

0007

File # 013  
INA/015/002  
cc: Mutz

**COAL SYSTEMS, Inc.**  
CONSULTANTS/ENGINEERS

#2

L. G. MANWARING, P.E.  
President

P.O. BOX 17117  
SALT LAKE CITY, UTAH 84117

Area Code 801  
261-4500

August 19, 1986

**RECEIVED**  
AUG 22 1986

**DIVISION OF  
OIL, GAS & MINING**

Ms. Kathy Mutz, Biologist  
DIVISION OF OIL, GAS AND MINING  
3 Triad Center, Suite 350  
Salt Lake City, Ut. 84180-1203

Re: J. B. King Mine  
Vegetation Reference Area  
Relocation

Dear Ms. Mutz:

Attached please find a map showing the new location of the vegetation reference area. As can be noted, only a small portion of the area is within the mine permit area. We have expressed concern regarding the acceptability of this situation, but you have assured us, as inferred in your letter of June 12, that the new location is no problem. The area has been properly staked in all corners.

Also attached, is a report by Steve Cox entitled, "Selection of New Reference Area". This report mentions that "The vegetation cover and shrub density on the new reference area is thought to be more representative of pre-mine conditions than the old reference area." Included in the report are discussions on sampling methods and survey results.

It is assumed that this correspondence will conclude the details of relocation of the reference area.

Sincerely,

COAL SYSTEMS, Inc.

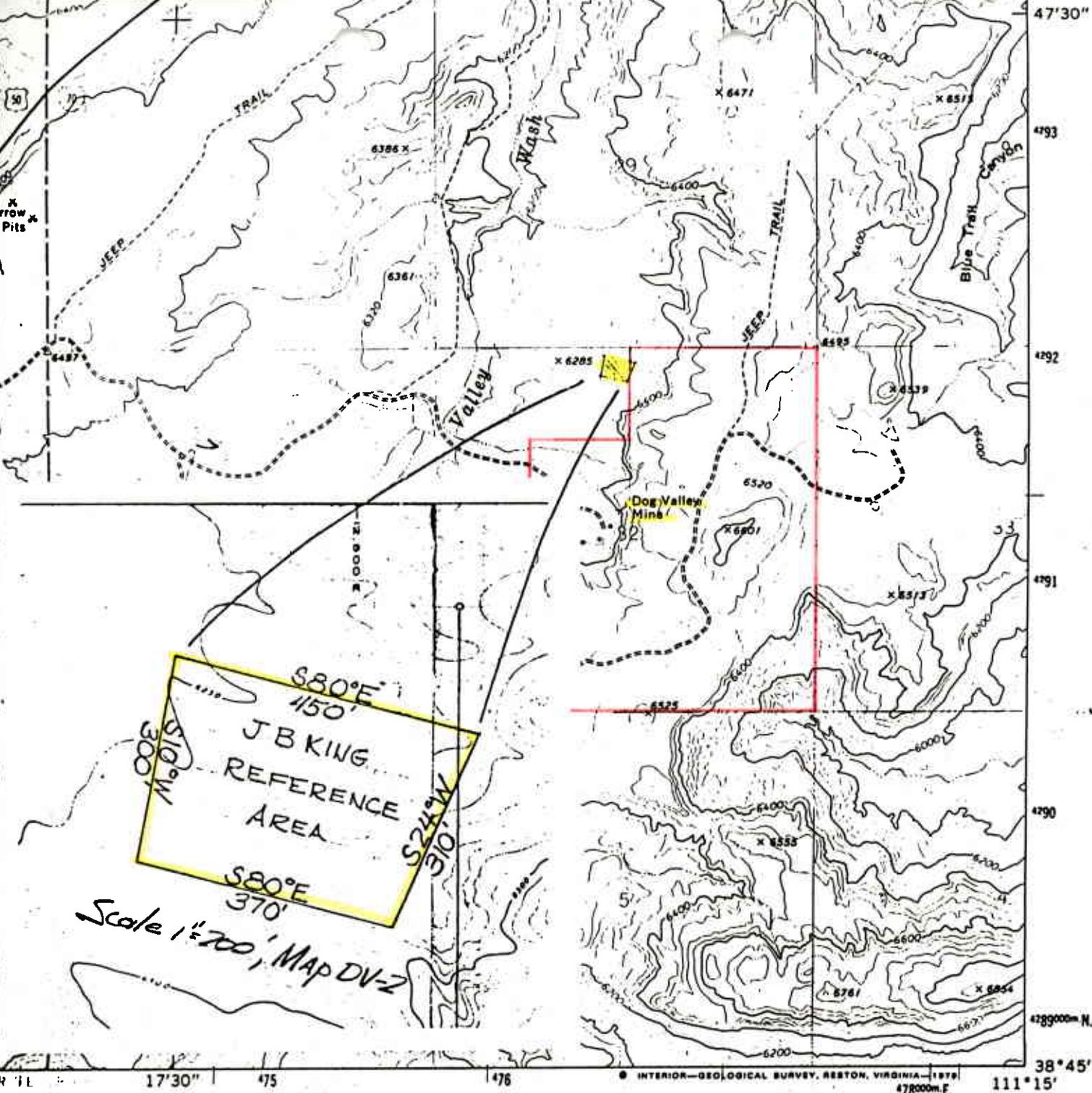
*L. G. Manwaring*  
L. G. Manwaring, P.E.  
President

LGM/bm

Attachments: Map showing reference area location  
Cox report  
Letter, Mutz to Manwaring, June 12, 1986

cc w/attachments: M. O'Donnell, Western States Minerals Corp.





80°E  
150'  
J B KING  
REFERENCE  
AREA  
300'  
80°E  
370'  
240'

Scale 1"=700', Map DV-2

INTERIOR-GEOLOGICAL SURVEY, RESTON, VIRGINIA-1978  
4780000m.E 111°15' 38°45'



QUADRANGLE LOCATION

ROAD CLASSIFICATION

- Primary highway, hard surface \_\_\_\_\_
- Secondary highway, hard surface \_\_\_\_\_
- Light-duty road, hard or improved surface \_\_\_\_\_
- Unimproved road \_\_\_\_\_
- Interstate Route    U. S. Route    State Route

**RECEIVED**

WALKER FLAT, UTAH

AUG 22 1986

N3845-W11115/7.5

ON, VIRGINIA 22092  
REQUEST

There may be private inholdings within the boundaries of the National or State reservations shown on this map

DIVISION OF  
OIL, GAS & MINING

1968  
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STATE OF UTAH  
NATURAL RESOURCES  
Oil, Gas & Mining

Norman H. Bangerter, Governor  
Dee C. Hansen, Executive Director  
Dianne R. Nielson, Ph.D., Division Director

355 W. North Temple • 3 Triad Center • Suite 350 • Salt Lake City, UT 84180-1203 • 801-538-5340

June 12, 1986

Mr. L.G. Manwaring  
Coal Systems, Inc.  
P.O. Box 17117  
Salt Lake City, Utah 84117

Dear Mr. ~~Manwaring~~ Manwaring:

RE: Reference Area for J.B. King Mine, Folder #13 ACT/015/002

On June 10, 1986 Steve Cox and I met at the mine site to finalize the location of the vegetation reference area. After viewing both the suggested area within the fenced reclamation site and an area northwest of the mine, we decided on the northwest area. Although it is outside the permit area, it occupies a small basin similar to the mine site. There is livestock grazing in the area but the vegetation appears to be in good condition. The site is a little farther from the reclamation area than I had originally estimated. I have enclosed a location map for your information.

I look forward to receiving the vegetation sampling information when available. I would also appreciate, at your convenience, a brief note for our files to clarify the seed mix, rate and methods used at the site (i.e., changes in the 1/13/86 memo from Howell to Hooper).

Sincerely,

Kathryn M. Mutz  
Reclamation Biologist

Enclosure  
cc: J. Whitehead  
0531R-51

J. B. KING MINE  
SELECTION OF NEW REFERENCE AREA

by

Steve Cox

Reclamation Biologist

224 N. 2650 E., St. George, Utah

for

Coal Systems, Inc.

Salt Lake City, Utah

June 20, 1986

## LIST OF TABLES

<u>Table</u>	<u>Title</u>
1	Cover Data Summary
2	Woody Plant Density Data Summary
3	Sample Adequacy Summary

### Reference Area Selection

On June 10, 1986, a new reference area was selected and sampled to obtain baseline vegetation information. The vegetation cover and shrub density on the new reference area is thought to be more representative of premine conditions than the old reference area (see Native Plants Report, August, 1983). The new reference area is located approximately 1500 m North of the minesite. It was selected in conjunction with Kathy Mutz, DOGM Reclamation Biologist and sampled using methods approved by her while on site. It is approximately 2 acres in size. Elevation, topography, and aspect are similar to the reclaimed minesite.

### Sampling Methods

The reference area was sampled for vegetation cover and woody plant density. Species identification was based primarily on vegetation surveys previously conducted in the same vegetation type on the permit area (Native Plants Report, 1983 and original species list in MRP). Vegetation was sampled using a X, Y coordinate grid system with 1m intervals and randomly selected sampling points. For each sample point, a pair of numbers was selected from a random numbers table.

To sample cover, at each sample point a 50m transect was laid out. Random orientation of each transect was achieved by selection of a 3-digit compass direction from the random numbers table. At 10m intervals along the transect, a 10 pin sampling frame was placed down. Pins were lowered and first hits on vegetation, litter, bare ground or rock were recorded. A total of 50 pin hits per transect were recorded and each transect counted as one sample. A total of 15 transects were used.

Woody plant density was sampled using 2m by 5m quadrats selected and oriented the same as the cover transects. All

shrubs rooted in the transect were counted and recorded. A total of 20 transects were sampled.

Sample adequacy was tested periodically on site to insure an adequate sample for both cover and density. The formula used was the DQGM approved formula:

$$N_{min} = \frac{t^2 s^2}{(d \bar{X})^2}$$

where

$N_{min}$  = minimum number of samples necessary, based on total cover or density estimates

$t$  = the  $t$  statistic for a two-tailed  $t$ -test at the 80% confidence level used for shrublands (i.e., 1.282)

$s$  = sample standard deviation

$d$  = the desired change in the mean (0.1)

$\bar{X}$  = sample mean

#### Reference Area Survey Results

Total vegetative cover on the reference area averaged 28.5% (see Table 1). Bareground, rock and litter accounted for 42.3%, 18.4% and 10.8% cover respectively. This vegetation type is best characterized as a shadscale - grassland community.

Relative cover of shrubs, grasses and forbs is 21%, 79% and >1% respectively. Dominant shrubs are shadscale (Atriplex confertifolia) accounting for 7% of total vegetative cover, Bigelow sagebrush (Artemisia bigelovii) for 5% and broom snakeweed (Gutierrezia sarothrae) for 4%. Other shrubs sampled were prickly pear cactus (Opuntia polyacantha), greasewood (Sarcobatus vermiculatus) and Nuttall horsebrush (Tetradymia nuttallii).

Grasses dominate the reference area with relative cover of 79%. Dominant grasses are Indian ricegrass (Oryzopsis hymenoides) accounting for 44% of the total vegetative cover

and galleta grass (Hilaria jamesii) for 35%. The only other grass sampled was cheatgrass (Bromus tectorum). Other grasses present but not sampled include blue grama (Bouteloua gracilis), bottlebrush squirreltail (Sitanion hystrix), sand dropseed (Sporobolus cryptandrus) and needle-and-thread grass (Stipa comata).

Forbs contributed less than 1% cover with wild buckwheat being the only forb sampled. Other forbs which occur in this vegetation type are included in Native Plant's 1983 supplemental species list previously submitted.

Total woody plant density is 4320 plants/acre (see Table 2). Shrubs with the highest density include shadscale (48% relative density), broom snakeweed (25%), and Bigelow sagebrush (12%). Other shrubs sampled were winterfat (Ceratoides lanata), Nuttall horsebrush, prickly pear cactus, and sclerocactus (Sclerocactus spp.).

#### Sample Adequacy

Sample adequacy was achieved for both cover and density (see Table 3). For cover, 15 samples were taken. Sample adequacy at the 80% confidence level was achieved with 9 samples. For woody plant density, 20 samples were taken. Sample adequacy at the 80% confidence level was achieved with 12 samples.

TABLE 1  
Cover Data Summary

<u>Species</u>	<u>% Cover</u>	<u>% Relative cover</u>
<u>Shrubs</u>		
<u>Atriplex confertifolia</u>	2.1	7
<u>Artemisia bigelovii</u>	1.3	5
<u>Gutierrezia sarothrae</u>	1.1	4
<u>Opuntia polyacantha</u>	0.7	2
<u>Sarcobatus vermiculatus</u>	0.5	2
<u>Tetradymia nuttallii</u>	0.3	1
<u>Grasses</u>		
<u>Onyzopsis hymenoides</u>	12.4	44
<u>Hilaria jamesii</u>	9.9	35
<u>Bromus tectorum</u>	0.1	>1
<u>Forbs</u>		
<u>Eriogonum spp.</u>	0.1	>1
Total Cover	28.5+ 6.8	100
Litter	10.8	
Ro.	18.4	
Bare ground	42.3	

TABLE 2

## Woody Plant Density Data Summary

<u>Species</u>	<u>Number/10m<sup>2</sup></u>	<u>Number/acre</u>
<u>Atriplex confertifolia</u>	5.2	2080
<u>Gutierrezia sarothrae</u>	2.7	1080
<u>Artemesia bigelovii</u>	1.3	520
<u>Ceratoides lanata</u>	1.0	400
<u>Opuntia polyacantha</u>	0.4	160
<u>Tetradymia nuttallii</u>	0.15	60
<u>Sclerocactus spp.</u>	0.05	20
Total	10.8 + 2.9	4320 + 1160

TABLE 3  
 Sample Adequacy Summary

	<u>Mean</u>	<u>Std.Dev.</u>	<u>t</u>	<u>d</u>	<u>Nmin</u>	<u>Number Sampled</u>
Vegetation Cover	28.5	6.8	1.28	.1	9	15
Woody Plant Density	10.8	2.9	1.28	.1	12	20