSITY:	1998 (no./ac)
Chrysothamnus nauseosus	348.48
Total	348.48

NOTES:

1) Methods: Steep, dangerous area so we had to estimate our quadrats and belts from a distance.

2) We did not sample for density in 1999, but previous data has been retained for observation (see above).

5) Site looked very good.

ENERGY WEST - COTTONWOOD FAN PORTAL
Portal (Diesel) 1996
Exposure: S W
Slope: 43 deg

Sample Date: 20-24 Sept 99	1.00	2.00	3.00	4.00	5.00	6.00
SHRUBS						
FORBS						
Melilotus officinalis	0.00	5.00	10.00	10.00	0.00	0.00
Aster foliaceus	0.00	0.00	0.00	0.00	10.00	0.00
GRASSES						
Elymus cinereus	0.00	0.00	10.00	10.00	0.00	0.00
Elymus lanceolatus	15.00	25.00	35.00	10.00	15.00	5.00
Elymus smithii	10.00	0.00	0.00	10.00	0.00	5.00
Elymus junceus	0.00	10.00	0.00	0.00	0.00	0.00
Stipa hymenoides	0.00	0.00	0.00	0.00	10.00	25.00
COVER						
Total Living Cover	25.00	40.00	55.00	40.00	35.00	35.00
Litter	20.00	5.00	10.00	5.00	10.00	10.00
Bareground	10.00	10.00	5.00	10.00	10.00	10.00
Rock	45.00	45.00	30.00	45.00	45.00	45.00
% COMPOSITION						
Shrubs	0.00	0.00	0.00	0.00	0.00	0.00
Forbs	0.00	12.50	18.18	25.00	28.57	0.00
Grasses	100.00	87.50	81.82	75.00	71.43	100.00

ENERGY WEST - COTTONWOOD FAN PORTAL
Portal (Diesel) 1996
Exposure: S W
Slope: 43 deg
Sample Date: 20-24 Sept 99

Mean	SDev	Freq	
			SHRUBS
			FORBS
4.17	4.49	50.00	*Melilotus officinalis*
1.67	3.73	16.67	*Aster foliaceus*
			GRASSES
3.33	4.71	33.33	*Elymus cinereus*
17.50	9.90	100.00	*Elymus lanceolatus*
4.17	4.49	50.00	*Elymus smithii*
1.67	3.73	16.67	*Elymus junceus*
5.83	9.32	33.33	*Stipa hymenoides*
			COVER
38.33	8.98		Total Living Cover
10.00	5.00		Litter
9.17	1.86		Bareground
42.50	5.59		Rock
			% COMPOSITION
0.00	0.00		Shrubs
14.04	11.14		Forbs
85.96	11.14		Grasses

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Reclaimed Slope (Final) `98

AREA: Cottonwood Fan Portal Area

DATE: September 20-24, 1999

WORKERS: P. Collins, D. Collins

SLOPE: variable

EXPOSURE: SW

ANIMAL USE/DISTURBANCE: Slight

EROSION: Negligible

COVER: (qualitative data only)

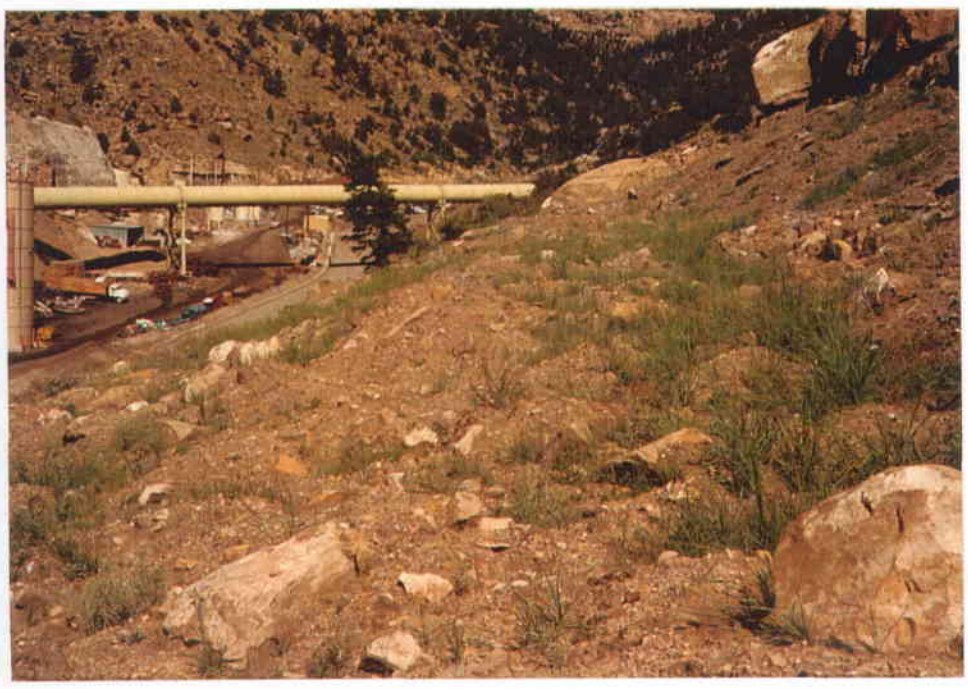
DOMINANT PLANT SPECIES OBSERVED:

Aster chilensis
Helianthus annuus
Triticum aestivum
Linum lewisii
Melilotus officinalis
Malcomia africana
Penstemon palmeri
Salsola pestifer

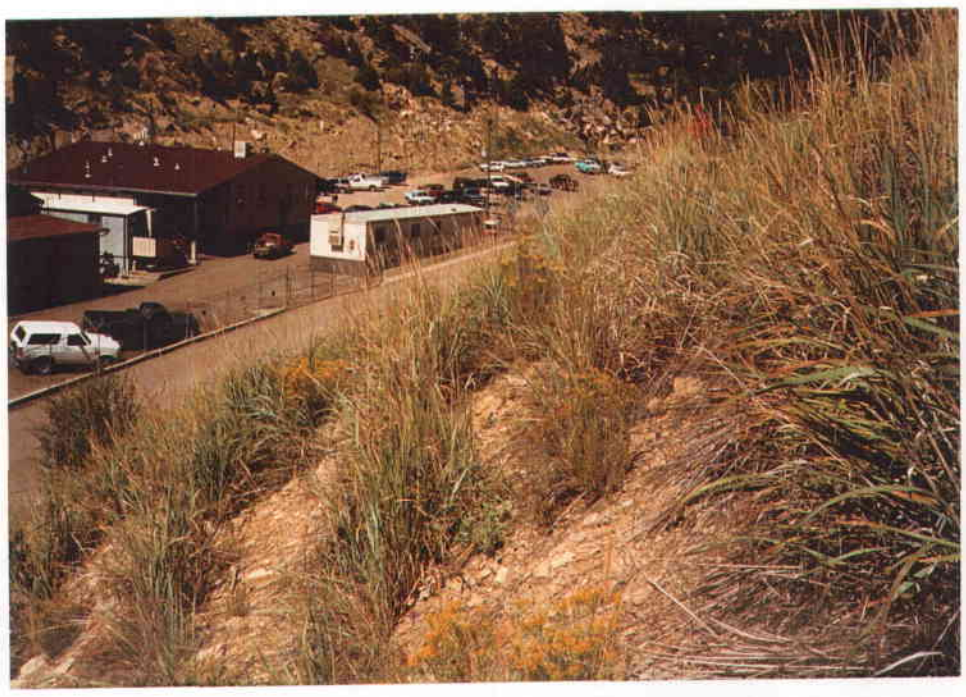
Agropyron cristatum
Elymus lanceolatus
Elymus salinus
Elymus junceus
Elymus cinereus
Elymus smithii
Elymus spicatus
Elymus elymoides
Avena fatua

NOTES:
1) Some of the grasses were difficult to identify due to their size and development. However, there was quite a lot of grass growth.
2) Site looked very good.
3) Most of the vegetation was in the gouges.
4) The area near the portal had straw with plastic netting covering it. The vegetation appeared less mature here. There were no gouges. The planting methods appeared different than other areas.

COLOR
PHOTOGRAPHS



Cottonwood Canyon - Reclaimed Slope



Cottonwood Canyon - Soil Pile (Subsoil)

Cottonwood Canyon - Soil Pile (Topsoil)

Cottonwood Canyon - Reference Area

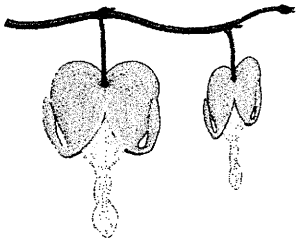
Cottonwood Canyon - Tube Conveyor Slope '96

Cottonwood Canyon - Belt Portal '96

Cottonwood Canyon - Portal (Diesel) '96

Cottonwood Canyon - Reclaimed Slope (Final)

RILDA CANYON AREA



ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Pad Area Slopes (96)

AREA: Rilda Canyon

DATE: August 23-27, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 20-30 deg.

EXPOSURE: variable

ANIMAL USE/DISTURBANCE: Slight

EROSION: Minimal

COVER: (No quantitative data were recorded this year)

DOMINANT PLANT SPECIES OBSERVED:

Populus tremuloides

Astragalus cicer
Hedysarum boreale
Melilotus officinalis

Poa pratensis
Elymus cinereus
Elymus smithii
Elymus elymoides
Elymus lanceolatus

WOODY SPECIES DENSITY:	1997 (no./ac)
Rosa woodsii	130.68
Populus tremuloides	130.68
Populus angustifolia	43.56
Total	304.92

NOTES: 1) Qualitative sampling only was done this year. We did not sample for density and production in 1999, but previous data has been retained for observation (see above).

2) Fill slopes were dominated by different species; slopes behind the fan were almost exclusively yellow sweetclover; other slopes were dominated by alfalfa, thickspike wheatgrass and Gt. Basin wildrye.

3) All slopes appeared as "excellent".

4) Was seeded in the Fall of 1995.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Roadway Slopes

AREA: Rilda Canyon

DATE: August 23-27, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 10-20 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE:

EROSION: Negligible

COVER: (No quantitative data were recorded this year)

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Gutierrezia sarothrae
Rosa woodsii
Mahonia repens
Populus tremuloides

Aster foliaceus
*Astragalus cicer**
Cirsium sp.
Cynoglossum officinale
*Medicago sativa**
Melilotus officinalis
Sanquisorba minor

Bromus inermis
Elymus lanceolatus
Elymus smithii
Elymus elymoides
Elymus cinereus
Elymus junceus
Stipa hymenoides
Poa fendleriana

WOODY SPECIES DENSITY:	1998 (no./ac)
Rosa woodsii	435.60
Total	435.60

NOTES:

1) Qualitative sampling only was done this year. We did not sample for density in 1999, but previous data has been retained for observation (see above).

2) Fill slopes looked "excellent" whereas the cut slopes looked "fair" with some bare areas.

ENERGY WEST MINING COMPANY
QUALITATIVE SAMPLING DATA SHEET AND
QUANTITATIVE/QUALITATIVE NOTES
1999

SITE NAME: Topsoil Pile

AREA: Rilda Canyon

DATE: August 23-27, 1999

WORKERS: P. Collins, D. Collins

SLOPE: 30 deg.

EXPOSURE: E

ANIMAL USE/DISTURBANCE: Slight, including elk.

EROSION: None observed

COVER: Approx. 15%-20%

DOMINANT PLANT SPECIES OBSERVED:

Chrysothamnus nauseosus
Rosa woodsii

*Melilotus officinalis**
Aster chilensis
Cynoglossum officinale
Penstemon palmeri

*Elymus lanceolatus**
Elymus elymoides
*Elymus smithii**
*Elymus cinereus**

* Dominant species

WOODY SPECIES DENSITY:	1997	(no./ac)	1998
Rosa woodsii	0		304.92
Total	0		304.92

Page 2

Rilda Canyon
Topsoil Pile

1) Qualitative sampling only was done this year. We did <u>not</u> sample for density and production in 1999, but previous data has been retained for observation (see above).

2) Was seeded in the Fall of 1995.

3) In 1997 it was reported that "from a distance it appeared the entire pile was growing nothing but yellow sweetclover, but on further examination there were lots of grasses under it."

   In 1998, the grasses dominated the site. In 1999 grasses and yellow sweetclover dominated.

4) Pile was looking better this year when compared to previous years. Excellent species diversity was beginning to show.

COLOR PHOTOGRAPHS

Rilda Canyon - Pad Area Slopes '96 (1 of 2)

Rilda Canyon - Pad Area Slopes '96 (2 of 2)

Rilda Canyon - Roadway Slopes

Rilda Canyon - Topsoil Pile '95