

Mountain Coal Company, LLC
Gordon Creek Mines #2, #7, & #8
ACT/007/016

2000

Annual Report

File in:

Confidential

Shelf

Expandable

Refer to Record No. *0004* Date *03/30/01*

In C *0070016* *2000* *In coming*

For additional information

GENERAL INFORMATION

| | |
|---|---|
| 1. Permit Number | ACT/007/016 |
| 2. Mine Name | Gordon Creek 2/7/8 Mines |
| 3. Permittee Name | Mountain Coal Company, LLC |
| 4. Operator Name (if other than Permittee) | |
| 5. Permit Expiration Date | August 28, 2004 |
| 6. Permit Number | |
| 7. Company Representative, Title | Eugene E. Di Claudio, President (Local Representative: Chris D. Hansen, Project Coordinator) |
| 8. Phone Number | (970) 929-2221 |
| 9. Fax Number | (970) 929-5595 |
| 10. E-mail Address | ediclaudio@archcoal.com |
| 11. Mailing Address | Mountain Coal Company, LLC |
| | West Elk Mine |
| | P.O. Box 591 |
| | Somerset, CO 81434 |
| 12. Resident Agent, Title | The Corporation Trust Company |
| 13. Mailing Address | Corporation Trust Center |
| | 1209 Orange Street |
| | Wilmington, DE |
| | |
| 14. Number of Binders Submitted | 2 |

IDENTIFICATION OF OTHER PERMITS

Identify other permits which are required in conjunction with mining and reclamation activities.

| Permit Type | ID Number | Description | Expires on |
|-------------------------------------|----------------|----------------------------|------------|
| 1. MSHA Mine ID(s) | NA | | |
| 2. MSHA Impoundment(s) | NA | | |
| 3. NPDES/UPDES Permit(s) (water) | UTG- 040004 | UPDES Permit for mine site | 04/30/2001 |
| 4. PSD (Air) Permit(s) | NA | | |

CERTIFIED REPORTS

List the certified inspection reports as required by the rules and under the approved plan which must be periodically submitted to the Division. Specify whether the information is included as APPENDIX A to this Annual Report or currently ON FILE with the Division.

| Certified Reports: | Reports Required? | | INCLUDED or ON FILE w/DOGM? | | Comments |
|-----------------------|-------------------|----|-----------------------------|---------|--|
| | YES | NO | Included | ON FILE | |
| 1. Excess Spoil Piles | | X | | | |
| 2. Refuse Piles | | X | | | |
| 3. Impoundments | X | | | X | Fourth Quarter 2000 submitted in this report |
| 4. | | | | | |
| 5. | | | | | |

REPORTING OF OTHER TECHNICAL DATA

List other technical data and information as required under the approved plan which must be periodically submitted to the Division. Specify whether the information is included as APPENDIX B to this Annual Report or currently ON FILE with the Division.

| Technical Data: | Reports Required? | | INCLUDED or ON FILE w/DOGM? | | Comments |
|--------------------------------|-------------------|----|-----------------------------|---------|--------------------|
| | YES | NO | Included | ON FILE | |
| 1. Climatological Data | | X | | | |
| 2. Subsidence Monitoring Data | | X | | | No longer required |
| 3. Vegetation Monitoring Data | X | | X | | |
| 4. Raptor Survey | | X | | | |
| 5. Soils Monitoring Data | | X | | | |
| 6. Water Monitoring Data | X | | | X | |
| First Quarter Report | X | | | X | |
| Second Quarter Report | X | | | X | |
| Third Quarter Report | X | | | X | |
| Fourth Quarter Report | X | | | X | |
| 7. Geological/Geophysical Data | | X | | | |
| 8. Engineering Data | | X | | | |
| 9. Other Data | | | | | |
| | | | | | |
| | | | | | |

LEGAL, FINANCIAL, COMPLIANCE AND RELATED INFORMATION

Changes in administration or corporate structure can often bring about necessary changes to information found in the mining and reclamation plan. The Division is requesting that each permittee review and update the legal, financial, compliance and related information in the plan as part of the Annual Report. Provide the Department of Commerce, Annual Report of Officers, or other equivalent information as necessary to ensure that the information provided in the plan is current. Provide any other changes as necessary regarding land ownership, lease acquisitions, legal results from appeals of violations, or other changes as necessary to update information required in the mining and reclamation plan. Include any certified financial statements, audits or worksheets which may be required to meet bonding requirements. Specify whether the information is currently ON FILE with the Division or included as APPENDIX C to this Annual Report.

| Legal/Financial Data: | Report Required? | | INCLUDED or ON FILE w/DOGM? | | Comments |
|--|------------------|----|-----------------------------|---------|------------|
| | YES | NO | Included | ON FILE | |
| 1. Department of Commerce, Annual Report of Officers | X | | | | Appendix C |
| 2. Other | | | | | |
| | | | | | |
| | | | | | |

MINE MAPS

Copies of mine maps, current and up-to-date through at least December 31, 1998, are to be provided to the Division as APPENDIX D to this Annual Report in accordance with the requirements of R645-301-525.270. These map copies shall be made in accordance with 30 CFR 75.1200, as required by MSHA. Upon request, mine maps shall be kept confidential by the Division.

| Map Number(s) | Map Title / Description | Confidential? |
|---------------|-------------------------|---------------|
| NA | | |
| | | |
| | | |
| | | |

OTHER INFORMATION

Please provide any comments or further information to be included as part of the Annual Report. Any other attachments are to be provided as APPENDIX E to this Annual Report. If information is submitted as a group rather than by individual mine. Please identify each of the mines data in the list below.

Additional attachments to this report? No Yes

| |
|--|
| |
| |
| |

APPENDIX A

Certified Reports

Excess Spoil Piles
Refuse Piles
Impoundments

as required under R645-301-514

Contents

Annual Pond Inspection Report

**MOUNTAIN COAL COMPANY
2000 ANNUAL POND INSPECTION REPORT**

POND: 2/7/8 Sediment Pond **LOCATION:** Gordon Creek 2/7/8

| IMPOUNDMENTS | |
|---------------------------------|---|
| (1) Stability | Slopes Stable. |
| (2) Structural Weakness/Erosion | None Noted. |
| (3) Potential Safety Hazards | None Noted. |
| (4) Depth of Impounded Water | Upper Cell - Frozen, Middle Cell - Dry, Lower Cell - Dry. |
| (5) Existing Storage Capacity | 4.25 acre feet. |
| (6) Monitoring Procedures | Quarterly Inspection U.P.D.E.S. Discharge |

| SEDIMENT PONDS ONLY | Cell #1 | Cell #2 | Cell #3 |
|--|----------------|----------------|----------------|
| (7) Sediment Accumulation (Elevation) | 7227.0 | 7713.0 | 7704.0 |
| (8) Sediment Cleanout Level (Elevation) | 7728.0 | N/A | N/A |
| (9) Principle Spillway (Elevation) | 7733.0 | 7723.0 | 7713.0 |
| (10) Emergency Spillway (Elevation) | 7733.0 | 7723.0 | 7713.0 |
| (11) Existing Sediment Capacity (To Cleanout) | 0.08 | N/A | N/A |

| GENERAL | |
|-------------------------------|--|
| (12) Comments/Recommendations | Cells 2 & 3 Expanded in 1996. Grouted, open channel spillways. 3 cells. No Inflow. No Discharge. |

STATEMENT

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized in the State of Utah to inspect and certify the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meets or exceeds the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.



 (Signature)

11/21/00

 (Date)



**MOUNTAIN COAL COMPANY
2000 ANNUAL POND INSPECTION REPORT**

POND: Sweet's Pond **LOCATION:** Gordon Creek 2/7/8

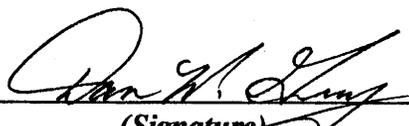
| IMPOUNDMENTS | |
|---------------------------------|--|
| (1) Stability | Slopes Stable. |
| (2) Structural Weakness/Erosion | None Noted. |
| (3) Potential Safety Hazards | None Noted. |
| (4) Depth of Impounded Water | 60" |
| (5) Existing Storage Capacity | (2.10 acre feet) Pond frozen. Not a sediment Pond. |
| (6) Monitoring Procedures | Quarterly Inspection |

| SEDIMENT PONDS ONLY | |
|--|-----|
| (7) Sediment Accumulation (Elevation) | N/A |
| (8) Sediment Cleanout Level (Elevation) | N/A |
| (9) Principle Spillway (Elevation) | N/A |
| (10) Emergency Spillway (Elevation) | N/A |
| (11) Existing Sediment Capacity (To Cleanout) | N/A |

| GENERAL | |
|-------------------------------|--|
| (12) Comments/Recommendations | Not a Sediment Pond. Operating properly. |

STATEMENT

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized in the State of Utah to inspect and certify the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meets or exceeds the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.



 (Signature)

11/21/00

 (Date)



**MOUNTAIN COAL COMPANY
2000 ANNUAL POND INSPECTION REPORT**

POND: Jacobs Pond **LOCATION:** Gordon Creek 2/7/8

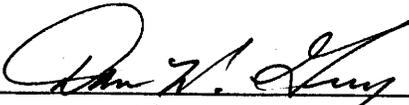
| IMPOUNDMENTS | |
|---------------------------------|--|
| (1) Stability | Slopes Stable. |
| (2) Structural Weakness/Erosion | None Noted. |
| (3) Potential Safety Hazards | None Noted. |
| (4) Depth of Impounded Water | 2.5' Water - 1' Below Spillway - Frozen. |
| (5) Existing Storage Capacity | N/A |
| (6) Monitoring Procedures | Quarterly Inspection |

| SEDIMENT PONDS ONLY | |
|--|-----|
| (7) Sediment Accumulation (Elevation) | N/A |
| (8) Sediment Cleanout Level (Elevation) | N/A |
| (9) Principle Spillway (Elevation) | N/A |
| (10) Emergency Spillway (Elevation) | N/A |
| (11) Existing Sediment Capacity (To Cleanout) | N/A |

| GENERAL | |
|-------------------------------|-------------------------------|
| (12) Comments/Recommendations | Stock/Wildlife Watering Pond. |

STATEMENT

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized in the State of Utah to inspect and certify the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meets or exceeds the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.



 (Signature)

 11/21/00
 (Date)



APPENDIX B

Reporting of Technical Data

including monitoring data, reports, maps, and other information
as required under the approved plan
or as required by the Division

in accordance with the requirements of R645-301-130 and R645-301-140.

Contents

Vegetation Report

VEGETATION MONITORING
AT THE
GORDON CREEK 2/7/8 MINES
2000

RECLAIMED AREAS
&
THE MOUNTAIN BRUSH/GRASS
REFERENCE AREA



Prepared by

MT. NEBO SCIENTIFIC, INC.
330 East 400 South, Suite 6
Springville, Utah 84663
(801) 489-6937

Patrick D. Collins, Ph.D.

for

CANYON FUEL COMPANY
P.O. Box 719
Helper, Utah 84526

February 2001

TABLE OF CONTENTS

| | |
|--------------------------------------|-------|
| INTRODUCTION | 1 |
| METHODS | 2 |
| Transect and Quadrat Placement | 2 |
| Cover and Composition | 3 |
| Woody Species Density | 4 |
| Diversity | 4 |
| Photographs | 5 |
| Raw Data | 5 |
| RESULTS | 6 |
| Reclaimed Areas | 6 |
| Reference Area | 6 |
| DISCUSSION | 7 |
| SUMMARY TABLES | 9-12 |
| COLOR PHOTOGRAPHS | 13-15 |
| APPENDIX | 16 |

VEGETATION MONITORING
AT THE
GORDON CREEK 2/7/8 MINES
2000

INTRODUCTION

Gordon Creek 2/7/8 is an area where coal mining has been conducted for many years. Recently, the area has been reclaimed or restored to a condition that is closer to what it was prior to disturbances made by mining activities. After sealing the portals, performing earthwork to bring the area back to approximate original contours and reclaiming all right-of-ways, final seeding was accomplished using seeds of native and approved introduced plant species (see Fig. 1). Final seeding for most of the area occurred in October 1998 with follow-up seeding on the regraded roads in October 1999.

The following report has been prepared to monitor the current condition of the vegetation of the restored or *Reclaimed Areas* at Gordon Creek 2/7/8 Mines. The Reclaimed Areas will be compared to a *Reference Area* that has been chosen as a standard for final revegetation success.

The Gordon Creek 2/7/8 mine site is located in the Bryner Canyon and Beaver Creek area at about 8,000 ft elevation in Carbon County, Utah. General plant communities surrounding the area include Mountain Brush/Grass, Oak Shrubland, Sagebrush/Grass, Aspen, and Douglas Fir.

| | |
|-----------------------|--|
| SHRUBS | |
| Bitterbrush | (<i>Purshia tridentata</i>) |
| Mtn. Mahogany | (<i>Cercocarpus ledifolius</i>) |
| Rubber rabbitbrush | (<i>Chrysothamnus nauseosus</i>) |
| Blue elderberry | (<i>Sambucus caerulea</i>) |
| Snowberry | (<i>Symphoricarpos albus</i>) |
| Sagebrush | (<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>) |
| FORBS | |
| Northern sweetvetch | (<i>Hedysarum boreale</i>) |
| Cicer milkvetch | (<i>Astragalus cicer</i>) |
| Purple daisy fleabane | (<i>Erigeron corymbosus</i>) |
| Little sunflower | (<i>Helianthella uniflora</i>) |
| Rocky Mt. penstemon | (<i>Penstemon strictus</i>) |
| Yellow sweet clover | (<i>Melilotus officinalis</i>) |
| Alfalfa (Ladak) | (<i>Medicago sativa</i>) |
| Pacific Aster | (<i>Aster chilensis</i>) |
| GRASSES | |
| Thickspike wheatgrass | (<i>Elymus lanceolatus</i>) |
| Bluebunch wheatgrass | (<i>Elymus spicatus</i>) |
| Slender wheatgrass | (<i>Elymus trachycaulus</i>) |
| Indian ricegrass | (<i>Stipa hymenoides</i>) |
| Gt. Basin wildrye | (<i>Elymus cinereus</i>) |

FIGURE 1: Final Seed Mixture for the Gordon Creek 2/7/8 Mine Site

METHODS

Methodologies used herein were performed in accordance with the guidelines supplied by the State of Utah, Division of Oil, Gas and Mining (DOGM). Quantitative and qualitative data were taken on the vegetation of the Reclaimed Areas and the Mountain Brush/Grass Reference Area. Sampling was conducted in mid-September, 2000.

Transect and Quadrat Placement

Transect lines for sampling were placed randomly throughout the Reclaimed and Reference Areas.

Random/regular placement of sampling quadrats were designed to record data without preconceived bias. This was accomplished in the Reclaimed Areas by establishing one long transect line along the entire length of the area. This line was placed as a central axis in the middle of the Reclaimed Area. At frequent and regular intervals along the central axis line, random numbers were generated and used to measure distances at right angles from the line to determine sample locations. Whether these random numbers were odd or even determined which side of the central axis line (north or south) a given quadrat was measured for placement. The random numbers selected could be high enough to place quadrats to the lateral limits of the Reclaimed Areas as well as all areas in-between. This insured that the sample quadrats were placed randomly over the entire study area in an attempt to adequately represent the site as a whole.

In the Reference Area three separate transect lines were placed randomly for the length of the area. To adequately sample the entire area, random numbers were taken from these transect lines using the same methods as described above for the Reclaimed Areas.

Cover and Composition

Cover estimates were made using ocular methods with meter square quadrats. Species composition and relative frequencies were also assessed from the quadrats. Additional information recorded on the raw data sheets were: estimated precipitation, slope, exposure, grazing use, animal disturbance and other appropriate notes. Plant nomenclature follows "A Utah

Flora" (Welsh et al., 1993).

Woody Species Density

Density of woody plant species of the Reclaimed Areas was estimated using belt transects that were 5 ft by 50 ft (250 ft²) in size. Total number of individuals by species were counted in each of the belt transects. The average number was then calculated followed by the number of individuals per acre.

Because the density numbers were so much different in the Reference Area when compared to the Reclaimed Areas, different sampling methods were warranted. For the Reference Area, the point quarter method was employed. In this 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. Again, the number of individuals per acre was the end results of the calculations.

Diversity

Three diversity indices have been reported in this document for the Reclaimed and Reference Areas. MacArthur's Diversity Index is an effective diversity measurement and is computed using the following equation:

$$1/\sum p_i^2$$

where,

p_i is the proportion of sum frequency contributed by the i th species in the sample area of concern.

The proportional contribution of each species is then squared and the values for all species in the sample areas are summed. This index integrates the number of species and the degree to which frequency of occurrence was equitably distributed among those species.

Another diversity measurement was provided that shows the average number of species encountered at each quadrat – or a measure of species diversity. Finally, a third measure of diversity or “richness” is simply the total number of species encountered in the quadrats.

Photographs

Color photographs of the sample areas were taken at the time of sampling and have been submitted with this report.

Raw Data

The raw data for cover have been summarized on a spreadsheet and are included in this report.

RESULTS

Reclaimed Areas

The total living cover for the Reclaimed Areas was estimated at 46.88% (Table 1-A). The living cover was comprised of 70% forbs, 29% grasses and 1% shrubs (Table 1-B). Woody species density was estimated at 135 plants per acre (Table 1-C).

By far, the dominant plant species by cover and frequency was a forb, alfalfa (*Medicago sativa*), followed distantly by thickspike wheatgrass (*Elymus lanceolatus*), then Cicer milkvetch (*Astragalus cicer*). For a list of species by cover and frequency, refer to Table 2.

Three diversity indices have been reported in Table 1-D. The average number of species per meter square was 2.98. Total Diversity using MacArthur's Index was 9.274. Finally, the total number of species encountered in the sample quadrats was 18.

Reference Area

The Mountain Brush/Grass Reference Area had a total living cover of 40.83% (Table 3-A), 73% of which were grasses, 25% shrubs and only 2% forbs (Table 3-B). The sampling results revealed that the woody species density was 1,568 individuals per acre (Table 3-C).

The dominant plant species for the Reference Area was the grass, Salina wildrye (*Elymus*

salinus). It was present in all of the sample quadrats (Table 4). The next most common species were the shrubs antelope bitterbrush (*Purshia tridentata*) and alder-leaf mountain mahogany (*Cercocarpus montanus*).

The three diversity indices for the Reference Area are shown in Table 3-D. The average number of species per meter square was 2.20. Total Diversity using MacArthur's Index was 3.892, whereas, the total number of species encountered in the sample quadrats was 11.0.

DISCUSSION

Results from quantitative sampling suggest that vegetation establishment on the restored areas of Gordon Creek 2/7/8 Mines is progressing quite well. Total living cover is greater on the revegetated areas when compared to the Reference Area, or as previously mentioned, the area chosen to be used as a standard for final revegetation success. Although the reclaimed disturbed areas were dominated by only a few species, the number of species 'present' in the quadrats and the lifeform composition were encouraging. Also, the lack of "weedy" species in the cover was reassuring.

As first suggested by shrub cover results, woody species were not an important component of the data. This was further demonstrated by results from the woody species density measurements. Total mean density in the Reclaimed Areas was only 135 plants per acre as compared to 1,568 in the Reference Area.

As expected, the Reclaimed Areas would not meet final revegetation standards at this time. It may be predicted, if not, expected, that the site will improve over time. Even though several of the desirable species were not 'abundant', the fact that these species were 'present' in the data is important, increasing the species diversity indices. These species will probably become a more important component over time by out-competing or decreasing the values of some of the more common species. Still, indices of species diversity suggest the Reclaimed Areas are more diverse than the Reference Area. And yet, further scrutiny of the cover data reveal that alfalfa is probably more abundant than would be preferred in a 'natural' condition – a possible indication that the community is not yet stable.

Natural establishment of the restored areas by an increase in woody species density to a number closer to that of the Reference Area is possible but unpredictable. It may be a good idea to closely monitor this situation or even augment the site by transplanting additional shrubs to increase density and to provide seed sources that enhance establishment of more woody species over time.

TABLE 1: Summary of total cover (A), composition (B), woody species density (C), and diversity (D) for the Reclaimed Areas of Gordon Creek 2/7/8 Mines (2000).

A.

| TOTAL COVER | % MEAN COVER | STANDARD DEVIATION | SAMPLE SIZE |
|--------------|--------------|--------------------|-------------|
| Total Living | 46.88 | 14.08 | 40 |
| Litter | 8.75 | 3.67 | 40 |
| Bareground | 23.50 | 13.00 | 40 |
| Rock | 20.88 | 11.77 | 40 |

B.

| UNDERSTORY COMPOSITION | PERCENT | STANDARD DEVIATION | SAMPLE SIZE |
|------------------------|---------|--------------------|-------------|
| Shrubs | 1.07 | 3.27 | 40 |
| Forbs | 69.84 | 21.84 | 40 |
| Grasses | 29.09 | 22.69 | 40 |

C.

| WOODY SPECIES DENSITY | NUMBER/ACRE |
|-----------------------------|--------------|
| <i>Artemisia tridentata</i> | 82.76 |
| <i>Purshia tridentata</i> | <u>52.27</u> |
| TOTAL | 135.03 |

D.

| DIVERSITY | |
|-------------------------------------|--------|
| Mean No. Species Per Square Meter | 2.980 |
| Total Diversity (MacArthur's Index) | 9.274 |
| Total Species Present (Richness) | 18.000 |

TABLE 2: Summary of living cover and frequency by species for the Reclaimed Areas of Gordon Creek 2/7/8 Mines (2000).

**UNDERSTORY COVER
BY SPECIES**

| | MEAN COVER | STANDARD DEVIATION | RELATIVE FREQUENCY | SAMPLE SIZE |
|------------------------------|---------------|-----------------------|-----------------------|----------------|
| <u>Trees & Shrubs</u> | | | | |
| <i>Artemisia tridentata</i> | 0.25 | 1.09 | 5.00 | 40 |
| <i>Purshia tridentata</i> | 0.25 | 1.09 | 5.00 | 40 |
| <u>Forbs</u> | | | | |
| <i>Achillea millefolium</i> | 0.38 | 1.32 | 7.50 | 40 |
| <i>Astragalus cicer</i> | 3.00 | 5.10 | 35.00 | 40 |
| <i>Hedysarum boreale</i> | 0.13 | 0.78 | 2.50 | 40 |
| <i>Linum lewisii</i> | 0.95 | 2.22 | 17.50 | 40 |
| <i>Medicago sativa</i> | 28.63 | 16.58 | 45.00 | 40 |
| <i>Melilotus officinalis</i> | 0.25 | 1.09 | 5.00 | 40 |
| <i>Penstemon</i> sp. | 0.93 | 2.21 | 17.50 | 40 |
| <u>Grasses</u> | | | | |
| <i>Agropyron cristatum</i> | 0.25 | 1.09 | 5.00 | 40 |
| <i>Bromus carinatus</i> | 0.38 | 1.32 | 7.50 | 40 |
| <i>Elymus cinereus</i> | 1.00 | 2.55 | 15.00 | 40 |
| <i>Elymus hispidus</i> | 0.88 | 3.52 | 7.50 | 40 |
| <i>Elymus lanceolatus</i> | 5.13 | 5.75 | 65.00 | 40 |
| <i>Elymus spicatus</i> | 1.75 | 3.80 | 20.00 | 40 |
| <i>Elymus trachycaulus</i> | 1.38 | 3.35 | 17.50 | 40 |
| <i>Poa pratensis</i> | 1.13 | 3.06 | 15.00 | 40 |
| <i>Stipa hymenoides</i> | 0.25 | 1.09 | 5.00 | 40 |

TABLE 3: Summary of total cover (A), composition (B), woody species density (C), and diversity (D) for the Mountain Brush/Grass Reference Area of Gordon Creek 2/7/8 Mines (2000).

A.

| TOTAL COVER | % MEAN COVER | STANDARD DEVIATION | SAMPLE SIZE |
|--------------|--------------|--------------------|-------------|
| Total Living | 40.83 | 14.72 | 30 |
| Litter | 17.33 | 11.01 | 30 |
| Bareground | 18.40 | 13.95 | 30 |
| Rock | 23.43 | 17.40 | 30 |

B.

| UNDERSTORY COMPOSITION | PERCENT | STANDARD DEVIATION | SAMPLE SIZE |
|------------------------|---------|--------------------|-------------|
| Shrubs | 24.60 | 25.96 | 30 |
| Forbs | 1.97 | 6.01 | 30 |
| Grasses | 73.43 | 26.74 | 30 |

C.

| WOODY SPECIES DENSITY | NUMBER/ACRE |
|----------------------------------|--------------|
| <i>Amalanchier utahensis</i> | 287.47 |
| <i>Cercocarpus montanus</i> | 274.40 |
| <i>Eriogonum corymbosum</i> | 169.87 |
| <i>Gutierrezia sarothrae</i> | 365.87 |
| <i>Mahonia repens</i> | 13.07 |
| <i>Purshia tridentata</i> | 365.87 |
| <i>Symphoricarpos oreophilus</i> | <u>91.47</u> |
| TOTAL | 1568.02 |

D.

| DIVERSITY | |
|-------------------------------------|--------|
| Mean No. Species Per Square Meter | 2.200 |
| Total Diversity (MacArthur's Index) | 3.982 |
| Total Species Present (Richness) | 11.000 |

TABLE 4: Summary of living cover and frequency by species for the Mountain/Grass Brush Reference Area of Gordon Creek 2/7/8 Mines (2000).

**UNDERSTORY COVER
BY SPECIES**

| | MEAN COVER | STANDARD DEVIATION | RELATIVE FREQUENCY | SAMPLE SIZE |
|----------------------------------|---------------|-----------------------|-----------------------|----------------|
| <u>Trees & Shrubs</u> | | | | |
| <i>Amalanchier utahensis</i> | 0.23 | 1.26 | 3.33 | 30 |
| <i>Artemisia tridentata</i> | | | | |
| <i>Cercocarpus montanus</i> | 2.33 | 6.16 | 16.67 | 30 |
| <i>Eriogonum corymbosum</i> | 1.17 | 4.02 | 10.00 | 30 |
| <i>Gutierrezia sarothrae</i> | 1.33 | 2.56 | 23.33 | 30 |
| <i>Purshia tridentata</i> | 7.33 | 15.48 | 26.67 | 30 |
| <i>Symphoricarpos oreophilus</i> | 0.33 | 1.25 | 6.67 | 30 |
| <u>Forbs</u> | | | | |
| <i>Artemisia dracunculus</i> | 0.33 | 1.25 | 3.33 | 30 |
| <i>Eriogonum sp.</i> | 0.33 | 1.25 | 6.67 | 30 |
| <i>Stanleya pinnata</i> | 0.03 | 0.18 | 3.33 | 30 |
| <u>Grasses</u> | | | | |
| <i>Elymus salinus</i> | 26.37 | 9.74 | 100.00 | 30 |
| <i>Stipa hymenoides</i> | 1.13 | 2.43 | 20.00 | 30 |

COLOR PHOTOGRAPHS

Reclaimed Areas (West to East)



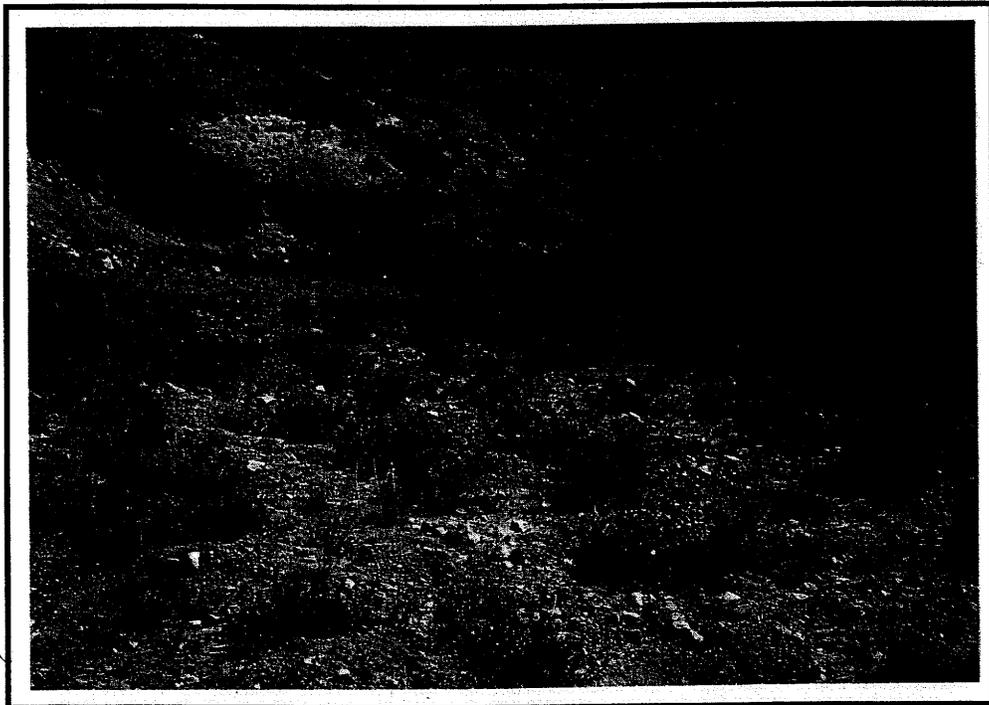
Reclaimed Area (1 of 4)



Reclaimed Area (2 of 4)



Reclaimed Area (3 of 4)

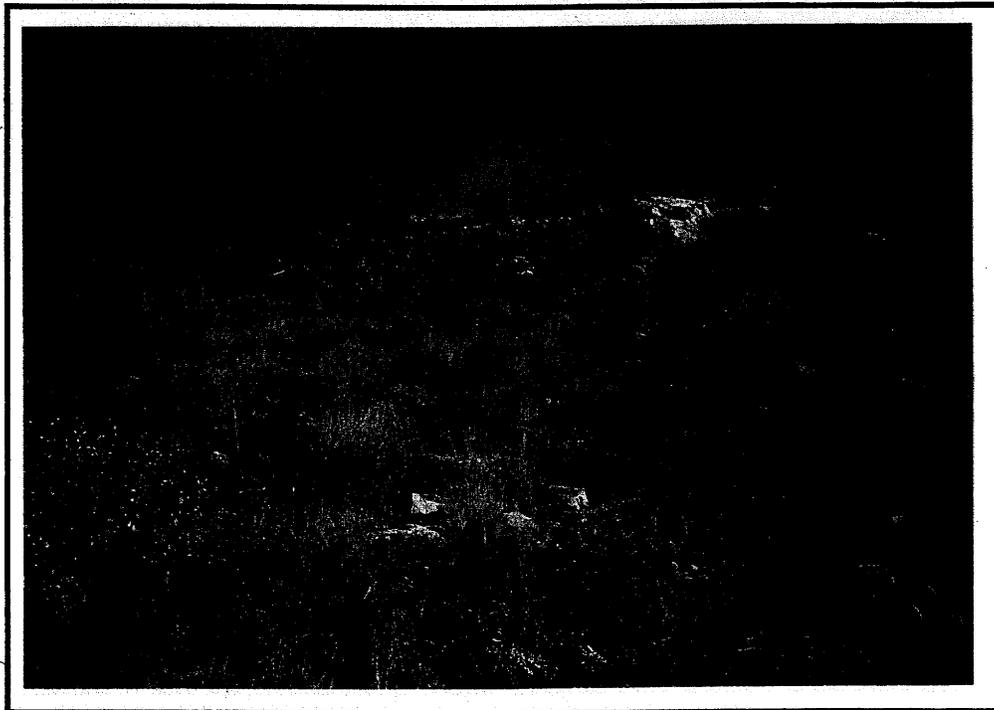


Reclaimed Area (4 of 4)

Reference Area



Reference Area (1 of 2)



Reference Area (2 of 2)

APPENDIX
(Raw Data)

CANYON FUELS - GORDON CREEK 2/7/8

Reclaimed Areas

Exposure: Variable

1 thru 20 Area from top of disturbed area down to first sediment pond

Slope: Variable

Sample Date: 19 Sept 00

| | 1.00 | 2.00 | 3.00 | 4.00 | 5.00 | 6.00 | 7.00 |
|------------------------------|-------|-------|-------|-------|-------|-------|-------|
| TREES & SHRUBS | | | | | | | |
| <i>Artemisia tridentata</i> | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| <i>Purshia tridentata</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.00 | 0.00 |
| FORBS | | | | | | | |
| <i>Achillea millefolium</i> | 0.00 | 0.00 | 0.00 | 0.00 | 5.00 | 0.00 | 0.00 |
| <i>Astragalus cicer</i> | 10.00 | 5.00 | 5.00 | 5.00 | 0.00 | 10.00 | 25.00 |
| <i>Hedysarum boreale</i> | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| <i>Linum lewisii</i> | 0.00 | 3.00 | 5.00 | 0.00 | 5.00 | 0.00 | 0.00 |
| <i>Medicago sativa</i> | 10.00 | 35.00 | 20.00 | 0.00 | 30.00 | 40.00 | 0.00 |
| <i>Melilotus officinalis</i> | 0.00 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| <i>Penstemon sp.</i> | 5.00 | 2.00 | 5.00 | 0.00 | 0.00 | 0.00 | 5.00 |
| GRASSES | | | | | | | |
| <i>Agropyron cristatum</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| <i>Bromus carinatus</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| <i>Elymus cinereus</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| <i>Elymus hispidus</i> | 0.00 | 0.00 | 0.00 | 20.00 | 0.00 | 0.00 | 0.00 |
| <i>Elymus lanceolatus</i> | 0.00 | 5.00 | 5.00 | 0.00 | 10.00 | 5.00 | 5.00 |
| <i>Elymus spicatus</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| <i>Elymus trachycaulus</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| <i>Poa pratensis</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| <i>Stipa hymenoides</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| COVER | | | | | | | |
| Total Living Cover | 35.00 | 55.00 | 40.00 | 25.00 | 50.00 | 60.00 | 35.00 |
| Litter | 5.00 | 10.00 | 5.00 | 10.00 | 10.00 | 5.00 | 10.00 |
| Bareground | 50.00 | 20.00 | 35.00 | 35.00 | 25.00 | 25.00 | 25.00 |
| Rock | 10.00 | 15.00 | 20.00 | 30.00 | 15.00 | 10.00 | 30.00 |
| % COMPOSITION | | | | | | | |
| Shrubs | 14.29 | 0.00 | 0.00 | 0.00 | 0.00 | 8.33 | 0.00 |
| Forbs | 85.71 | 90.91 | 87.50 | 20.00 | 80.00 | 83.33 | 85.71 |
| Grasses | 0.00 | 9.09 | 12.50 | 80.00 | 20.00 | 8.33 | 14.29 |

| 8.00 | 9.00 | 10.00 | 11.00 | 12.00 | 13.00 | 14.00 | 15.00 | 16.00 | 17.00 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 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 | 5.00 | 0.00 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 10.00 | 10.00 | 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 | 5.00 | 5.00 | 0.00 | 0.00 | 0.00 |
| 50.00 | 15.00 | 40.00 | 15.00 | 45.00 | 5.00 | 15.00 | 30.00 | 40.00 | 40.00 |
| 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 | 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 | 10.00 | 0.00 | 0.00 | 5.00 | 5.00 | 0.00 | 0.00 | 5.00 |
| 5.00 | 0.00 | 0.00 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 10.00 | 0.00 | 0.00 | 5.00 | 5.00 | 20.00 | 5.00 | 25.00 |
| 0.00 | 10.00 | 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 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 10.00 | 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 |
| 65.00 | 40.00 | 70.00 | 45.00 | 65.00 | 30.00 | 35.00 | 50.00 | 50.00 | 75.00 |
| 10.00 | 10.00 | 15.00 | 10.00 | 5.00 | 5.00 | 10.00 | 5.00 | 5.00 | 5.00 |
| 15.00 | 15.00 | 5.00 | 30.00 | 20.00 | 45.00 | 35.00 | 30.00 | 10.00 | 5.00 |
| 10.00 | 35.00 | 10.00 | 15.00 | 10.00 | 20.00 | 20.00 | 15.00 | 35.00 | 15.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.00 | 0.00 |
| 92.31 | 50.00 | 71.43 | 77.78 | 76.92 | 33.33 | 71.43 | 60.00 | 80.00 | 53.33 |
| 7.69 | 50.00 | 28.57 | 22.22 | 23.08 | 66.67 | 28.57 | 40.00 | 10.00 | 46.67 |

21 thru 40 Are from that pond to the bottom ponds

| 18.00 | 19.00 | 20.00 | 21.00 | 22.00 | 23.00 | 24.00 | 25.00 | 26.00 | 27.00 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 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 | 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 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 40.00 | 45.00 | 5.00 | 0.00 | 30.00 | 25.00 | 25.00 | 30.00 | 70.00 | 35.00 |
| 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 | 5.00 | 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 | 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 | 5.00 | 5.00 | 10.00 | 5.00 | 10.00 | 0.00 | 5.00 | 0.00 | 5.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.00 | 5.00 | 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 | 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 |
| 50.00 | 50.00 | 30.00 | 30.00 | 50.00 | 40.00 | 35.00 | 40.00 | 75.00 | 45.00 |
| 15.00 | 10.00 | 5.00 | 5.00 | 10.00 | 5.00 | 10.00 | 5.00 | 15.00 | 10.00 |
| 10.00 | 25.00 | 20.00 | 5.00 | 30.00 | 15.00 | 40.00 | 15.00 | 5.00 | 30.00 |
| 25.00 | 15.00 | 45.00 | 60.00 | 10.00 | 40.00 | 15.00 | 40.00 | 5.00 | 15.00 |
| 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 80.00 | 90.00 | 50.00 | 50.00 | 60.00 | 62.50 | 71.43 | 75.00 | 93.33 | 77.78 |
| 10.00 | 10.00 | 50.00 | 50.00 | 40.00 | 37.50 | 28.57 | 25.00 | 6.67 | 22.22 |

| 28.00 | 29.00 | 30.00 | 31.00 | 32.00 | 33.00 | 34.00 | 35.00 | 36.00 | 37.00 |
|--------|-------|-------|-------|-------|--------|-------|-------|-------|-------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 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 | 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 | 5.00 | 0.00 | 0.00 | 10.00 |
| 40.00 | 40.00 | 30.00 | 30.00 | 5.00 | 0.00 | 25.00 | 45.00 | 35.00 | 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 | 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 | 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 | 5.00 | 5.00 | 5.00 | 10.00 | 5.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.00 | 0.00 | 15.00 |
| 0.00 | 10.00 | 0.00 | 5.00 | 15.00 | 0.00 | 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 |
| 0.00 | 0.00 | 0.00 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 45.00 | 50.00 | 35.00 | 45.00 | 30.00 | 15.00 | 40.00 | 75.00 | 45.00 | 55.00 |
| 10.00 | 15.00 | 10.00 | 10.00 | 5.00 | 5.00 | 5.00 | 5.00 | 10.00 | 10.00 |
| 10.00 | 25.00 | 35.00 | 35.00 | 40.00 | 55.00 | 35.00 | 5.00 | 15.00 | 20.00 |
| 35.00 | 10.00 | 20.00 | 10.00 | 25.00 | 25.00 | 20.00 | 15.00 | 30.00 | 15.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 100.00 | 80.00 | 85.71 | 66.67 | 16.67 | 0.00 | 75.00 | 60.00 | 88.89 | 72.73 |
| 0.00 | 20.00 | 14.29 | 33.33 | 83.33 | 100.00 | 25.00 | 40.00 | 11.11 | 27.27 |

CANYON FUELS - GORDON CREEK 2

Reclaimed Areas

Exposure: Variable

Slope: Variable

Sample Date: 19 Sept 00

| 38.00 | 39.00 | 40.00 | Mean | SDev | Freq | |
|-------|-------|-------|-------|-------|-------|-------------------------------|
| <hr/> | | | | | | TREES & SHRUBS |
| 0.00 | 0.00 | 0.00 | 0.25 | 1.09 | 5.00 | <i>Artemisia tridentata</i> |
| 0.00 | 0.00 | 0.00 | 0.25 | 1.09 | 5.00 | <i>Purshia tridentata</i> |
| | | | | | | FORBS |
| 0.00 | 0.00 | 0.00 | 0.38 | 1.32 | 7.50 | <i>Achillea millefolium</i> |
| 0.00 | 0.00 | 0.00 | 3.00 | 5.10 | 35.00 | <i>Astragalus cicer</i> |
| 0.00 | 0.00 | 0.00 | 0.13 | 0.78 | 2.50 | <i>Hedysarum boreale</i> |
| 0.00 | 0.00 | 0.00 | 0.95 | 2.22 | 17.50 | <i>Linum lewisii</i> |
| 45.00 | 55.00 | 35.00 | 28.63 | 16.58 | 45.00 | <i>Medicago sativa</i> |
| 0.00 | 0.00 | 0.00 | 0.25 | 1.09 | 5.00 | <i>Mellilotus officinalis</i> |
| 0.00 | 0.00 | 0.00 | 0.93 | 2.21 | 17.50 | <i>Penstemon sp.</i> |
| | | | | | | GRASSES |
| 0.00 | 0.00 | 0.00 | 0.25 | 1.09 | 5.00 | <i>Agropyron cristatum</i> |
| 0.00 | 0.00 | 0.00 | 0.38 | 1.32 | 7.50 | <i>Bromus carinatus</i> |
| 0.00 | 0.00 | 0.00 | 1.00 | 2.55 | 15.00 | <i>Elymus cinereus</i> |
| 0.00 | 0.00 | 0.00 | 0.88 | 3.52 | 7.50 | <i>Elymus hispidus</i> |
| 0.00 | 0.00 | 20.00 | 5.13 | 5.75 | 65.00 | <i>Elymus lanceolatus</i> |
| 0.00 | 10.00 | 0.00 | 1.75 | 3.80 | 20.00 | <i>Elymus spicatus</i> |
| 0.00 | 0.00 | 0.00 | 1.38 | 3.35 | 17.50 | <i>Elymus trachycaulus</i> |
| 0.00 | 0.00 | 0.00 | 1.13 | 3.06 | 15.00 | <i>Poa pratensis</i> |
| 5.00 | 0.00 | 0.00 | 0.25 | 1.09 | 5.00 | <i>Stipa hymenoides</i> |
| <hr/> | | | | | | COVER |
| 50.00 | 65.00 | 55.00 | 46.88 | 14.08 | | Total Living Cover |
| 20.00 | 10.00 | 10.00 | 8.75 | 3.67 | | Litter |
| 5.00 | 15.00 | 25.00 | 23.50 | 13.00 | | Bareground |
| 25.00 | 10.00 | 10.00 | 20.88 | 11.77 | | Rock |
| <hr/> | | | | | | % COMPOSITION |
| 0.00 | 0.00 | 0.00 | 1.07 | 3.27 | | Shrubs |
| 90.00 | 84.62 | 63.64 | 69.84 | 21.84 | | Forbs |
| 10.00 | 15.38 | 36.36 | 29.09 | 22.69 | | Grasses |

CANYON FUELS - GORDON CREEK 2/7/8

Reference Area

Exposure: SSE

Slope: 33 deg

Sample Date: 20 Sept 00

| | 1.00 | 2.00 | 3.00 | 4.00 | 5.00 | 6.00 | 7.00 |
|--|------|------|------|------|------|------|------|
|--|------|------|------|------|------|------|------|

TREES & SHRUBS

| | | | | | | | |
|----------------------------------|------|-------|------|-------|-------|-------|-------|
| <i>Amalanchier utahensis</i> | 7.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| <i>Cercocarpus montanus</i> | 0.00 | 0.00 | 0.00 | 0.00 | 15.00 | 0.00 | 20.00 |
| <i>Eriogonum corymbosum</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| <i>Gutierrezia sarothrae</i> | 0.00 | 10.00 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| <i>Purshia tridentata</i> | 0.00 | 0.00 | 0.00 | 25.00 | 0.00 | 50.00 | 10.00 |
| <i>Symphoricarpos oreophilus</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

FORBS

| | | | | | | | |
|------------------------------|------|------|------|------|------|------|------|
| <i>Artemisia dracunculus</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| <i>Eriogonum jamesii</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| <i>Stanleya pinnata</i> | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

GRASSES

| | | | | | | | |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| <i>Stipa hymenoides</i> | 0.00 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| <i>Elymus salinus</i> | 33.00 | 15.00 | 30.00 | 40.00 | 35.00 | 10.00 | 20.00 |

COVER

| | | | | | | | |
|--------------------|-------|-------|-------|-------|-------|-------|-------|
| Total Living Cover | 40.00 | 35.00 | 35.00 | 65.00 | 50.00 | 60.00 | 50.00 |
| Litter | 15.00 | 10.00 | 10.00 | 20.00 | 45.00 | 20.00 | 15.00 |
| Bareground | 30.00 | 30.00 | 20.00 | 10.00 | 4.00 | 10.00 | 20.00 |
| Rock | 15.00 | 25.00 | 35.00 | 5.00 | 1.00 | 10.00 | 15.00 |

% COMPOSITION

| | | | | | | | |
|---------|-------|-------|-------|-------|-------|-------|-------|
| Shrubs | 17.50 | 28.57 | 14.29 | 38.46 | 30.00 | 83.33 | 60.00 |
| Forbs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Grasses | 82.50 | 71.43 | 85.71 | 61.54 | 70.00 | 16.67 | 40.00 |

| 8.00 | 9.00 | 10.00 | 11.00 | 12.00 | 13.00 | 14.00 | 15.00 | 16.00 | 17.00 |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|--------|
| 0.00 | 0.00 | 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 | 0.00 | 5.00 | 0.00 | 20.00 | 0.00 | 0.00 |
| 5.00 | 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 | 0.00 | 5.00 | 5.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 5.00 | 4.00 | 0.00 | 0.00 | 0.00 | 5.00 | 0.00 | 0.00 |
| 40.00 | 35.00 | 25.00 | 35.00 | 35.00 | 20.00 | 30.00 | 40.00 | 25.00 | 25.00 |
| 45.00 | 35.00 | 40.00 | 40.00 | 40.00 | 35.00 | 35.00 | 65.00 | 30.00 | 25.00 |
| 10.00 | 10.00 | 10.00 | 15.00 | 20.00 | 10.00 | 10.00 | 5.00 | 5.00 | 10.00 |
| 15.00 | 40.00 | 5.00 | 30.00 | 10.00 | 10.00 | 5.00 | 20.00 | 40.00 | 35.00 |
| 30.00 | 15.00 | 45.00 | 15.00 | 30.00 | 45.00 | 50.00 | 10.00 | 25.00 | 30.00 |
| 11.11 | 0.00 | 25.00 | 0.00 | 12.50 | 28.57 | 0.00 | 30.77 | 16.67 | 0.00 |
| 0.00 | 0.00 | 0.00 | 2.50 | 0.00 | 14.29 | 14.29 | 0.00 | 0.00 | 0.00 |
| 88.89 | 100.00 | 75.00 | 97.50 | 87.50 | 57.14 | 85.71 | 69.23 | 83.33 | 100.00 |

| 18.00 | 19.00 | 20.00 | 21.00 | 22.00 | 23.00 | 24.00 | 25.00 | 26.00 | 27.00 |
|-------|--------|-------|-------|-------|-------|--------|--------|--------|--------|
| 0.00 | 0.00 | 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 | 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 | 5.00 | 0.00 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 65.00 | 0.00 | 0.00 | 0.00 | 20.00 | 25.00 | 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 |
| 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.00 |
| 5.00 | 25.00 | 25.00 | 20.00 | 10.00 | 25.00 | 40.00 | 25.00 | 20.00 | 30.00 |
| 75.00 | 25.00 | 30.00 | 25.00 | 40.00 | 75.00 | 40.00 | 25.00 | 20.00 | 35.00 |
| 20.00 | 10.00 | 15.00 | 10.00 | 10.00 | 20.00 | 25.00 | 50.00 | 20.00 | 35.00 |
| 4.00 | 15.00 | 15.00 | 10.00 | 10.00 | 4.00 | 10.00 | 20.00 | 5.00 | 15.00 |
| 1.00 | 50.00 | 40.00 | 55.00 | 40.00 | 1.00 | 25.00 | 5.00 | 55.00 | 15.00 |
| 86.67 | 0.00 | 16.67 | 20.00 | 75.00 | 66.67 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13.33 | 100.00 | 83.33 | 80.00 | 25.00 | 33.33 | 100.00 | 100.00 | 100.00 | 100.00 |

CANYON FUELS - GORDON CREEK 2

Reference Area

Exposure: SSE

Slope: 33 deg

Sample Date: 20 Sept 00

| 28.00 | 29.00 | 30.00 | Mean | SDev | Freq | |
|--------|-------|-------|-------|-------|--------|----------------------------------|
| | | | | | | TREES & SHRUBS |
| 0.00 | 0.00 | 0.00 | 0.23 | 1.26 | 3.33 | <i>Amalanchier utahensis</i> |
| 0.00 | 0.00 | 0.00 | 2.33 | 6.16 | 16.67 | <i>Cercocarpus montanus</i> |
| 0.00 | 0.00 | 0.00 | 1.17 | 4.02 | 10.00 | <i>Eriogonum corymbosum</i> |
| 0.00 | 0.00 | 0.00 | 1.33 | 2.56 | 23.33 | <i>Gutierrezia sarothrae</i> |
| 0.00 | 15.00 | 10.00 | 7.33 | 15.48 | 26.67 | <i>Purshia tridentata</i> |
| 0.00 | 5.00 | 0.00 | 0.33 | 1.25 | 6.67 | <i>Symphoricarpos oreophilus</i> |
| | | | | | | FORBS |
| 0.00 | 0.00 | 7.00 | 0.23 | 1.26 | 3.33 | <i>Artemisia dracunculus</i> |
| 0.00 | 0.00 | 0.00 | 0.33 | 1.25 | 6.67 | <i>Eriogonum sp.</i> |
| 0.00 | 0.00 | 0.00 | 0.03 | 0.18 | 3.33 | <i>Stanleya pinnata</i> |
| | | | | | | GRASSES |
| 0.00 | 0.00 | 0.00 | 1.13 | 2.43 | 20.00 | <i>Stipa hymenoides</i> |
| 30.00 | 35.00 | 8.00 | 26.37 | 9.74 | 100.00 | <i>Elymus salinus</i> |
| | | | | | | COVER |
| 30.00 | 55.00 | 25.00 | 40.83 | 14.72 | | Total Living Cover |
| 30.00 | 30.00 | 5.00 | 17.33 | 11.01 | | Litter |
| 35.00 | 10.00 | 65.00 | 18.40 | 13.95 | | Bareground |
| 5.00 | 5.00 | 5.00 | 23.43 | 17.40 | | Rock |
| | | | | | | % COMPOSITION |
| 0.00 | 36.36 | 40.00 | 24.60 | 25.96 | | Shrubs |
| 0.00 | 0.00 | 28.00 | 1.97 | 6.01 | | Forbs |
| 100.00 | 63.64 | 32.00 | 73.43 | 26.74 | | Grasses |

APPENDIX C

Legal, Financial, Compliance and Related Information

Annual Report of Officers
as submitted to the Utah Department of Commerce

and other changes in ownership and control information
as required under R645-301-110.

Contents

Mountain Coal and Arch Coal Company Officers

Mountain Coal Company, L.L.C.

Status: Active
Formation: Delaware

Entity Type: Limited Liability Company

Primary Address

CityPlace One
Suite 300
St. Louis, MO 63141

Registered Address

The Corporation Trust Company
Corporation Trust Center
1209 Orange Street
Wilmington, DE

DIRECTORS

| | Title |
|---------------------|--------------|
| Eugene E. DiClaudio | Director |
| C. Henry Besten | Director |
| Robert G. Jones | Director |
| Robert W. Shanks | Director |
| Kenneth G. Woodring | Director |

OFFICERS

| | Title |
|---------------------|-------------------------------|
| Eugene E. DiClaudio | President and General Manager |
| James E. Florczak | Vice President & Treasurer |
| Rosemary L. Klein | Secretary |
| William H. Rose | Assistant Secretary |

INCORPORATION/QUALIFICATIONS

| Jurisdiction | Inc/Qual |
|---------------------|-----------------|
| Delaware | Formation |
| Colorado | Qualification |
| Utah | Qualification |

Arch Coal, Inc.

Status: Active
 Incorporation: Delaware
 Entity Type: Corporation
 Federal ID #: 43-0921172

Primary Address

CityPlace One
 Suite 300
 St. Louis, MO 63141-7056

Registered Address

The Corporation Trust Company
 Corporation Trust Center
 1209 Orange Street
 Wilmington, DE 19801

Former Name (s)

Arch Mineral Corporation

From Date

June 20, 1969

Through Date

June 30, 1997

Comment: Changed name to Arch Coal, Inc. upon merger with Ashland Coal, Inc.

DIRECTORS

| | Title |
|---------------------------|--------------|
| Philip W. Block | Director |
| James R. Boyd | Director |
| Theodore D. Sands | Director |
| Thomas L. Feazell | Director |
| Robert L. Hintz | Director |
| Douglas H. Hunt | Director |
| Steven F. Leer | Director |
| James L. Parker | Director |
| A. Michael Perry | Director |
| Ignacio Dominguez Urquijo | Director |

OFFICERS

| | Title |
|-----------------------|---|
| James R. Boyd | Chairman of the Board |
| Steven F. Leer | President & Chief Executive Officer |
| Kenneth G. Woodring | Executive Vice President - Mining Operations |
| John W. Eaves | Senior Vice President - Marketing |
| C. Henry Besten, Jr. | Vice President - Strategic Marketing |
| Robert W. Shanks | Vice President - Operations |
| David B. Peugh | Vice President - Business Development |
| Terry O'Connor | Vice President - External Affairs |
| Larry R. Brown | Vice President & Chief Information Officer |
| William H. Rose | Vice President - Tax Planning |
| Bradley M. Allbritten | Vice President - Human Resources |
| Robert G. Jones | Vice President - Law, General Counsel and Assistant Secretary |
| James E. Florczak | Treasurer |
| John W. Lorson | Controller |
| Rosemary L. Klein | Secretary |
| Charles David Steele | Internal Auditor |

DIRECT SUBSIDIARIES

Arch Australia Pty Limited
Arch Energy Resources, Inc.
Arch Reclamation Services, Inc.
Arch Western Acquisition Corporation
Ark Land Company
Allegheny Land Company
Apogee Coal Company
Arch Coal International, Ltd.
Arch Coal Sales Company, Inc.
Arch Coal Terminal, Inc.
Ashland Terminal, Inc.
Catenary Coal Holdings, Inc.
Coal-Mac, Inc.
Energy Development Co.
Mingo Logan Coal Company
Mountain Gem Land, Inc.
Mountain Mining, Inc.
Mountaineer Land Company
P. C. Holding, Inc.
Paint Creek Terminals, Inc.

Incorp/Formed in

New South Wales, Australia
Delaware
Delaware
Delaware
Delaware
Delaware
Delaware
Barbados
Delaware
Delaware
Delaware
Delaware
Kentucky
Iowa
Delaware
West Virginia
Delaware
Delaware
Delaware
Delaware

INCORPORATION/QUALIFICATIONS

| Jurisdiction | Inc/Qual |
|---------------|---------------|
| Delaware | Incorporation |
| Alabama | Qualification |
| Colorado | Qualification |
| Illinois | Qualification |
| Kentucky | Qualification |
| Missouri | Qualification |
| Montana | Qualification |
| New Mexico | Qualification |
| Virginia | Qualification |
| West Virginia | Qualification |
| Wyoming | Qualification |

APPENDIX D

Mine Maps

as required under R645-301-525.270.

Contents

NONE

APPENDIX E

Other Information

in accordance with the requirements of R645-301 and R645-302.

Contents

NONE