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Bacteriological and Chemical Analysis
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RECEIVED
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MINING AND EXPLORATION

3-11-82

CERTIFICATE OF ANALYSIS

81-7299

Utah Power & Light Company
Mining & Exploration
P.O. Box 899
Salt Lake City, UT 84110

ATTN: C. E. Shingleton

Gentlemen:

The following analysis is on samples of soil received on 9-16-81.

SAMPLE: Wilberg rock disposal area.

	North End	South End
pH	7.90	8.25
ECe (mmhos/cm)	9.0	8.5
SAR	1.85	1.76
Sand	20%	20%
Silt	60%	65%
Clay	20%	15%
Sodium	110	95
Calcium	210	150
Magnesium	34	42

Sincerely,

Lyle S. Ford, President

LSF/am

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WILBERG WASTE ROCK DUMP SITE

SOIL DESCRIPTION

JOSEPH M. JARVIS

WILBERG WASTE ROCK DUMP SITE

SITE: Portions of E½SE¼ S. 34 and W½ SW¼ S. 35 T. 17 S. R. 17 E. SLBM. 48.62 acres

PARENT MATERIAL: Alluvial outwash of Cretaceous sandstone and siltstone beds.

ASPECT: Southeast

SLOPE: 3%

ANNUAL PRECIPITATION: 12 inches

VEGETATION: Pinyon-Juniper Woodland

An open stunted type with a sparse shrub understory of Ephedra nevadensis, Cercocarpus montanus and Cowania mexicana.

LAND USE: Curently the site has a coal hauling road and is partially cleared of trees on about ten acres. Some deer winter use occurs here but the alluvial fan produces less browse than adjacent higher slopes.

PRODUCTIVITY: Low, 1,000 lbs/acre

SOIL: A young shallow alluvial derived soil, calcerous with a definite hardpan. Impervious layer influences plant growth so large rooted species predominate in the vegetation composition.

SOIL DESCRIPTION:

A_1	0-3"	Brown (10YR 5/3,moist) silt loam; gravelly with scattered rocks; granular, soft, loose, slightly sticky, slightly plastic; moderately calcerous, PH 8.2; few small and medium roots; boundary gradual.
A_2	3-18"	Pale brown (10YR 6/3,moist) loam, gravelly with scattered rocks; small angular blocky, friable, slightly sticky, slightly plastic; moderately calcerous; common small and medium roots, some large relic roots; some clay buildup at 14", cobble bed at 18-20".
C_{ca}	20"-	Light brownish gray (10YR 6/2,moist) caliche,rocky; massive, very hard, strongly calcerous; few medium roots; a cemented caliche layer.
C		Depth varies but consists mainly of bedded cobbles and rocks.

VEGETATION INFORMATION FOR THE WILBERG MINE

REPORT PREPARED FOR
UTAH POWER & LIGHT COMPANY

BY
JERRY R. BARKER

INSTITUTE FOR LAND REHABILITATION
COLLEGE OF NATURAL RESOURCES
UTAH STATE UNIVERSITY
LOGAN, UTAH

Agricultural Experiment Station
Land Rehabilitation
September 1980

VEGETATION INFORMATION FOR THE WILBERG MINE (783.19)

This reports the vegetational information for the Wilberg Mine area. Only vegetational data for the reference site are reported, since this mine was existing at the time of vegetation sampling. No new disturbances are planned within the permit area.

Methodology

Data for the vegetation types were collected for the Wilberg Mine August 26, 1980, and were analyzed September 8 and 9, 1980.

Six vegetational types were identified within the permit area and adjacent areas and mapped (see map 2-11). Aerial photography (scale 1:24,000) and field reconnaissance were utilized to construct the map. Aerial photography (taken in 1962) and the vegetation of adjacent canyons and areas were used to infer what species composition and aerial cover were before the present disturbance occurred at the mine site.

A reference site to represent the vegetation type disturbed by mining was located as close to the disturbed area as feasible. Differences in species composition, aerial cover, slope, aspect, soils and geology were minimized as much as possible between the disturbed area and respective reference site. The reference site was marked at the

corners with metal T-posts in the field and located on the vegetation map and Map 2-12 in the Soil Section.

Vegetational analyses of the reference site consisted of measuring aerial plant cover and species composition by life form. Also, tree density and size class composition were determined. Aerial cover was measured by the step-point method. Plant cover, litter, rock or bare ground was determined at every third step along a 20 point transect. The starting point and direction of each transect was randomly selected. Species composition was determined by listing each plant species by life form which occurred along the transects. Tree density was obtained by counting each tree by species within each reference site. Tree size class was determined by measuring diameter at breast height (DBH) for all tree species except pinyon pine and Utah juniper. Basal diameters were measured for these two species.

Statistical adequacy for the step-point transects was determined after 10 transects had been completed. A 90 percent confidence level with a 10 percent error of the mean was used to determine the proper sample size (Table 1, see appendix for field sheets).

Personnel from the Forest Service and Division of Wildlife Resources located in Price, Utah, were consulted with regards to livestock and big game use within the permit area.

Table 1. Sample size and statistical adequacy for step-point transerts which measured aerial plant cover of the reference site. A 90 percent confidence level with a 10 percent error of the mean was used to determine the proper sample size.

Reference Site	No. Sampled	No. Required
Wilberg Mine		
Pinyon-juniper	24	23

Personnel involved with vegetational sampling:

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Permit Area Vegetation

The mine property permit area is 12,000 acres. Six major vegetation types are identified within the permit area and adjacent land (see Map 2-11, Vegetation Map). Mixed conifer, pinyon-juniper, sagebrush, grass, riparian and salt desert shrub are the six vegetation types (Table 1-A). The mixed conifer type occurs mainly at the higher elevations (above 9,000 ft.) or at lower elevations with a northern exposure. The pinyon-juniper vegetation type is found mainly on the steep, rocky slopes with a southern exposure. Elevation for this vegetation type varies from 7,000 to 9,000 feet. The sagebrush and grass vegetation types also occur at the high elevations, but are restricted to the

Table 1-A. Vegetation types and size of each that are found within the permit area and adjacent land.

Vegetation Type	Total Acres	% of Permit Area
Mixed Conifer	9,037.06	50.2
Pinyon-juniper	4,524.41	25.1
Sagebrush	4,053.03	22.5
Grass	301.51	1.7
Riparian	83.99	0.5
TOTAL	18,000	100
Salt Desert Shrub[1]	281.71	

[1] The salt desert shrub type is located on adjacent land to the permit area. It is influenced by the Des-Bee-Dove Pond (see vegetational Map 2-11).

more xeric sites than the mixed conifer. The riparian vegetation type is located along Deer Creek, Cottonwood and Grimes Wash. This vegetation type is well developed along Deer Creek below the mine, but is poorly developed along Cottonwood and Grimes Wash. The salt desert shrub vegetation type is not found within the permit area, but is located on adjacent land. It has a southwestern exposure and elevation varies from 6,600 to 7,600 feet.

Area Disturbed By Mining

Table 2 lists the vegetation types and acres disturbed by mining activities.

Wilberg Mine

The disturbed area of the Wilberg Mine is about 18 acres. Elevation varies from 7,500 to 8,000 feet. The general slope varies from 33-36°. Annual precipitation averages about 8 inches. The topography is dominated by a southern exposure. The vegetation type disturbed by mining activities was a pinyon-juniper gradating into a mixed conifer (Table 3). Pinyon pine and Utah juniper were the dominant trees. However, white fir and Douglas fir were also present. Saskatoon serviceberry, low rabbitbrush and Mormon tea were important shrubs. Herbaceous plants included salina wildrye, bluebunch wheatgrass, and corymbed eriogonum. Total aerial plant cover varied around 30-35 percent. Soils were probably a Torriorthent.

Table 2. Vegetation type, number of acres, and percent of vegetation type disturbed by mining at the Wilberg Mine.

Mine Vegetation Type	Acres Disturbed	% of Vegetation Type
Pinyon-juniper	18	0.1

Table 3. Plant species that are assumed to have been growing within the disturbed portion of the pinyon-juniper vegetation type at the Wilberg Mine.

Scientific Name	Common Name
Trees	
Abies concolor	White fir
Juniperus osteosperma	Utah juniper
Pinus edulis	Pinyon pine
Pseudotsuga menziesii	Douglas fir
Shrubs	
Amelanchier alnifolia	Saskatoon serviceberry
Atriplex cuneata	Cuneate saltbush
Chrysothamus viscidiflorus	Low rabbitbrush
Ephedra viridis	Mormon tea
Xanthocephalum sarothrae	Snakeweed
Forbs	
Eriogonum corymbosum	Corymbed eriogonum
Hedysarum boreale	Utah sweetvetch
Grasses	
Agropyron spiciatum	Bluebunch wheatgrass
Elymus salinus	Salina wildrye
Oryzopsis hymenoides	Indian-rice grass

Reference Sites

A reference site was established to represent the vegetation types disturbed by mining activities (Table 4).

The reference site (5,926 yd^2 in size) for the pinyon-juniper vegetation type has an eastern exposure with an elevation of 7,500 feet. Slope varies around 35°. Important plants include Utah juniper, pinyon pine, white fir, Douglas fir, saskatoon serviceberry, Mormon tea, corymbed eriogonum, bluebunch wheatgrass and salina wildrye (Table 5). Total aerial cover is 38 percent. The trees provide most of the cover. Pinyon pine has the greatest density (Table 6). Most of the trees occur in the smallest size class. The soil is loamy-skeletal mixed mesic Lithic Ustic Torriorthent of the Sunup series.

Wildlife And Livestock

The mining permit area is located within the Ferron Ranger District of the Manti-LaSal National Forest managed by the United States Forest Service. Both wildlife and livestock utilize the permit area for grazing. However, wildlife and livestock grazing is limited to the higher elevations. Very little wildlife and livestock grazing occurs on the steep slopes where the mine is located.

Table 4. Similarity in species composition, aerial cover, geology, soil, slope and aspect between the disturbed area and reference site for the Wilberg Mine.

Mine / Vegetation Type	Species Composition		Aerial Cover, %		Geology		Soil[2]		Slope, °		Aspect	
	R[1]	D	R	D	R	D	R	D	R	D	R	D
Wilberg												
Pinyon-juniper	16	14	38	30-35			Torriorthent	Torriorthent	33-36	35-38	SE	SE, SW

[1]R = Reference Site
D = Disturbed Area

[2]Classified at the great group level.

Table 5. Plant species and aerial plant cover occurring within the pinyon-juniper vegetation type reference site at the Wilberg Mine.

Scientific Name	Symbol[1]	Common Name
Trees		
Abies concolor	ABCO	White fir
Juniperus osteosperma	JUOS	Utah juniper
Pinus edulis	PIED	Pinyon pine
P. flexilis	PIFL	Limber pine
Pseudotsuga menziesii	PSME	Douglas fir
Shrubs		
Amelanchier alnifolia	AMAL	Saskatoon serviceberry
Atriplex cuneata	ATCU	Cuneata saltbush
Chrysothamus viscidiflorus	CHVI	Low rabbitbrush
Ephedra viridis	EPVI	Mormon tea
Xanthocephalum sarothrae	XASA	Snakeweed
Forbs		
Eriogonum corymbosum	ERCO	Corymbed eriogonum
Galium sp.	GAsp	Galium
Hedysarum boreale	HEBO	Utah sweetvetch
Grasses		
Agropyron spicatum	AGSP	Bluebunch wheatgrass
Elymus salinus	ELSA	Salina wildrye
Oryzopsis hymenoides	ORHY	Indian-rice grass

Item	% Cover
Tree	17
Shrub	8
Forb	4
Grass	10
Total Aerial Cover	39
Litter	4
Rock	16
Bare ground	42

[1] Plant symbols are used for easy reference to the field data sheets.

Table 6. Tree size class (DBH) and number of trees found within each size class by species for the pinyon-juniper vegetation type reference site at the Wilberg Mine.

	Diameter At Breast Height Inches				
	0 - 4	4 - 10	10 - 20	> 20	% Of Total
Mixed Conifer					
Pinyon pine	49	1	0	0	54
Utah juniper	7	6	0	0	14
White fir	7	0	0	0	8
Douglas fir	19	1	0	0	22
Limber pine	0	1	1	0	2
% Of Total	89	10	1	0	

Deer, elk, and moose utilize the area for grazing (Table 7). Deer have a greater impact on the vegetation than elk or moose because of their high numbers.

Besides wildlife use, the area provides summer grazing for cattle (Table 8). Cattle grazing occurs on the East Mountain allotment of the Ferron Ranger District. For the past several years, there has been a 10 percent non-use of the available AUM's. This year (1980) all AUM's are being utilized. Overall range condition is fair.

Endangered Or Threatened Plants

During the vegetation sampling, no endangered or threatened plant species were identified.

APPENDIX

Field Data For The Vegetation Reference Area[1]

[1] Plant symbols were used for convenience in the field. For proper identification, refer to the description of the vegetation reference area in the text.

COVER DATA

Vegetation Type Pinyon - juniper at Willberg

Date _____ Affected or Control

Transect Number

Point No.	11	12	13	14	15	16	17	18	19	20
1	XASA	B	B	B	R	PSME	R	B	ERCO	B
2	R	PIED	B	R	B	PIED	B	R	B	AGSP
3	R	ORHY	B	R	B	R	B	ATCU	B	ABCO
4	HEBO	R	B	AGSP	B	R	B	ATCU	B	ABCO
5	B	ELSA	L	R	B	R	B	ATCU	B	AMAL
6	B	B	L	L	ORHY	R	ERCO	B	B	R
7	R	ELSA	AMAL	L	ORHY	PIED	ERCO	ELSA	R	B
8	R	R	AMAL	B	L	B	B	B	B	L
9	ELSA	B	AMAL	R	PIED	B	B	R	B	B
10	R	R	PSME	R	PIED	B	B	R	ELSA	B
11	HEBO	ORHY	PSME	R	B	AMAL	B	ELSA	R	R
12	B	PIED	PSME	JUOS	B	AMAL	ERCO	B	L	L
13	B	PIED	PSME	B	CHUI	AMAL	R	ATCU	PIFL	R
14	B	PIED	PSME	PIED	B	B	R	ATCU	PIFL	R
15	B	PIED	B	PIED	ERCO	R	L	ERCO	PIFL	ELSA
16	R	PIED	B	PIED	B	R	R	B	B	PIED
17	R	PIED	B	B	ERCO	R	B	B	B	B
18	R	PIED	B	B	B	B	B	B	ELSA	EPUI
19	PIED	B	HEBO	PIED	ELSA	L	B	R	L	EPUI
20	PIED	R	B	PIED	R	B	ELSA	B	B	EPUI

COVER DATA

Vegetation Type Mixed Conifer at Willberg

Date _____ Affected or Control

Transect Number

Point No.	1	2	3	4	5	6	7	8	9	10
1	B	CHUI	ATCU	B	ELSA	ORHY	B	L	B	B
2	B	B	ATCU	ELSA	B	R	B	JUOS	B	B
3	ELSA	B	ATCU	B	AGSP	ELSA	B	JUOS	R	R
4	R	B	B	B	P	R	B	JUOS	R	L
5	R	B	ATCU	B	PIED	R	B	JUOS	R	B
6	R	B	R	JUOS	ABCO	R	PIED	ELSA	ERCO	AMAL
7	HEBO	B	AGSP	B	ABCO	R	PIED	B	B	AMAL
8	PIED	B	AMAL	B	L	ELSA	PIED	B	B	AMAC
9	PIED	B	B	B	ABCO	R	PIED	B	B	ERCO
10	B	B	B	B	L	R	PIED	AMAL	B	ORHY
11	B	B	L	ELSA	ABCO	R	B	B	B	ORHY
12	PIED	B	B	PSME	ABCO	B	B	L	B	B
13	PIED	AMAL	B	L	B	B	B	AMAL	B	B
14	AMAL	AMAL	L	B	B	R	ABCO	B	B	HEBO
15	B	AMAL	B	ELSA	PIED	GASP	R	AGSP	B	B
16	B	AMAL	B	B	PIED	ORHY	R	ORHY	PIED	B
17	B	AMAL	R	ELSA	PIED	B	B	R	PIED	XASA
18	R	B	PSME	B	ELSA	ELSA	PIED	B	PIED	YASA
19	R	B	PSME	R	B	B	B	B	ABCO	R
20	R	AMAL	AMAL	ELSA	L	R	B	HEBO	ABCO	L

COVER DATA

Vegetation Type Pinyon-juniper at Willerg

Date _____ Affected or Control

Transect Number

Point No.	21	22	23	24						
1	R	ELSA	PIED	R						
2	R	PSME	PIED	B						
3	R	L	B	B						
4	B	B	B	B						
5	B	ELSA	PIED	B						
6	B	B	PIED	PIED						
7	AMAL	ELSA	PIED	ERCO						
8	PIED	B	B	B						
9	PIED	R	JUOS	B						
10	PIED	ELSA	R	B						
11	B	B	R	B						
12	B	B	R	ERCO						
13	PIED	B	R	ELSA						
14	PIED	B	B	B						
15	HEBD	JUOS	L	B						
16	R	R	L	B						
17	R	B	R	L						
18	R	B	AGSP	R						
19	ERSA	ESA	B	B						
20	B	B	R	B						

Tree sizes and densities for the Pinyon-juniper vegetation type at Wilberg Mine.

Species	DBH(inches)	Total
Pinus edulis	2, 4, 12, 14, 2, 3, 9, 2, 11, 9, 3, 3, 18, 2, 6, 9, 7, 24, 3, 3, 3, 3, 7, 3, 9, 4, 2, 4, 3, 3, 2, 2, 2, 3, 3, 2, 4, 3, 3, 1, 1, 1, 2, 2, 2, 2, 5, 2, 2, 2, 25, 1 2, 4	54
Juniperus osteosperma	3, 3, 3, 11, 2, 2, 4, 6	8
Pinus flexilis	25, 40	2
Pseudotsuga menziesii	2, 10, 11, 2, 2, 2, 2, 2, 2, 3, 3, 2, 1, 1, 2, 7, 3, 2, 1, 3	20