



COPY

March 30, 2004

Lowell Braxton, Director  
Utah Coal Regulatory Program  
1594 West North Temple, Suite 1210  
Box 145801  
Salt Lake City, Utah 84114-5801

*Incoming  
C/O 15/0015 JK*

RE: Emery Mine  
Permit No. ACT/015/015  
2003 Annual Report

Dear Mr. Braxton:

Enclosed please find two copies of Consolidation Coal Company's, 2003 Annual Report for the Emery Mine.

Over the last year, Consolidation Coal Company and its parent company Consol Energy Inc. has undergone several changes involving ownership, officers and directors. Within the 2003 Annual Report (Appendix C-2, "Ownership & Control Information"), listings have been included detailing the current corporate structure and changes in its officers and directors.

If you have any questions or need further information, please contact me at the above location.

Sincerely,

*Timothy D Kirschbaum*

Timothy D. Kirschbaum  
Environmental Engineer  
(304)-534-4748

RECEIVED

APR 01 2004

DIV. OF OIL, GAS & MINING

File in:

- Confidential
- Shelf
- Expandable

Refer to Record No. *0012* Date *03302004*

In C *0150015 Incoming*

*2003 Annual Report*

**CONSOLIDATION COAL COMPANY**

**EMERY MINE**

**PERMIT ACT/015/015**

**ANNUAL REPORT FOR 2003**

RECEIVED

APR 01 2004

DIV. OF OIL, GAS & MINING

To enter text, click in the box and type your response. If a box already contains an entry select the entry and type the replacement. You can use the tab key to move from one field to the next. To select a check box, click in the box or type an x.

## GENERAL INFORMATION

Permitte Name	Consolidation Coal Company
Mine Name	Emery Mine
Operator Name (If other then permittee)	
Permit Expiration Date	January 6, 2006
Permit Number	C/015/015
Authorized Representative Title	John Gefferth, Environmental Engineer
Phone Number	618-625-6850
Fax Number	618-625-6844
E-mail Address	johngefferth@consolenergy.com
Mailing Address	P.O. Box 566, Sesser, IL 62884
Designated Representative	John Gefferth
Resident Agent	CT Corporation Systems
Resident Agent Mailing Address	50 W. Broadway, 8 <sup>th</sup> Floor, Salt Lake City, UT 84101-2006
Number of Binders Submitted	2

## IDENTIFICATION OF OTHER PERMITS

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

Permit Type	ID Number	Description	Expiration Date
MSHA Mine ID(s)	42-00079	Emery Mine	N/A
MSHA Impoundment(s)			
NPDES/UPDES Permit(s)	UT0022616	Minor Industrial	5-31-2004
PSD Permit(s) (Air)	DAQE-177-95	Approval Order Issued 8-5-2002	
Other			

**CERTIFIED REPORTS**

List the certified inspection reports as required by the rules and under the approved plan that must be periodically submitted to the Division. Specify whether the information is included as Appendix A to this report or currently on file with the Division.

Certified Reports:	Required		Included or on file with DOGM		Comments
	Yes	No	Included	On File	
Excess Spoil Piles	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Refuse Piles	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Refuse Pile 1 - Filed Quarterly
Impoundments	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Annual Inspections - see Appendix A-1 for copies
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

**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 report or currently on file with the Division.

Technical Data:	Required		Included or on file with DOGM		Comments
	Yes	No	Included	On file	
Climatological	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Subsidence Monitoring	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	see Appendix B-1
Vegetation Monitoring	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	see Appendix B-2
Raptor Survey	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Soils Monitoring	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	see Appendix B-2
Water Monitoring	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
First quarter	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Second quarter	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Third quarter	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Fourth quarter	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Geological / Geophysical	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Engineering	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Non Coal Waste / Abandoned Underground Equipment*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other Data					
Macroinvertebrate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	see Appendix B-3
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

\*Reminder: If equipment has been abandoned during 2003, an amendment must be submitted that includes a map showing its location, a description of what was abandoned, whether there were any hazardous or toxic materials and any revision to the PHC as necessary.





**APPENDIX A**

**Certified Reports**

Excess Spoil Piles  
Refuse Piles  
Impoundments

As required under R645-301-514

**CONTENTS**

ANNUAL IMPOUNDMENT CERTIFICATION

**CONSOLIDATION COAL COMPANY**  
**EMERY MINE**  
**EMERY, UTAH**  
**ANNUAL IMPOUNDMENT CERTIFICATION**

**POND #1**  
**INSPECTED BY Bruce Ware**

**PERMIT NO. ACT/015/015**  
**DATE 12-20-2003**

**I. PHYSICAL INSPECTION (Stability and Structural Condition)**

	<u>YES</u>	<u>NO</u>
A. Upstream Cracking or Movement		X
B. Downstream Cracking or Movement		X
C. Erosion		X
D. Proper Operation of Discharge System(s)	X	
E. Significant Seepage or Piping	N/A	
F. Existing and Required Monitoring		

**II. FIELD DATA**

A. Pond Volume	<u>13.36</u> Ac-ft
(Measured from Board 1 ft. above concrete outlet)	
B. Pool Elevation	<u>5838.7</u> Ft
C. Top of Dam Elevation	<u>5844.0</u> Ft
D. Dewatering Pipe Invert Elevation	<u>        </u> Ft

<b>*Minimum Volumes Required:</b>	Treatment	<u>3.20</u> Ac-ft
	40% sed. Vol	<u>4.10</u> Ac-ft
	<b>TOTAL</b>	<u>7.30</u> Ac-ft

This is an annual report for (year) 2003

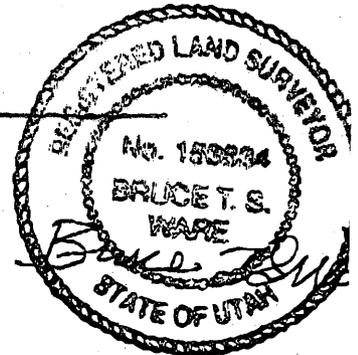
Name Bruce T. S. Ware Utah Registration No. (Seal) 153834

Firm Ware Surveying and Engineering

Phone 435-637-2620

Address 2223 North 1200 West Helper, UT 84526

Signature Bruce T. S. Ware Date Dec 20, 2003



**CONSOLIDATION COAL COMPANY**  
**EMERY MINE**  
**EMERY, UTAH**  
**ANNUAL IMPOUNDMENT CERTIFICATION**

POND #2  
INSPECTED BY Bruce Ware

PERMIT NO. ACT/015/015  
DATE 12-20-2003

**I. PHYSICAL INSPECTION (Stability and Structural Condition)**

	<u>YES</u>	<u>NO</u>
A. Upstream Cracking or Movement		X
B. Downstream Cracking or Movement		X
C. Erosion		X
D. Proper Operation of Discharge System(s)	Dry	
E. Significant Seepage or Piping		
F. Existing and Required Monitoring	N/A	

**II. FIELD DATA**

A. Pond Volume	<u>1.29</u> Ac-ft
(Measured from Board 1 ft. above concrete outlet)	
B. Pool Elevation	Dry Ft
C. Top of Dam Elevation	<u>5912.1</u> Ft
D. Dewatering Pipe Invert Elevation	_____ Ft

*Minimum Volumes Required:	Treatment	<u>0.68</u> Ac-ft
	40% sed. Vol	<u>0.33</u> Ac-ft
	<b>TOTAL</b>	<u>1.01</u> Ac-ft

This is an annual report for (year) 2003

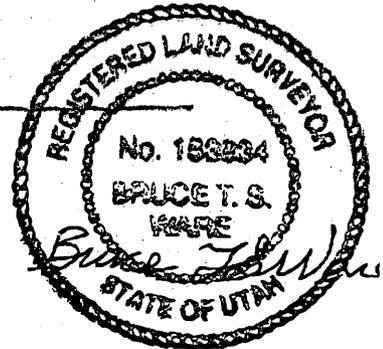
Name Bruce T. S. Ware Utah Registration No. (Seal) 153834

Firm Ware Surveying and Engineering

Phone 435-637-2620

Address 2223 North 1200 West Helper, UT 84526

Signature Bruce T. S. Ware Date Dec 20, 2003



**CONSOLIDATION COAL COMPANY**  
**EMERY MINE**  
**EMERY, UTAH**  
**ANNUAL IMPOUNDMENT CERTIFICATION**

POND #3  
INSPECTED BY Bruce Ware

PERMIT NO. ACT/015/015  
DATE 12-20-2003

**I. PHYSICAL INSPECTION (Stability and Structural Condition)**

	<u>YES</u>	<u>NO</u>
A. Upstream Cracking or Movement		X
B. Downstream Cracking or Movement		X
C. Erosion		X
D. Proper Operation of Discharge System(s)	Dry	
E. Significant Seepage or Piping		
F. Existing and Required Monitoring	N/A	

**II. FIELD DATA**

A. Pond Volume	<u>1.09</u> Ac-ft
(Measured from Board 1 ft. above concrete outlet)	
B. Pool Elevation	<u>Dry</u> Ft
C. Top of Dam Elevation	<u>5911</u> Ft
D. Dewatering Pipe Invert Elevation	<u>5910.2</u> Ft

*Minimum Volumes Required:	Treatment	<u>0.37</u> Ac-ft
	40% sed. Vol	<u>0.46</u> Ac-ft
	<b>TOTAL</b>	<u>0.83</u> Ac-ft

This is an annual report for (year) 2003

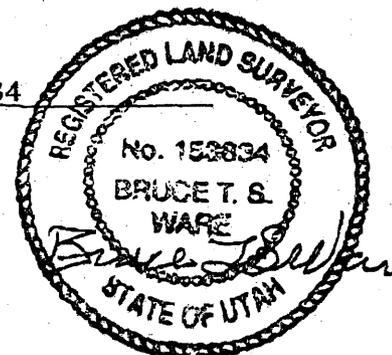
Name Bruce T. S. Ware Utah Registration No. (Seal) 153834

Firm Ware Surveying and Engineering

Phone 435-637-2620

Address 2223 North 1200 West Helper UT 84526

Signature Bruce T. S. Ware Date Dec 20, 2003



**CONSOLIDATION COAL COMPANY**  
**EMERY MINE**  
**EMERY, UTAH**  
**ANNUAL IMPOUNDMENT CERTIFICATION**

**POND #5**  
**INSPECTED BY Bruce Ware**

**PERMIT NO. ACT/015/015**  
**DATE 12-20-2003**

**I. PHYSICAL INSPECTION (Stability and Structural Condition)**

- |  |                   |                  |
|--|-------------------|------------------|
|  | <b><u>YES</u></b> | <b><u>NO</u></b> |
| A. Upstream Cracking or Movement           |                   | X                |
| B. Downstream Cracking or Movement         |                   | X                |
| C. Erosion                                 |                   | X                |
| D. Proper Operation of Discharge System(s) | X                 |                  |
| E. Significant Seepage of Piping           |                   |                  |
| F. Existing and Required Monitoring        | N/A               |                  |

**II. FIELD DATA**

- |   |                   |
|---|-------------------|
| A. Pond Volume                                    | <u>4.71</u> Ac-ft |
| (Measured from Board 1 ft. above concrete outlet) |                   |
| B. Pool Elevation                                 | <u>5942.5</u> Ft  |
| C. Top of Dam Elevation                           | <u>5949</u> Ft    |
| D. Dewatering Pipe Invert Elevation               | <u>5948.1</u> Ft  |

**\*Minimum Volumes Required:**

Treatment	<u>3.70</u> Ac-ft
40% sed. Vol	<u>0.45</u> Ac-ft
<b>TOTAL</b>	<b><u>4.15</u> Ac-ft</b>

This is an annual report for (year) 2003

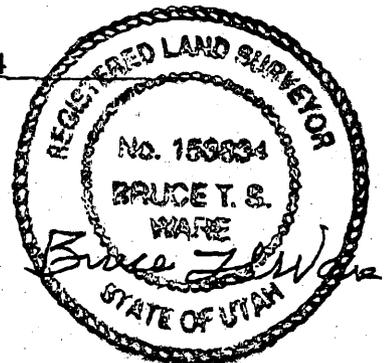
Name Bruce T. S. Ware Utah Registration No. (Seal) 153834

Firm Ware Surveying and Engineering

Phone 435-637-2620

Address 2223 North 1200 West Helper, UT 84526

Signature Bruce T. S. Ware Date Dec. 20, 2003



**CONSOLIDATION COAL COMPANY**  
**EMERY MINE**  
**EMERY, UTAH**  
**ANNUAL IMPOUNDMENT CERTIFICATION**

POND #6  
INSPECTED BY Bruce Ware

PERMIT NO. ACT/015/015  
DATE 12-20-2003

**I. PHYSICAL INSPECTION (Stability and Structural Condition)**

	<b>YES</b>	<b>NO</b>
A. Upstream Cracking or Movement		X
B. Downstream Cracking or Movement		X
C. Erosion		X
D. Proper Operation of Discharge System(s)	X	
E. Significant Seepage or Piping		X
F. Existing and Required Monitoring	N/A	

**II. FIELD DATA**

- A. Pond Volume 8.9 Ac-ft  
(Measured from Board 1 ft. above concrete outlet)
- B. Pool Elevation 6019.9 Ft
- C. Top of Dam Elevation 6023.0 Ft
- D. Dewatering Pipe Invert Elevation 6019.9 Ft

\*Minimum Volumes Required:

Treatment	<u>1.70</u>	Ac-ft
40% sed. Vol	<u>3.00</u>	Ac-ft
<b>TOTAL</b>	<u>4.70</u>	Ac-ft

This is an annual report for (year) 2003

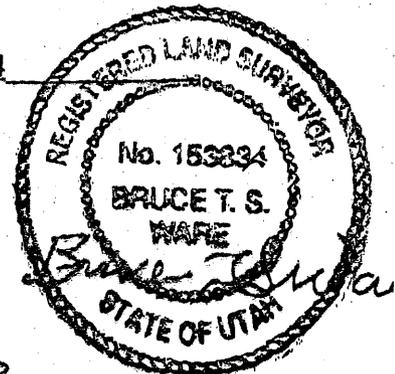
Name Bruce T. S. Ware Utah Registration No. (Seal) 153834

Firm Ware Surveying and Engineering

Phone 435-637-2620

Address 2223 North 1200 West Helper, UT 84526

Signature Bruce T. S. Ware Date Dec 20, 2003



**CONSOLIDATION COAL COMPANY**  
**EMERY MINE**  
**EMERY, UTAH**  
**ANNUAL IMPOUNDMENT CERTIFICATION**

POND #8  
INSPECTED BY Bruce Ware

PERMIT NO. ACT/015/015  
DATE 12-20-2003

**I. PHYSICAL INSPECTION (Stability and Structural Condition)**

	<b>YES</b>	<b>NO</b>
A. Upstream Cracking or Movement		X
B. Downstream Cracking or Movement		X
C. Erosion		X
D. Proper Operation of Discharge System(s)	Dry	
E. Significant Seepage or Piping		
F. Existing and Required Monitoring	N/A	

**II. FIELD DATA**

A. Pond Volume	<u>3.55</u> Ac-ft
(Measured from Board 1 ft. above concrete outlet)	
B. Pool Elevation	<u>Dry</u> Ft
C. Top of Dam Elevation	<u>5914.0</u> Ft
D. Dewatering Pipe Invert Elevation	<u>5911.0</u> Ft

*Minimum Volumes Required:	Treatment	<u>1.18</u> Ac-ft
	40% sed. Vol	<u>0.80</u> Ac-ft
	<b>TOTAL</b>	<u>1.98</u> Ac-ft

This is an annual report for (year) 2003

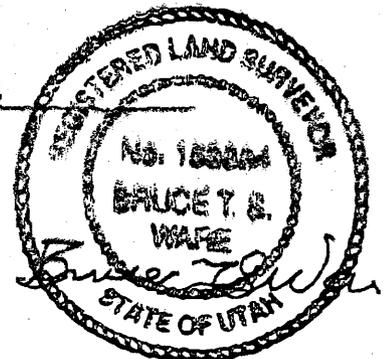
Name Bruce T. S. Ware Utah Registration No. (Seal) 153834

Firm Ware Surveying and Engineering

Phone 435-637-2620

Address 2223 North 1200 West Helper UT 84526

Signature Bruce T. S. Ware Date Dec 20, 2003



**CONSOLIDATION COAL COMPANY**  
**EMERY MINE**  
**EMERY, UTAH**  
**ANNUAL IMPOUNDMENT CERTIFICATION**

**POND #9**  
**INSPECTED BY Bruce Ware**

**PERMIT NO. ACT/015/015**  
**DATE 12-20-2003**

**I. PHYSICAL INSPECTION (Stability and Structural Condition)**

	<u>YES</u>	<u>NO</u>
A. Upstream Cracking or Movement		X
B. Downstream Cracking or Movement		X
C. Erosion		X
D. Proper Operation of Discharge System(s)	Dry	
E. Significant Seepage or Piping		
F. Existing and Required Monitoring	N/A	

**II. FIELD DATA**

A. Pond Volume	<u>653</u> Ac-ft
B. Pool Elevation	<u>dry</u> Ft
C. Top of Dam Elevation	<u>6055.2</u> Ft
D. Dewatering Pipe Invert Elevation	<u>6052.55</u> Ft
*Minimum Volumes Required:	
Treatment	<u>.20</u> Ac-ft
40% sed. Vol	<u>.128</u> Ac-ft
<b>TOTAL</b>	<b><u>.328</u> Ac-ft</b>

This is an annual report for (year) 2003

Name Bruce T. S. Ware Utah Registration No. (Seal) 153834

Firm Ware Surveying and Engineering

Phone 435-637-2620

Address 2223 North 1200 West Helper, UT 84526

Signature Bruce T. S. Ware Date Dec 20, 2003



**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 requirement of R645-310-130 and R645-301-140

**CONTENTS**

SUBSIDENCE MONITORING  
RECLAMATION MONITORING STUDY  
4<sup>th</sup> EAST PORTAL MACROINVERTEBRATE SAMPLING  
WEATHER DATA - CD

Emery Mine Subsidence Monitoring Report -- 2003

Station	Location	Resurvey		2000 Survey		2001 Survey		2002 Survey		2003 Survey	
		Northing	Easting	Date	Elevation	Date	Elevation	Date	Elevation	Date	Elevation
H-6	1 East	196,403.16	2,070,884.42	6,092.21	6,091.30	Nov-99	6,091.31	Oct-00	6,091.27	Nov-02	6,091.27
SMK-2	1 East	197,094.12	2,069,844.82	6,099.91	6,097.94	Nov-99	6,098.31	Oct-00	6,098.32	Nov-02	6,098.41
H-1	2 East	196,955.37	2,072,825.14	6,078.84	6,078.29	Nov-99	6,078.31	Oct-00	6,078.33	Nov-02	6,078.31
SMK-3	2 East	197,304.72	2,071,450.90	6,083.56	6,077.66	Nov-99	6,077.60	Oct-00	6,077.63	Nov-02	6,077.56
83-1	3 East	197,431.73	2,072,907.02	6,062.29	6,061.04	Nov-99	6,061.05	Oct-00	6,061.12	Nov-02	6,061.04
E	3 East	197,803.76	2,072,023.67	6,079.87	6,077.98	Nov-99	6,078.02	Oct-00	6,078.02	Nov-02	6,078.02
86-6	4 East	199,025.80	2,073,046.70	6,075.64	6,074.76	Nov-99	6,074.73	Oct-00	6,074.75	Nov-02	6,074.76
88-9	4 East	198,236.28	2,074,137.07	6,069.17	6,068.41	Nov-99	6,068.41	Oct-00	6,068.41	Nov-02	6,068.41
88-7	4 East	197,096.86	2,075,534.68	6,059.99	6,052.98	Nov-99	6,053.32	Oct-00	6,053.32	Nov-02	6,053.32
86-7	5 East	198,752.34	2,073,668.90	6,099.98	6,098.04	Nov-99	6,098.04	Oct-00	6,098.04	Nov-02	6,098.04
86-10	5 East	198,804.10	2,075,063.22	6,074.13	6,074.13	Nov-99	6,074.13	Oct-00	6,074.13	Nov-02	6,074.13
90-1	1South-4East	198,321.82	2,071,554.61	6,064.48	6,064.48	Nov-99	6,064.48	Oct-00	6,064.48	Nov-02	6,064.48
90-2	1South-4East	194,151.36	2,072,233.01	6,043.70	6,043.70	Nov-99	6,043.70	Oct-00	6,043.70	Nov-02	6,043.70
90-3	1South-4East	194,697.79	2,072,613.67	6,020.64	6,020.64	Nov-99	6,020.64	Oct-00	6,020.64	Nov-02	6,020.64
90-4	1South-4East	194,989.80	2,073,108.04	6,025.91	6,025.91	Nov-99	6,025.91	Oct-00	6,025.91	Nov-02	6,025.91
90-5	1South-4East	195,743.01	2,073,472.37	6,026.62	6,026.62	Nov-99	6,026.62	Oct-00	6,026.62	Nov-02	6,026.62
90-6	7 North	200,823.57	2,073,450.93	6,121.41	6,121.41	Sep-88	6,121.41	Sep-88	6,121.41	Sep-88	6,121.41
88-2	1 Federal	198,195.95	2,068,451.12	6,099.63	6,099.63	Sep-86	6,099.63	Sep-86	6,099.63	Sep-86	6,099.63
88-1	1 Federal	198,991.86	2,065,342.80	6,036.66	6,036.66	Sep-86	6,036.66	Sep-86	6,036.66	Sep-86	6,036.66
88-4	1 Federal	199,177.18	2,062,879.70	6,074.13	6,074.13	Sep-86	6,074.13	Sep-86	6,074.13	Sep-86	6,074.13
88-5	2 Federal	198,486.12	2,064,069.40	6,159.24	6,159.24	Sep-86	6,159.24	Sep-86	6,159.24	Sep-86	6,159.24
87-1	2 Federal	195,498.41	2,066,141.67	6,095.61	6,095.61	May-87	6,095.61	May-87	6,095.61	May-87	6,095.61
88-6	3 Federal	195,517.06	2,065,670.10	6,070.89	6,070.89	Oct-88	6,070.89	Oct-88	6,070.89	Oct-88	6,070.89
88-4	4 Federal	196,346.15	2,064,818.22	6,095.47	6,095.47	Oct-88	6,095.47	Oct-88	6,095.47	Oct-88	6,095.47
88-5	4 Federal	196,312.43	2,065,049.88	6,092.04	6,092.04	Oct-88	6,092.04	Oct-88	6,092.04	Oct-88	6,092.04
88-3	5 Federal	197,031.84	2,064,091.02	6,010.65	6,010.65	Oct-88	6,010.65	Oct-88	6,010.65	Oct-88	6,010.65
88-13	5 Federal	197,515.26	2,064,041.37	6,032.25	6,032.25	Oct-88	6,032.25	Oct-88	6,032.25	Oct-88	6,032.25
88-2	6 Federal	197,475.04	2,063,677.78	6,012.68	6,012.68	Aug-89	6,012.68	Aug-89	6,012.68	Aug-89	6,012.68
88-1	7 Federal	198,336.96	2,062,843.16	6,039.62	6,039.62	Aug-89	6,039.62	Aug-89	6,039.62	Aug-89	6,039.62
89-1	1R 1 Fed	200,820.64	2,064,974.76	6,197.18	6,197.18	Dec-89	6,197.18	Dec-89	6,197.18	Dec-89	6,197.18
89-2	1R 1 Fed	201,172.57	2,065,398.39	6,195.63	6,195.63	Dec-89	6,195.63	Dec-89	6,195.63	Dec-89	6,195.63
89-3	2R 1 Fed	199,428.72	2,064,637.87	6,166.98	6,166.98	Dec-89	6,166.98	Dec-89	6,166.98	Dec-89	6,166.98
88-4	2R 1 Fed	200,808.75	2,066,115.13	6,181.48	6,181.48	Dec-89	6,181.48	Dec-89	6,181.48	Dec-89	6,181.48
88-12	3R 1 Fed	199,324.35	2,065,857.05	6,188.57	6,188.57	Oct-88	6,188.57	Oct-88	6,188.57	Oct-88	6,188.57
88-11	4R 1 Fed	198,689.86	2,068,811.32	6,149.97	6,149.97	Oct-88	6,149.97	Oct-88	6,149.97	Oct-88	6,149.97
88-3	4R 1 Fed	199,162.30	2,067,668.46	6,147.18	6,147.18	Sep-86	6,147.18	Sep-86	6,147.18	Sep-86	6,147.18
C-36	6R 1 Fed	196,855.12	2,066,750.82	6,027.17	6,027.17		6,027.17		6,027.17		6,027.17
Q	1L & South	191,929.15	2,066,753.80	5,931.20	5,931.20	Jun-81	5,931.20	Jun-81	5,931.20	Jun-81	5,931.20
L	2 West	193,219.03	2,065,365.10	5,946.18	5,946.18		5,946.18		5,946.18		5,946.18
N	2 West	193,874.72	2,065,955.61	5,948.67	5,948.67	Dec-82	5,948.67	Dec-82	5,948.67	Dec-82	5,948.67
W	2R 2 West	194,616.64	2,065,467.15	5,957.06	5,957.06	Jan-81	5,957.06	Jan-81	5,957.06	Jan-81	5,957.06
83-3	3R 2 West	194,594.74	2,064,492.11	5,962.25	5,962.25	May-84	5,962.25	May-84	5,962.25	May-84	5,962.25
83-4	3R 2 West	194,829.82	2,064,844.95	5,968.22	5,968.22	May-84	5,968.22	May-84	5,968.22	May-84	5,968.22
83-5	4R 2 West	194,627.68	2,063,887.44	5,969.63	5,969.63	May-84	5,969.63	May-84	5,969.63	May-84	5,969.63
83-6	4R 2 West	194,965.20	2,064,059.57	5,971.07	5,971.07	May-84	5,971.07	May-84	5,971.07	May-84	5,971.07
85-1	5R 2 West	194,958.12	2,063,444.68	5,974.25	5,974.25	Dec-85	5,974.25	Dec-85	5,974.25	Dec-85	5,974.25
85-2	5R 2 West	195,463.95	2,063,363.98	5,978.85	5,978.85	Dec-85	5,978.85	Dec-85	5,978.85	Dec-85	5,978.85
35		199,945.66	2,071,528.06	6,102.06	6,102.06	Jul-03	6,102.06	Jul-03	6,102.06	Jul-03	6,102.06
36		195,191.43	2,074,015.19	6,036.68	6,036.68	Jul-03	6,036.68	Jul-03	6,036.68	Jul-03	6,036.68

- Notes:  
 1. New monument set at original location  
 2. New Monument set at New location noted in resurvey column July 2003, Elevation 6078.25

**RECLAMATION MONITORING  
STUDY FOR THE EMERY MINE**

**VEGETATION & SOILS**

**December 2003**



*Document includes:*

**RECLAMATION MONITORING  
STUDY FOR THE  
EMERY MINE:  
VEGETATION**

**&**

**RECLAMATION MONITORING  
STUDY FOR THE  
EMERY MINE:  
SOILS**

*for*

**CONSOLIDATION COAL COMPANY  
P.O. Box 527  
Emery, Utah 84522**

*Prepared  
by*

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



**RECLAMATION MONITORING  
STUDY FOR THE  
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**MT. NEBO SCIENTIFIC, INC.**  
330 East 400 South, Suite 6  
Springville, Utah 84663  
(801) 489-6937

Patrick D. Collins, Ph.D.

*for*

**CONSOLIDATION COAL COMPANY**  
Emery, Utah 84522  
P.O. Box 1029



December 2003

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(VEGETATION REPORT)

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# INTRODUCTION

## History

The Emery Mine located in south central Utah has a history of coal mining and reclamation operations. Although the mine had been idle for several years, it has recently re-opened with the development of a new portal. Mining operations have begun at the new "4<sup>th</sup> East Portal" area.

Because the Emery Mine has had a history of coal mining operations, reclamation and revegetation efforts have also been conducted. Upon initial observations it is apparent that some of the revegetation was unsuccessful for unknown, or at least unidentified, reasons. It is this premise that the State of Utah, Division of Oil, Gas & Mining (DOGGM) and Consolidation Coal Company (CCC) determined that it would be prudent to conduct a reclamation monitoring study on those areas that have been reclaimed or re-seeded. It was believed that a study should be conducted to assess the current condition of those areas and determine whether or not success has been or could be achieved once final revegetation of the mine site is conducted.

## Scope

The purpose of this study was to monitor and report on several areas that have been reclaimed or re-seeded within the permit boundary of the Emery Mine. Gathering current quantitative data on these sites should provide a basis to determine success or failure of past revegetation efforts. Therefore, determination of success or failure of the re-seeded plant species is one objective of the study. Another objective was to try to discern the reasons for these determinations. In an attempt to help provide clues to ascertain possible reasons for revegetation conditions, a soil sampling program was designed by DOGGM and CCC. Mr. James Nyenhuis sampled each area at two depths and has prepared a report with his findings included in this document. In addition, records and files located at CCC were reviewed for historical information about each site which also may help determine explanations for current conditions at the site and provide detail to enhance future revegetation success efforts.

## The Study Sites

A total of 19 vegetation study areas were sampled for the study. The soil for all the vegetation study areas were also sampled including 3 additional sites, bringing the total to 22 sites studied. Table 1 lists all study sites and includes the site number, site name, GPS coordinates and the names of the 7.5 minute USGS quadrangle maps where each were located. The number of each site was also identified in the field using labeled 18" wooden stakes, 48" lathe, and plastic flagging.

**Table 1: Study Site Names and Locations**

Site No.	Site Name	Zone	UTM Easting Coordinate	UTM Northing Coordinate	USGS 7.5 Minute Quad. Map
1	SUBSOIL PILES FROM PONDS 4 & 5	12S	0477617	4301502	Walker Flat
2	COAL PILE TOPSOIL PILE	12S	0477455	4301122	Walker Flat
3	TOPSOIL PILE FROM POND 6	12S	0475735	4302965	Emery Flat
4	SUBSOIL PILE (E) FROM POND 6	12S	0475735	4302965	Emery Flat
5	SUBSOIL PILE (W) FROM POND 6	12S	0475735	4302965	Emery Flat
6	POND 6 BANKS	12S	0475735	4302965	Emery Flat
7	POND 5 AREA	12S	0477377	4301439	Walker Flat
8	BOREHOLE RECLAIMED ROAD	12S	0477219	4301680	Walker Flat
9	SUBSTATION TOPSOIL PILE	12S	0477837	4301441	Walker Flat
10	TOPSOIL PILE FROM POND 1	12S	0476595	4301661	Walker Flat
11	POND 1 BANKS	12S	0476658	4301177	Walker Flat
12	GREASEWOOD REFERENCE AREA (GW3)	12S	0477207	4301424	Walker Flat
13	REFERENCE AREA GREASEWOOD	12S	0477660	4302069	Walker Flat
14	POND 1 SUBSOIL PILE	12S	0476595	4301661	Walker Flat
15	RIPARIAN MEADOW REFERENCE AREA - 1	12S	0477646	4302263	Walker Flat
16	RIPARIAN MEADOW REFERENCE AREA - 3	12S	0477471	4302167	Walker Flat
17	ANNUAL FORB REFERENCE AREA - 1	12S	0477558	4302484	Walker Flat
18	MIXED DESERT SHRUB REFERENCE AREA	12S	0477966	4302119	Walker Flat
19	TEST PLOT AREA	12S	0477294	4301015	Walker Flat
20	CANYON BOTTOM ROAD	12S	0477949	4301108	Walker Flat
21	POND 4 AREA	12S	0477377	4301439	Walker Flat
22	4 <sup>TH</sup> EAST PORTAL TOPSOIL PILE	12S	0479668	4302679	Walker Flat

## METHODS

Methodologies used herein were performed in accordance with the guidelines supplied by the State of Utah, Division of Oil, Gas and Mining (DOG M). Quantitative and qualitative data were taken on the vegetation from a list of areas provided by Consolidation Coal Company.

### **Sampling Design and Transect/Quadrat Placement**

Transect lines for vegetation sampling were placed randomly within the boundaries of the sample areas. The transect placement technique was employed with the goal to adequately sample a representative subset of the entire site. The number of samples taken were not dependent on sample adequacy formulas, but rather the size of each given sample area -- or the larger the area, the greater the sample size.

Once the transects were established, quadrat locations for sampling were chosen using random numbers from the transect lines with the objective to record data without preconceived bias.

### **Cover and Composition**

Cover estimates were made using ocular methods with meter square quadrats. Species composition, cover by species, and relative frequencies were also assessed from the quadrats. Plant nomenclature follows "A Utah Flora" (Welsh et al., 1993).

### **Woody Species Density**

Density of woody plant species for the study areas were estimated using the point-quarter method. 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. The number of individuals per acre was the end result of the calculations.

### **Total Density**

Several previous studies have been conducted over the years by companies or individuals other than *Mt. Nebo Scientific, Inc.* From these studies it was noted that many of the data sets reported density for all species (not just woody species) using 1/2 meter square quadrats. With this in mind, additional data for density were also recorded for this study using the same quadrat size, and thus reported in a similar manner as the previous studies.

### **Photographs**

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

## RESULTS

### **Cover, Frequency, Composition & Density**

Because of the extensive data sets and the number of sites sampled for the study, it was believed that the best method to present the results was to show summarized tables for the data for each site. Therefore the RESULTS section of this report is comprised primarily of the tables below that show living cover by species, total cover, frequency, lifeform composition, woody species density and total density for each site.

**Table 2. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site 1 - Subsoil Piles From Ponds 4 & 5	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Atriplex canescens</i>	0.53	1.09	20.00
<i>Atriplex confertifolia</i>	5.73	10.37	33.33
<i>Ephedra viridis</i>	0.80	2.07	13.33
<i>Sarcobatus vermiculatus</i>	4.13	10.15	26.67
<b>FORBS</b>			
<i>Eriogonum sp.</i>	0.07	0.25	6.67
<i>Lappula occidentalis</i>	2.53	4.57	66.67
<b>GRASSES</b>			
<i>Stipa hymenoides</i>	0.53	1.09	20.00
<b>B. TOTAL COVER</b>			
Total Living Cover	14.33	13.78	
Litter	5.27	2.11	
Bareground	63.60	24.73	
Rock	16.80	19.96	
<b>C. DESIRABLE SPECIES COVER</b>			
	11.80	14.70	
<b>D. % COMPOSITION</b>			
Shrubs	57.48	43.44	
Forbs	36.43	41.59	
Grasses	6.10	12.90	

<b>Table 3. Woody Species Density, Emery Mine Reclamation Study. (Pl. Qtr. Method)</b>	
Site 1 - Subsoil Piles From Ponds 4 & 5	No./Ac
<i>Atriplex canescens</i>	405.45
<i>Atriplex confertifolia</i>	585.66
<i>Ephedra viridis</i>	22.53
<i>Sarcobatus vermiculatus</i>	337.88
<b>Total</b>	<b>1351.51</b>

**Table 4. Total Density Per 1/2 Square Meter. Emery Mine Reclamation Study.**

Site 1 - Subsoil Piles From Ponds 4 & 5	Mean	SDev
<b>TREES &amp; SHRUBS</b>		
<i>Sarcobatus vermiculatus</i>	0.60	1.02
<i>Atriplex confertifolia</i>	0.73	1.39
<b>FORBS</b>		
<i>Lappula occidentalis</i>	3.67	5.80
<b>GRASSES</b>		
<i>Stipa hymenoides</i>	0.53	1.09
<b>Total Density</b>	<b>5.53</b>	<b>5.74</b>

**Table 5. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site 2 - Coal Pile Topsoil Pile	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Atriplex confertifolia</i>	6.07	6.88	80.00
<i>Atriplex gardneri</i>	0.60	1.54	13.33
<i>Chrysothamnus nauseosus</i>	0.13	0.50	6.67
<i>Gutierrezia sarothrae</i>	0.87	1.78	20.00
<i>Sclerocactus whipplei</i>	0.07	0.25	6.67
<b>FORBS</b>			
<i>Eriogonum inflatum</i>	1.60	2.73	40.00
<i>Halogeton glomeratus</i>	0.53	0.88	33.33
<i>Lappula occidentalis</i>	6.47	6.47	80.00
<b>GRASSES</b>			
<i>Stipa hymenoides</i>	0.80	1.64	20.00
<b>B. TOTAL COVER</b>			
Total Living Cover	17.13	6.14	
Litter	5.33	2.57	
Bareground	52.33	11.81	
Rock	25.20	10.82	
<b>C. DESIRABLE SPECIES COVER</b>			
	10.13	6.91	
<b>D. % COMPOSITION</b>			
Shrubs	42.73	29.09	
Forbs	52.38	26.97	
Grasses	4.89	10.17	

**Table 6. Woody Species Density, Emery Mine Reclamation Study. (Pt. Qtr. Method).**

Site 2 - Coal Pile Topsoil Pile	No/Ac
<i>Atriplex gardneri</i>	365.17
<i>Atriplex confertifolia</i>	3286.55
<i>Ceratoides lanata</i>	73.03
<i>Gutierrezia sarothrae</i>	438.21
<i>Opuntia polyacantha</i>	73.03
<i>Sarcobatus vermiculatus</i>	146.07
Total	4382.07

**Table 7. Total Density Per 1/2 Square Meter.**

**Emery Mine Reclamation Study.**

Site 2 - Coal Pile Topsoil Pile	Mean	SDev
<b>TREES &amp; SHRUBS</b>		
<i>Atriplex confertifolia</i>	1.07	1.00
<i>Atriplex gardneri</i>	0.13	0.34
<i>Chrysothamnus nauseosus</i>	0.20	0.75
<i>Gutierrezia sarothrae</i>	1.20	3.73
<i>Sarcobatus vermiculatus</i>	0.13	0.50
<i>Sclerocactus whipplei</i>	0.07	0.25
<b>FORBS</b>		
<i>Erigeron sp.</i>	0.07	0.25
<i>Eriogonum inflatum</i>	0.73	1.81
<i>Halogeton glomeratus</i>	0.60	0.95
<i>Lappula occidentalis</i>	8.27	8.25
<b>GRASSES</b>		
<i>Stipa hymenoides</i>	0.13	0.50
<b>Total Density</b>	<b>12.60</b>	<b>8.18</b>

**Table 8. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site 3 - Topsoil Pile From Pond 6	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Atriplex canescens</i>	0.07	0.25	6.67
<i>Suaeda torreyana</i>	0.20	0.54	13.33
<b>FORBS</b>			
<i>Halogeton glomeratus</i>	0.60	1.54	20.00
<i>Lappula occidentalis</i>	3.07	1.95	93.33
<b>GRASSES</b>			
<b>B. TOTAL COVER</b>			
Total Living Cover	3.93	2.02	
Litter	1.47	0.72	
Bareground	71.40	9.50	
Rock	23.20	8.34	
<b>C. DESIRABLE SPECIES COVER</b>			
	0.27	0.57	
<b>D. % COMPOSITION</b>			
Shrubs	4.19	8.78	
Forbs	95.81	8.78	
Grasses	0.00	0.00	

**Table 9. Woody Species Density, Emery Mine Reclamation Study, (Pt. Qtr. Method).**

Site 3- Topsoil Pile From Pond 6	No/Ac
<b>Total</b>	<b>0.00</b>

**Table 10. Total Density Per 1/2 Square Meter.**

**Emery Mine Reclamation Study.**

Site 3 - Topsoil Pile From Pond 6	Mean	SDev
<b>TREES &amp; SHRUBS</b>		
<i>Suaeda torreyana</i>	0.07	0.25
<b>FORBS</b>		
<i>Halogeton glomeratus</i>	0.27	0.77
<i>Lappula occidentalis</i>	9.80	6.40
<b>GRASSES</b>		
<b>Total Density</b>	<b>10.13</b>	<b>6.68</b>

**Table 11. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site 4 - Subsoil Pile (E) From Pond 6	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Ceratoides lanata</i>	2.57	5.18	28.57
<i>Sarcobatus vermiculatus</i>	0.14	0.35	14.29
<b>FORBS</b>			
<i>Halogeton glomeratus</i>	0.29	0.45	28.57
<i>Lappula occidentalis</i>	2.71	1.91	85.71
<b>GRASSES</b>			
<i>Elymus junceus</i>	8.14	17.26	28.57
<i>Stipa hymenoides</i>	0.29	0.70	14.29
<b>B. TOTAL COVER</b>			
Total Living Cover	14.14	21.16	
Litter	1.43	0.49	
Bareground	63.29	20.05	
Rock	21.14	16.17	
<b>C. DESIRABLE SPECIES COVER</b>			
	11.14	22.44	
<b>D. % COMPOSITION</b>			
Shrubs	7.11	11.28	
Forbs	73.33	42.31	
Grasses	19.56	31.26	

**Table 12. Woody Species Density, Emery Mine Reclamation Study. (Pt. Qtr. Method).**

Site 4 - Subsoil Pile (E) From Pond 6	No/Ac
<i>Atriplex canescens</i>	63.59
<i>Ceratoides lanata</i>	120.11
<i>Gutierrezia sarothrae</i>	0.00
<i>Suaeda torreyana</i>	7.07
<i>Sarcobatus vermiculatus</i>	7.07
Total	197.83

**Table 13. Total Density Per 1/2 Square Meter. Emery Mine Reclamation Study.**

Site 4 - Subsoil Pile (E) From Pond 6	Mean	SDev
<b>TREES &amp; SHRUBS</b>		
<i>Ceratoides lanata</i>	0.43	1.05
<i>Sarcobatus vermiculatus</i>	0.14	0.35
<b>FORBS</b>		
<i>Halogeton glomeratus</i>	0.43	0.73
<i>Lappula occidentalis</i>	10.86	7.99
<b>GRASSES</b>		
<i>Elymus junceus</i>	3.57	6.93
<i>Stipa hymenoides</i>	0.29	0.70
<b>Total Density</b>	15.71	6.52

**Table 14. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site 5 - Subsoil Pile (W) From Pond 6	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Ceratoides lanata</i>	0.15	0.53	7.69
<i>Salsola pestifer</i>	0.31	0.72	15.38
<i>Sarcobatus vermiculatus</i>	0.77	2.66	7.69
<i>Suaeda torreyana</i>	0.08	0.27	7.69
<b>FORBS</b>			
<i>Halogeton glomeratus</i>	2.77	3.81	53.85
<i>Kochia scoparia</i>	1.38	2.62	15.38
<i>Lappula occidentalis</i>	2.46	1.78	76.92
<b>GRASSES</b>			
<i>Stipa hymenoides</i>	0.08	0.27	7.69
<b>B. TOTAL COVER</b>			
Total Living Cover	8.00	3.72	
Litter	2.92	2.30	
Bareground	45.23	10.74	
Rock	43.85	10.23	
<b>C. DESIRABLE SPECIES COVER</b>			
	1.38	2.84	
<b>D. % COMPOSITION</b>			
Shrubs	13.04	27.06	
Forbs	86.45	27.38	
Grasses	0.51	1.78	

**Table 15. Woody Species Density, Emery Mine Reclamation Study. (Pl. Qtr. Method).**

Site 5 - Subsoil Pile (W) From Pond 6	No/Ad
<i>Atriplex gardneri</i>	1.09
<i>Atriplex canescens</i>	13.05
<i>Ceratoides lanata</i>	21.75
<i>Suaeda torreyana</i>	1.09
<i>Sarcobatus vermiculatus</i>	19.58
<b>Total</b>	<b>56.55</b>

**Table 16. Total Density Per 1/2 Square Meter.**

**Emery Mine Reclamation Study.**

Site 5 - Subsoil Pile (W) From Pond 6	Mean	SDev
<b>TREES &amp; SHRUBS</b>		
<i>Sarcobatus vermiculatus</i>	0.08	0.27
<i>Salsola pestifer</i>	0.15	0.36
<b>FORBS</b>		
<i>Halogeton glomeratus</i>	1.08	1.73
<i>Kochia scoparia</i>	0.69	1.43
<i>Lappula occidentalis</i>	8.38	8.35
<b>GRASSES</b>		
<i>Stipa hymenoides</i>	0.23	0.80
<b>Total Density</b>	<b>10.62</b>	<b>7.72</b>

**Table 17. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site 6 - Pond 6 Banks	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Chrysothamnus nauseosus</i>	3.00	13.08	5.00
<i>Sarcobatus vermiculatus</i>	12.65	20.60	45.00
<i>Suaeda torreyana</i>	1.90	5.71	10.00
<b>FORBS</b>			
<i>Halogeton glomeratus</i>	1.15	3.41	15.00
<i>Iva axillaris</i>	0.25	1.09	5.00
<i>Lappula occidentalis</i>	0.10	0.44	5.00
<b>GRASSES</b>			
<i>Carex lanuginosa</i>	4.00	11.47	20.00
<i>Elymus hispidus</i>	15.70	17.66	50.00
<i>Elymus junceus</i>	1.25	4.44	10.00
<b>B. TOTAL COVER</b>			
Total Living Cover	40.00	22.30	
Litter	10.70	7.68	
Bareground	41.05	18.48	
Rock	8.25	8.32	
<b>C. DESIRABLE SPECIES COVER</b>			
	38.50	23.78	
<b>D. % COMPOSITION</b>			
Shrubs	46.22	45.09	
Forbs	7.98	22.08	
Grasses	45.80	46.54	

**Table 18. Woody Species Density, Emery Mine Reclamation Study (Pl. Qtr. Method).**

Site 6 - Pond 6 Banks	No/Ac
<i>Artemisia tridentata</i>	13.76
<i>Chrysothamnus nauseosus</i>	288.93
<i>Tamarix chinensis</i>	27.52
<i>Sarcobatus vermiculatus</i>	674.18
<i>Suaeda torreyana</i>	96.31
<b>Total</b>	<b>1100.70</b>

**Table 19. Total Density Per 1/2 Square Meter.**

**Emery Mine Reclamation Study.**

Site 6 - Pond 6 Banks	Mean	SDev
<b>TREES &amp; SHRUBS</b>		
<i>Chrysothamnus nauseosus</i>	0.05	0.22
<i>Sarcobatus vermiculatus</i>	1.45	3.14
<i>Suaeda torreyana</i>	0.05	0.22
<b>FORBS</b>		
<i>Iva axillaris</i>	0.20	0.87
<i>Halogeton glomeratus</i>	1.75	6.53
<i>Lappula occidentalis</i>	0.15	0.65
<b>GRASSES</b>		
<i>Carex lanuginosa</i>	2.65	8.74
<i>Elymus junceus</i>	1.15	4.37
<i>Elymus hispidus</i>	1.45	2.11
<b>Total Density</b>	<b>8.90</b>	<b>9.95</b>

**Table 20. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site 7 - Pond 5 Area	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Atriplex canescens</i>	3.20	9.09	13.33
<i>Atriplex confertifolia</i>	0.33	1.25	6.67
<i>Chrysothamnus nauseosus</i>	2.00	4.00	20.00
<i>Gutierrezia sarothrae</i>	2.20	2.69	53.33
<i>Sarcobatus vermiculatus</i>	8.73	12.65	60.00
<b>FORBS</b>			
<i>Halogeton glomeratus</i>	0.40	1.25	13.33
<i>Iva axillaris</i>	1.20	3.39	13.33
<b>GRASSES</b>			
<i>Stipa hymenoides</i>	1.53	2.19	33.33
<b>B. TOTAL COVER</b>			
Total Living Cover	19.60	12.61	
Litter	7.00	5.88	
Bareground	62.93	12.85	
Rock	10.47	6.87	
<b>C. DESIRABLE SPECIES COVER</b>			
	18.00	13.49	
<b>D. % COMPOSITION</b>			
Shrubs	71.25	36.83	
Forbs	13.89	31.54	
Grasses	14.87	27.83	

**Table 21. Woody Species Density, Emery Mine Reclamation Study. (Pt. Qtr. Method).**

Site 7 - Pond 5 Area	No/Ac
<i>Artemisia tridentata</i>	131.66
<i>Atriplex canescens</i>	197.49
<i>Atriplex corrugata</i>	65.83
<i>Atriplex gardneri</i>	65.83
<i>Ceratoides lanata</i>	65.83
<i>Chrysothamnus nauseosus</i>	789.96
<i>Gutierrezia sarothrae</i>	724.13
<i>Sarcobatus vermiculatus</i>	1909.07
<b>Total</b>	<b>3949.80</b>

**Table 22. Total Density Per 1/2 Square Meter.**

**Emery Mine Reclamation Study.**

Site 7 - Pond 5 Area	Mean	SDev
<b>TREES &amp; SHRUBS</b>		
<i>Atriplex confertifolia</i>	0.13	0.50
<i>Atriplex canescens</i>	0.13	0.34
<i>Chrysothamnus nauseosus</i>	0.07	0.25
<i>Gutierrezia sarothrae</i>	3.60	3.98
<i>Sarcobatus vermiculatus</i>	1.60	2.73
<b>FORBS</b>		
<i>Iva axillaris</i>	1.47	3.81
<i>Halogeton glomeratus</i>	0.07	0.25
<b>GRASSES</b>		
<i>Stipa hymenoides</i>	0.27	0.57
<b>Total Density</b>	<b>7.33</b>	<b>5.96</b>

**Table 23. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site 8 - Borehole Reclaimed Road	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
TREES & SHRUBS			
<i>Atriplex corrugata</i>	1.60	3.32	20.00
<i>Sarcobatus vermiculatus</i>	0.50	1.50	10.00
<i>Suaeda torreyana</i>	0.50	1.50	10.00
FORBS			
<i>Eriogonum inflatum</i>	0.10	0.30	10.00
<i>Lappula occidentalis</i>	2.60	1.91	80.00
GRASSES			
<b>B. TOTAL COVER</b>			
Total Living Cover	5.30	2.37	
Litter	1.70	1.19	
Bareground	84.70	3.72	
Rock	8.30	4.03	
<b>C. DESIRABLE SPECIES COVER</b>			
	2.60	3.44	
<b>D. % COMPOSITION</b>			
Shrubs	35.83	44.42	
Forbs	64.17	44.42	
Grasses	0.00	0.00	

**Table 24. Woody Species Density, Emery Mine Reclamation Study, (Pl. Qtr. Method).**

Site 8 - Borehole Reclaimed Rd	No/Ac
<i>Atriplex corrugata</i>	227.03
<i>Sarcobatus vermiculatus</i>	275.68
<i>Suaeda torreyana</i>	145.95
<b>Total</b>	<b>648.66</b>

**Table 25. Total Density Per 1/2 Square Meter. Emery Mine Reclamation Study.**

Site 8 - Borehole Reclaimed Rd.	Mean	SDev
TREES & SHRUBS		
<i>Atriplex corrugata</i>	0.30	0.64
<i>Suaeda torreyana</i>	0.10	0.30
FORBS		
<i>Lappula occidentalis</i>	4.00	3.52
GRASSES		
<b>Total Density</b>	<b>4.40</b>	<b>3.10</b>

**Table 26. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site 9 - Substation Topsoil Pile	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Atriplex confertifolia</i>	4.90	4.74	60.00
<i>Atriplex gardneri</i>	0.10	0.30	10.00
<b>FORBS</b>			
<i>Eriogonum inflatum</i>	1.00	1.55	40.00
<i>Halogeton glomeratus</i>	0.80	1.08	40.00
<i>Lappula occidentalis</i>	1.50	2.62	40.00
<b>GRASSES</b>			
<i>Stipa hymenoides</i>	0.40	1.20	10.00
<b>B. TOTAL COVER</b>			
Total Living Cover	8.70	4.98	
Litter	6.80	3.97	
Bareground	71.00	13.00	
Rock	13.50	8.67	
<b>C. DESIRABLE SPECIES COVER</b>			
	6.40	5.75	
<b>D. % COMPOSITION</b>			
Shrubs	43.67	33.28	
Forbs	51.33	37.36	
Grasses	5.00	15.00	

**Table 27. Woody Species Density, Emery Mine Reclamation Study (Pr. Qtr. Method)**

Site 9 - Substation Topsoil Pile	No/Ac
<i>Atriplex corrugata</i>	34.10
<i>Atriplex confertifolia</i>	1261.69
<i>Chrysothamnus nauseosus</i>	34.10
<i>Sarcobatus vermiculatus</i>	34.10
Total	1363.99

**Table 28. Total Density Per 1/2 Square Meter.**

**Emery Mine Reclamation Study.**

Site 9 - Substa. Topsoil Pile	Mean	SDev
<b>TREES &amp; SHRUBS</b>		
<i>Atriplex confertifolia</i>	0.60	1.02
<b>FORBS</b>		
<i>Eriogonum inflatum</i>	0.80	1.47
<i>Halogeton glomeratus</i>	0.50	0.67
	2.30	3.07
<b>GRASSES</b>		
	0.10	0.30
<b>Total Density</b>	<b>4.30</b>	<b>3.03</b>

**Table 29. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site 10- Topsoil Pile From Pond 1	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Sarcobatus vermiculatus</i>	4.53	6.51	40.00
<i>Suaeda torreyana</i>	6.00	9.02	53.33
<b>FORBS</b>			
<i>Halogeton glomeratus</i>	1.20	1.60	46.67
<i>Lappula occidentalis</i>	4.33	10.46	26.67
<b>GRASSES</b>			
<b>B. TOTAL COVER</b>			
Total Living Cover	10.53	9.65	
Litter	16.07	12.63	
Bareground	11.13	5.83	
Rock	71.07	14.05	
	1.73	2.24	
<b>C. DESIRABLE SPECIES COVER</b>			
	10.53	9.65	
<b>D. % COMPOSITION</b>			
Shrubs	62.63	42.88	
Forbs	37.37	42.88	
Grasses	0.00	0.00	

**Table 30. Woody Species Density, Emery Mine Reclamation Study. (Pt. Qtr. Method).**

Site 10 - Topsoil Pile From Pond 1	No/Ac
<i>Sarcobatus vermiculatus</i>	625.85
<i>Suaeda torreyana</i>	818.42
Total	1444.27

**Table 31. Total Density Per 1/2 Square Meter. Emery Mine Reclamation Study.**

Site 10 - Topsoil Pile From Pond 1	Mean	SDev
<b>TREES &amp; SHRUBS</b>		
<i>Sarcobatus vermiculatus</i>	0.13	0.34
<i>Suaeda torreyana</i>	0.53	0.50
<b>FORBS</b>		
<i>Halogeton glomeratus</i>	1.20	1.83
<i>Lappula occidentalis</i>	3.33	7.88
<b>GRASSES</b>		
<b>Total Density</b>	5.20	8.05

**Table 32. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site 11 - Pond 1 Banks	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Artemisia pygmaea</i>	0.10	0.44	5.00
<i>Artemisia tridentata</i>	0.25	1.09	5.00
<i>Ceratoides lanata</i>	0.25	1.09	5.00
<i>Chrysothamnus nauseosus</i>	11.60	18.73	55.00
<i>Sarcobatus vermiculatus</i>	25.05	25.74	75.00
<i>Suaeda torreyana</i>	0.90	2.43	15.00
<b>FORBS</b>			
<i>Halogeton glomeratus</i>	0.60	2.62	5.00
<b>GRASSES</b>			
<i>Distichlis spicata</i>	1.25	5.45	5.00
<b>B. TOTAL COVER</b>			
Total Living Cover	40.00	22.19	
Litter	14.45	14.88	
Bareground	44.35	28.52	
Rock	1.20	0.68	
<b>C. DESIRABLE SPECIES COVER</b>			
	39.40	22.75	
<b>D. % COMPOSITION</b>			
Shrubs	92.60	23.67	
Forbs	2.40	10.46	
Grasses	5.00	21.79	

**Table 33. Woody Species Density, Emery Mine Reclamation Study, (Pt. Qtr. Method).**

Site 11 - Pond 1 Banks	No/Ac
<i>Artemisia frigida</i>	183.20
<i>Chrysothamnus nauseosus</i>	1557.24
<i>Sarcobatus vermiculatus</i>	1465.64
<i>Suaeda torreyana</i>	412.21
<i>Ceratoides lanata</i>	45.80
<b>Total</b>	<b>3664.10</b>

**Table 34. Total Density Per 1/2 Square Meter.**

**Emery Mine Reclamation Study.**

Site 11 - Pond 1 Banks	Mean	SDev
<b>TREES &amp; SHRUBS</b>		
<i>Artemisia tridentata</i>	0.05	0.22
<i>Artemisia pygmaea</i>	0.05	0.22
<i>Ceratoides lanata</i>	0.10	0.44
<i>Chrysothamnus nauseosus</i>	0.80	1.44
<i>Sarcobatus vermiculatus</i>	0.70	0.78
<i>Suaeda torreyana</i>	0.15	0.65
<b>FORBS</b>		
<i>Halogeton glomeratus</i>	1.60	6.97
<b>GRASSES</b>		
<i>Distichlis spicata</i>	1.25	5.45
<b>Total Density</b>	<b>4.70</b>	<b>8.14</b>

**Table 35. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site 12 - Greasewood Reference Area (GW3)	Mean	SDev	Freq
<b>A.. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Sarcobatus vermiculatus</i>	11.20	12.53	60.00
<i>Suaeda torreyana</i>	14.50	9.90	90.00
<b>FORBS</b>			
<b>GRASSES</b>			
<b>B. TOTAL COVER</b>			
Total Living Cover	25.70	15.17	
Litter	17.00	5.16	
Bareground	56.10	19.52	
Rock	1.20	0.40	
<b>C. DESIRABLE SPECIES COVER</b>			
	25.70	15.17	
<b>D. % COMPOSITION</b>			
Shrubs	100.00	0.00	
Forbs	0.00	0.00	
Grasses	0.00	0.00	

**Table 36. Woody Species Density, Emery Mine Reclamation Study (Pt. Qm Method).**

Site 12 - Greasewood Reference Area (GW3)	No/Ac
<i>Sarcobatus vermiculatus</i>	1956.68
<i>Suaeda torreyana</i>	5870.05
<b>Total</b>	<b>7826.74</b>

**Table 37. Total Density Per 1/2 Square Meter.**

**Emery Mine Reclamation Study.**

Site 12 - Greasewood Reference Area (GW3)	Mean	SDev
<b>TREES &amp; SHRUBS</b>		
<i>Sarcobatus vermiculatus</i>	0.50	0.50
<i>Suaeda torreyana</i>	12.10	9.20
<b>FORBS</b>		
<b>GRASSES</b>		
<b>Total Density</b>	<b>12.60</b>	<b>9.29</b>

**Table 38. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site 13 - Reference Area Greasewood	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Artemisia tridentata</i>	0.90	3.92	5.00
<i>Atriplex canescens</i>	0.50	2.18	5.00
<i>Atriplex confertifolia</i>	1.85	3.00	30.00
<i>Gutierrezia sarothrae</i>	0.85	2.29	20.00
<i>Opuntia sp.</i>	2.20	4.64	25.00
<i>Sarcobatus vermiculatus</i>	13.10	19.54	60.00
<i>Suaeda torreyana</i>	1.40	5.45	10.00
<b>FORBS</b>			
<i>Halogeton glomeratus</i>	0.25	1.09	5.00
<i>Lappula occidentalis</i>	0.95	1.96	25.00
<i>Sphaeralcea coccinea</i>	0.15	0.65	5.00
<b>GRASSES</b>			
<i>Hilaria jamesii</i>	4.40	10.74	15.00
<i>Sporobolus airoides</i>	2.95	5.56	30.00
<i>Stipa hymenoides</i>	0.70	2.63	10.00
<b>B. TOTAL COVER</b>			
Total Living Cover	30.20	16.67	
Litter	9.55	6.27	
Bareground	40.70	18.76	
<b>C. DESIRABLE SPECIES COVER</b>			
	29.00	17.12	
<b>D. % COMPOSITION</b>			
Shrubs	62.25	32.50	
Forbs	6.70	11.56	
Grasses	31.05	34.60	

**Table 39. Woody Species Density, Emery Mine Reclamation Study (Pt. Qu. Method).**

Site 13 - Reference Area Greasewood	No/Ac
<i>Artemisia tridentata</i>	32.66
<i>Atriplex canescens</i>	130.64
<i>Atriplex confertifolia</i>	751.17
<i>Gutierrezia sarothrae</i>	32.66
<i>Suaeda torreyana</i>	97.98
<i>Opuntia polyacantha</i>	163.30
<i>Sarcobatus vermiculatus</i>	1404.37
Total	2612.77

**Table 40. Total Density Per 1/2 Square Meter.**

**Emery Mine Reclamation Study.**

Site 13 - Reference Area Greasewood	Mean	SDev
<b>TREES &amp; SHRUBS</b>		
<i>Atriplex confertifolia</i>	0.20	0.40
<i>Atriplex canescens</i>	0.15	0.65
<i>Gutierrezia sarothrae</i>	0.90	1.89
<i>Opuntia sp.</i>	0.25	0.54
<i>Sarcobatus vermiculatus</i>	1.35	3.64
<i>Suaeda torreyana</i>	0.15	0.48
<b>FORBS</b>		
<i>Halogeton glomeratus</i>	0.10	0.44
<i>Lappula occidentalis</i>	1.55	3.50
<b>GRASSES</b>		
<i>Hilaria jamesii</i>	0.60	2.62
<i>Sporobolus airoides</i>	1.00	2.12
<i>Stipa hymenoides</i>	0.05	0.22
<b>Total Density</b>	<b>6.30</b>	<b>5.06</b>

**Table 41. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site 14 - Pond 1 Subsoil Pile	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Chrysothamnus nauseosus</i>	1.87	3.93	26.67
<i>Sarcobatus vermiculatus</i>	0.27	0.68	13.33
<i>Suaeda torreyana</i>	0.40	1.02	20.00
<b>FORBS</b>			
<i>Halogeton glomeratus</i>	0.53	0.62	46.67
<b>GRASSES</b>			
<i>Hilaria jamesii</i>	0.33	1.25	6.67
<i>Elymus junceus</i>	0.33	1.25	6.67
<b>B. TOTAL COVER</b>			
Total Living Cover	3.73	4.99	
Litter	1.93	1.12	
Bareground	93.27	5.52	
Rock	1.07	0.25	
<b>C. DESIRABLE SPECIES COVER</b>			
	3.20	5.28	
<b>D. % COMPOSITION</b>			
Shrubs	48.33	46.96	
Forbs	46.67	49.89	
Grasses	5.00	13.54	

**Table 42. Woody Species Density, Emery Mine Reclamation Study. (Pt. Qtr. Method)**

Site 14 - Pond 1 Subsoil Pile	No/Ac
<i>Symphoricarpos oreophilus</i>	9.55
<i>Atriplex confertifolia</i>	9.55
<i>Chrysothamnus nauseosus</i>	152.81
<i>Suaeda torreyana</i>	191.01
<i>Sarcobatus vermiculatus</i>	210.11
<b>Total</b>	<b>573.02</b>

**Table 43. Total Density Per 1/2 Square Meter. Emery Mine Reclamation Study.**

Site 14 - Pond 1 Subsoil Pile	Mean	SDev
<b>TREES &amp; SHRUBS</b>		
<i>Chrysothamnus nauseosus</i>	0.13	0.34
<i>Sarcobatus vermiculatus</i>	0.07	0.25
<i>Suaeda torreyana</i>	0.20	0.40
<b>FORBS</b>		
<i>Halogeton glomeratus</i>	0.53	0.50
<b>GRASSES</b>		
<i>Hilaria jamesii</i>	0.20	0.75
<i>Elymus junceus</i>	0.07	0.25
<b>Total Density</b>	<b>1.20</b>	<b>0.75</b>

**Table 44. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

<b>Site 15 - Riparian Meadow Reference Area 1</b>			
	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<b>FORBS</b>			
<i>Asclepias speciosa</i>	0.13	0.50	6.67
<i>Erigeron sp.</i>	6.00	8.21	40.00
<b>GRASSES</b>			
<i>Agrostis stolonifera</i>	0.87	2.55	13.33
<i>Carex hoodii</i>	61.00	23.29	93.33
<i>Distichlis spicata</i>	0.33	1.25	6.67
<i>Elymus trachycaulus</i>	5.00	6.32	46.67
<i>Juncus articus</i>	2.67	7.04	13.33
<i>Muhlenbergia asperifolia</i>	5.80	13.77	33.33
<b>B. TOTAL COVER</b>			
Total Living Cover	81.80	12.38	
Litter	13.67	11.88	
Bareground	3.53	7.42	
Rock	1.00	0.00	
<b>C. DESIRABLE SPECIES COVER</b>			
	81.80	12.38	
<b>D. % COMPOSITION</b>			
Shrubs	0.00	0.00	
Forbs	7.30	9.87	
Grasses	92.70	9.87	

**Table 45. Woody Species Density, Emery Mine Reclamation Study, (Pt. Qtr. Method).**

<b>Site 15 - Riparian Meadow Ref Area 1</b>	<b>No/Ac</b>
<b>Total</b>	<b>0</b>

**Table 46. Total Density Per 1/2 Square Meter.**

**Emery Mine Reclamation Study.**

**Site 15 - Riparian Meadow      Mean      SDev**  
**Reference Area 1**

(inappropriate method for this site)

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**Table 47. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site 16 - Riparian Meadow Reference Area 3	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Chrysothamnus nauseosus</i>	0.63	1.65	12.50
<b>FORBS</b>			
<i>Aster sp.</i>	1.25	2.17	25.00
<i>Erigeron sp.</i>	0.63	1.65	12.50
<b>GRASSES</b>			
<i>Distichlis spicata</i>	25.63	12.36	100.00
<i>Juncus articus</i>	21.88	9.98	87.50
<i>Muhlenbergia asperifolia</i>	1.25	3.31	12.50
<i>Poa pratensis</i>	1.88	2.42	37.50
<i>Sitanion hystrix</i>	6.25	5.45	62.50
<b>B. TOTAL COVER</b>			
Total Living Cover	59.38	9.16	
Litter	30.75	17.16	
Bareground	8.75	10.81	
Rock	1.13	0.33	
<b>C. DESIRABLE SPECIES COVER</b>			
	59.38	9.16	
<b>D. % COMPOSITION</b>			
Shrubs	1.25	3.31	
Forbs	3.64	6.86	
Grasses	95.11	9.95	

**Table 48. Woody Species Density, Emery Mine Reclamation Study. (Pt. Qtr. Method)**

Site 16 - Riparian Meadow Reference Area 3	No/Ad
Total	0

**Table 49. Total Density Per 1/2 Square Meter.**

**Emery Mine Reclamation Study.**

Site 16- Riparian Meadow Reference Area 3	Mean	SDev
<b>TREES &amp; SHRUBS</b>		

(inappropriate method for this site)

**Table 50. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

<b>Site 17 - Annual Forb Reference Area 1</b>			
	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Artemisia frigida</i>	3.60	3.85	50.00
<i>Atriplex confertifolia</i>	1.20	1.99	30.00
<i>Gutierrezia sarothrae</i>	0.20	0.60	10.00
<i>Opuntia polyacantha</i>	1.00	1.67	30.00
<i>Erigeron sp.</i>	0.30	0.90	10.00
<i>Gilia sp.</i>	0.10	0.30	10.00
<i>Lappula occidentalis</i>	0.50	1.50	10.00
<i>Phacelia sp.</i>	8.30	1.68	100.00
<b>GRASSES</b>			
<i>Hilaria jamesii</i>	6.30	4.98	80.00
<b>B. TOTAL COVER</b>			
Total Living Cover	21.50	3.91	
Litter	4.30	1.10	
Bareground	14.70	11.07	
Rock	59.50	14.04	
<b>C. DESIRABLE SPECIES COVER</b>			
	21.00	3.74	
<b>D. % COMPOSITION</b>			
Shrubs	29.60	21.94	
Forbs	43.00	10.56	
Grasses	27.40	21.93	

**Table 51. Woody Species Density- Emery Mine Reclamation Study. (Pr. Qtr. Method).**

<b>Site 17- Annual Forb Reference Area -1</b>	<b>No/Ac</b>
<i>Artemisia frigida</i>	2123.15
<i>Atriplex confertifolia</i>	1011.02
<i>Gutierrezia sarothrae</i>	101.10
<i>Ceratoides lanata</i>	303.31
<i>Opuntia polyacantha</i>	505.51
<b>Total</b>	<b>4044.09</b>

**Table 52. Total Density Per 1/2 Square Meter.**

**Emery Mine Reclamation Study.**

<b>Site 17- Annual Forb Reference Area - 1</b>	<b>Mean</b>	<b>SDev</b>
<b>TREES &amp; SHRUBS</b>		
<i>Artemisia frigida</i>	2.20	4.71
<i>Opuntia polyacantha</i>	0.20	0.40
<b>FORBS</b>		
<i>Gilia sp.</i>	0.10	0.30
<i>Phacelia sp.</i>	7.50	2.46
<b>GRASSES</b>		
<i>Hilaria jamesii</i>	7.70	6.86
<b>Total Density</b>	<b>17.70</b>	<b>10.18</b>

**Table 53. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site 18 - Mixed Desert Shrub Reference Area	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Artemisia frigida</i>	4.65	6.94	40.00
<i>Atriplex confertifolia</i>	4.95	5.39	65.00
<i>Ceratoides lanata</i>	0.55	1.36	15.00
<i>Eriogonum corymbosum</i>	0.50	1.50	10.00
<i>Gutierrezia sarothrae</i>	2.65	1.88	80.00
<i>Opuntia polyacantha</i>	3.00	5.60	30.00
<b>FORBS</b>			
<i>Erigeron sp.</i>	0.10	0.44	5.00
<b>GRASSES</b>			
<i>Bouteloua gracilis</i>	0.05	0.22	5.00
<i>Hilaria jamesii</i>	11.60	8.66	80.00
<i>Sporobolus airoides</i>	1.50	2.78	25.00
<i>Stipa hymenoides</i>	2.05	3.07	35.00
<b>B. TOTAL COVER</b>			
Total Living Cover	31.60	7.12	
Litter	6.40	2.22	
Bareground	55.75	7.63	
Rock	6.25	3.37	
<b>C. DESIRABLE SPECIES COVER</b>			
	31.60	7.12	
<b>D. % COMPOSITION</b>			
Shrubs	51.22	25.79	
Forbs	0.29	1.25	
Grasses	48.49	26.30	

**Table 54. Woody Species Density Emery Mine Reclamation Study (Pl. Qtr Method).**

Site 18 - Mixed Desert Shrub Ref. Area	No/Ac
<i>Artemisia tridentata</i>	1795.13
<i>Atriplex confertifolia</i>	3191.35
<i>Atriplex canescens</i>	99.73
<i>Ceratoides lanata</i>	698.11
<i>Eriogonum corymbosum</i>	99.73
<i>Gutierrezia sarothrae</i>	897.57
<i>Opuntia polyacantha</i>	997.30
<i>Sarcobatus vermiculatus</i>	99.73
<i>Sclerocactus whipplei</i>	99.73
Total	7978.36

**Table 55. Total Density Per 1/2 Square Meter.**

**Emery Mine Reclamation Study.**

Site 18 - Mixed Desert Shrub Reference Area	Mean	SDev
<b>TREES &amp; SHRUBS</b>		
<i>Artemisia frigida</i>	0.40	0.80
<i>Atriplex confertifolia</i>	0.80	0.81
<i>Ceratoides lanata</i>	0.05	0.22
<i>Eriogonum corymbosum</i>	0.05	0.22
<i>Gutierrezia sarothrae</i>	3.20	3.78
<i>Opuntia polyacantha</i>	0.40	0.86
<b>FORBS</b>		
<i>Erigeron sp.</i>	0.10	0.44
<b>GRASSES</b>		
<i>Hilaria jamesii</i>	9.10	7.56
<i>Sporobolus airoides</i>	0.15	0.36
<i>Stipa hymenoides</i>	0.15	0.36
<b>Total Density</b>	<b>14.40</b>	<b>9.00</b>

**Table 56. Cover by Species (A), Total Cover (B), Desirable Plant Species Cover (C), and Lifeform Composition (D).**

**Emery Mine Reclamation Study.**

Site Test Plot	Mean	SDev	Freq
<b>A. COVER &amp; FREQUENCY BY SPECIES</b>			
<b>TREES &amp; SHRUBS</b>			
<i>Atriplex canescens</i>	2.80	7.45	20.00
<i>Sarcobatus vermiculatus</i>	13.20	20.54	30.00
<i>Suaeda torreyana</i>	10.10	11.10	50.00
<b>FORBS</b>			
<i>Bassia hyssopifolia</i>	2.00	6.00	10.00
<i>Sphaeralcea coccinea</i>	0.10	0.30	10.00
<b>GRASSES</b>			
<i>Sporobolus airoides</i>	11.20	19.67	40.00
<i>Sporobolus flexuosus</i>	8.90	13.68	40.00
<b>B. TOTAL COVER</b>			
Total Living Cover	48.30	14.49	
Litter	26.40	14.17	
Bareground	23.90	14.98	
Rock	1.40	0.49	
<b>C. DESIRABLE SPECIES COVER</b>			
	46.30	13.39	
<b>D. % COMPOSITION</b>			
Shrubs	56.94	31.82	
Forbs	3.23	9.19	
Grasses	39.83	33.45	

**Table 57. Woody Species Density, Emery Mine Reclamation Study. (P. Qtr. Method).**

Site Test Plot	No/Ac
<i>Ceratoides lanata</i>	73.95
<i>Atriplex canescens</i>	813.40
<i>Sarcobatus vermiculatus</i>	369.73
<i>Suaeda torreyana</i>	1700.75
Total	2957.83

**Table 58. Total Density Per 1/2 Square Meter.**

**Emery Mine Reclamation Study.**

Test Plot	Mean	SDev
<b>TREES &amp; SHRUBS</b>		
<i>Atriplex canescens</i>	0.20	0.40
<i>Sarcobatus vermiculatus</i>	0.20	0.60
<i>Suaeda torreyana</i>	0.60	0.80
<b>FORBS</b>		
<i>Bassia hyssopifolia</i>	4.00	12.00
<b>GRASSES</b>		
<i>Sporobolus airoides</i>	0.90	1.64
<i>Sporobolus flexuosus</i>	0.30	0.64
<b>Total Density</b>	<b>6.20</b>	<b>11.65</b>

## Site Records & History

Records and files were reviewed for historical information about each site which, in some cases, helped determine explanations for current conditions at the site and provided clues to help explain revegetation successes or failures. A summary of the findings from these records is shown below.

**Table 59: Historical Information About Each of the Sites.**

Site No.	Site Name	History & Notes
1	Subsoil Piles From Pond 4 & 5	<p>Deducing from DOGM inspection reports [Wyatt and Pruit (January 21, 1982); Wyatt (July 14, 1982); Kale (November 10, 1982)], it appears Ponds 4 &amp; 5 were constructed in the winter of 1981-82 along with the Subsoil Piles created from the excavation.</p> <p>This areas were seeded in spring 1982.</p> <p>Pond 4 was a reverse osmosis pond (or evaporation lagoon) whereas Pond 5 was the proposed preparation plant sediment pond. (The preparation plant was never constructed).</p> <p>Wyatt (1982) reports: "Topsoil and subsoil stockpiles excavated from the preparation plant's sediment pond excavation had been reseeded. <i>Germination is scarce</i>".</p> <p>In another inspection report, Shepherd (May 29, 1987) reported "we also looked at the revegetation efforts that were initiated 1 year ago during the installation of the evaporation lagoon. Much of the vegetation of the pond embankments is of a weedy nature (predominantly halogeton). Some of the planted species are evident, however sparse (mostly crested wheatgrass and sweetclover)."</p> <p>(This suggests that the area was re-seeded).</p>

**Table 59: Historical Information About Each of the Sites.**

2	Coal Pile Topsoil Pile	<p>In a DOGM inspection report Kale (November 10, 1982) reported that a new disturbance was made for a coal stockpile. Soil was salvaged from this disturbance.</p> <p>Because this topsoil pile was relatively small, it has been postulated that the coal storage pile may have been expanded at a later date (Kirschbaum 2003).</p> <p><i>No reports on revegetation success were noted.</i></p>
3	Topsoil Pile From Pond 6	<p>In a DOGM inspection report Haddock (April 18-19, 1989) reported that seeding was completed on the sites of recent construction, namely, the pipeline corridor leading to Pond 6, the topsoil and subsoil piles created during Pond 6 construction and the area surrounding Pond 6. No mulch was used in these areas as a variance to the mulching requirement. This was approved on March 20, 1989.</p>
4	Subsoil Pile (E) From Pond 6	<p><i>Note - Haddock (September 7-8, 1989) reported that there was very little vegetation on the new pipeline corridor and topsoil piles associated with Pond 6. He also states that the site had been graded and disced and appears stable.</i></p>
5	Subsoil Pile (W) from Pond 6	<p>Demczak (May 30, 1991) stated that the topsoil pile by the main haulage road to the mine will be reseeded this fall.</p> <p>Burton (October 1991) stated that work had begun on reshaping and revegetating the topsoil stockpiles located north of Pond 6.</p> <p>Burton (November 21, 1991) reported that the topsoil and subsoil piles located on the south side of Emery County Road #907 have been reseeded and mulched. Consol first made wedge-shaped depressions with a front-end loader. The depressions are sized approximately 5'L x 1' D x 1' W. The pile was then disced with a tractor around these depressions. The seed was a mix recommended by P. Baker (Division) and was hand broadcast, followed by hand mulching of 1T/ac straw. The mulch was incorporated by discing with a tractor. The mulch in the wedge-shaped depressions was not crimped. The right-of-way on land on the opposite side of the road was treated in the same manner, except that no depressions were formed in the surface of the relatively level ground.</p>

**Table 59: Historical Information About Each of the Sites.**

Burton (January 21, 1992) reported that the topsoil and subsoil piles located on the south side of Emery County Road #907 were reseeded and mulched in the fall of 1991.

Note: In the same report, Burton also stated that at the end of the inspection, a photograph of a dozen cows grazing on the adjacent Pond #6 was taken. The ability of the cows to access the topsoil storage area will severely limit the success of the recent revegetation. She said Consol may want to eliminate the grazing in the area either by fencing or through an agreement with the rancher. The right-of-way on land on the opposite side of the road was also reseeded and should be free of grazing pressure for at least two years as well.

Baker (February 13, 1992) reported a few cattle were grazing next to the soil stockpiles by Pond 6, and one of the piles had tracks on it. He said Consol has had difficulty in establishing vegetation on these stockpiles, and I discussed the possible need to fence them. Mr. Bray stated that the company is considering this but that it cannot be done now because the ground is frozen.

The inspector obtained copies of the purchase order and invoice for the seed used last fall on these same stockpiles. All species required in the plan were present in the proper proportions. (Seed list was not included in this report).

Demczak (March 27, 1992) reported that the topsoil and subsoil piles located near Pond 6 have a history of sparse or no vegetation growing on them. The piles were mulched and reseeded in the fall of 1991. The inspection of the piles revealed single stem plants springing up throughout the topsoil piles. The disturbing factor was that cows have been roaming on to the piles. Therefore, further investigation into the regulation is needed to prevent these occurrences. Those piles should be protected from contaminants and unnecessary competition that would interfere with revegetation.

In a DOGM inspection report Baker (April 9, 1992) said that they looked at the topsoil and subsoil stock pile near sediment Pond 6 that were seeded last fall. He stated that these piles have a moderate number of seedling plants growing on them. The most common plants, however, were grain from the mulch, and weeds. Baker discussed the possible need to fence these stockpiles from cattle that graze in the area. These stockpiles are not particularly subject to erosion, but vegetative cover is needed to retain the viability and usability of the topsoil. Forage in the area is generally fair or poorer quality, and cattle would be inclined to eat desirable vegetation that grows on the stockpiles. Mr. Bray stated that he would discuss the situation with company officials who would decide whether or not to spend the money to fence the stockpiles. Mr. Baker stated that if the piles are not fenced and if there is evidence that vegetation establishment is being impaired by grazing, enforcement action would be considered.

Burton (June 18, 1992) reports that the same topsoil and subsoil piles observed. Some grasses and seedlings on the subsoil pile. Plants seemed healthier on the subsoil pile. Livestock hoof prints were evident on pile. Consol said no cattle will be there until fall.

Demczak (October 29, 1992) stated that "we have looked at vegetation establishment on the soil stockpiles near Pond 6. Best establishment has been on the small subsoil pile in the middle. The reasons for this better plant establishment should be investigated. I am not sure why this pile was kept separate from the larger subsoil pile on the west, *but the soil may lack some undesirable characteristics of other soils.*

**Table 59: Historical Information About Each of the Sites.**

		<p>Demczak (June 22, 1993) reported that "there has been very little vegetation on top of the topsoil piles. The seeding which took place 2 years ago has not been very successful. There are some grasses within the berm ditch around the topsoil pile where moisture has been concentrated and a small amount of native vegetation on the pile."</p> <p>Demczak (July 9, 1993) mentioned that only cover on piles are weeds, but grasses are growing inside berm. He recommended roughening surface of piles.</p> <p>In a later inspection report, Johnson (November 18, 1993) stated that "there are signs that cattle have been walking on the topsoil piles. Since vegetation is difficult to establish on these piles and the soils are highly erodible, measures should be taken to keep the cattle out of the area."</p> <p>Johnson (December 21, 1993) later reports that "there are signs that cattle are waking on the topsoil piles. Some of the grasses in the trough between the topsoil and the berms around the topsoil appear to have been eaten, but it could not be determined whether it was by cattle, rabbits or another animal".</p> <p>Baker (December 30, 1993) provided a qualitative assessment of these pile. In this memorandum he makes the following statements.</p> <ul style="list-style-type: none"> <li>• Success has been better on the middle, smaller pile. There are several seeded grasses that appeared to have survived the second summer although they are still small and have not set seed. Because they have not set seed, it is impossible to identify them. This pile also contains a few small winterfat and fourwing saltbush plants. Even though this pile has more seeded species growing on it than the other piles, cover from the seeded species is still less than 5%.</li> <li>• The two larger piles have very few seeded grasses growing on them. A few winterfat and fourwing saltbush plants are present, but these are very small and it is questionable how much longer they will survive.</li> <li>• There are more seeded plants in the gouges that were created with the seeding project than on other areas. Cover from seeded species is less than 1%.</li> <li>• There are more native species growing on the topsoil piles now than in 1991, but there is not as much cover from native species as there is in adjacent areas. Some of the possible reasons for not having better success are: 1) the soil is of poor quality, and its quality is diminished even further when it is disturbed. However, other topsoil piles at the mine have substantially more perennial vegetation than these three, 2) precipitation is low in the area, and it may not have come at optimal times for plant establishment, 3) there were some limitations with the equipment that could be used, and the gouges may not have been large enough to capture enough water to make the gouges as useful as they could have been, 4) cattle and rabbits have access to the topsoil piles. I saw evidence of grazing of some of the established plants, including a woody plant that had been bitten off at ground level. During the first winter after the seeding, the cattle appeared to eat some of the mulch and to use it for bedding.</li> </ul>
6	Pond 6 Banks	(See Sites 3-5 for History and Notes).

**Table 59: Historical Information About Each of the Sites.**

7	Pond 4 & 5 Areas	(See Site No. 1 for History and Notes).
8	Borehole Reclaimed Road	<p>From a DOGM inspection by Portle (April 10, 1984), he stated that the borehole access road was seeded in fall 1982.</p> <p>Another source confirms the above statement and adds "since no earth materials were removed and no road surfacing material was placed during construction (prior to Aug. 3 1977) of these roads, no grading, backfilling or topsoil respreading was required" (Emery Mine MRP, October 2002).</p> <p>The same source shows the following seeds were planted at pounds of pure live seed rates.</p> <p>Crested wheatgrass (0.5)          Western wheatgrass (1.0)          Indian ricegrass (0.5)          Galleta (0.5)          Streambank wheatgrass (1.0)          Fourwing saltbush (1.5)</p> <p>The same inspection report recommended it be seeded again in spring 1984 because success was not good.</p>
9	Substation Topsoil Pile	According to Behling (2003) this pile was probably created when the substation was constructed and seeded at the same time.
10	Topsoil Pile from Pond 1	<p>This pond was constructed in the early 1980s (Behling 2003).</p> <p>Although not stated directly, it was probably seeded immediately or soon after construction.</p>
11	Pond 1	<p>This pond was constructed in the early 1980s (Behling 2003).</p> <p>Although not stated directly, it was probably seeded immediately or soon after construction.</p>
12	Grease-wood Reference Area (GW3)	<p>Reasons for establishing this reference area are unknown. A larger greasewood reference area has been established in a different location. The larger area was described by Peterson and Keammerer (1980).</p> <p>This is a small area of about 1600 ft<sup>2</sup> (40' x 40').</p>
13	Reference Area Grease-wood	<p>Peterson and Keammerer (1980) stated that they established a greasewood reference area that was "based on characteristics of the vegetation types and other site considerations". The report also states that this reference area was selected as to closely represent the vegetation type within the area to be disturbed.</p> <p>Size of the reference area was 100 feet by 100 feet and was fenced.</p>

**Table 59: Historical Information About Each of the Sites.**

14	Pond 1 Subsoil	<p>This pond was constructed in the early 1980s (Behling 2003).</p> <p>Although not stated directly, it was probably seeded immediately or soon after construction.</p> <p>This pile is long and narrow because it was proposed to be a slurry ditch when first constructed.</p>
15	Riparian Meadow Reference Area - 1	<p>No information was found for this reference area. Information was found, however, on the smaller riparian meadow reference area (see Site No. 16 below).</p> <p>Approximate size was 50 feet by 150 feet.</p>
16	Riparian Meadow Reference Area - 3	<p>Peterson and Keammerer (1980) stated that they established a riparian meadow reference area that was "based on characteristics of the vegetation types and other site considerations". The report also stated that this reference area was selected as to closely represent the vegetation type within the area to be disturbed.</p> <p>Another larger riparian meadow reference area was established. No information was found for this area (see Site No. 16 above).</p> <p>Size of the reference area was 40 feet by 60 feet and was fenced.</p>
17	Annual Forb - 1	<p>In an early report prepared by Peterson and Keammerer (1980), this community was described for the Emery Deep Mine permit area.</p> <p>As described in the scope of the Peterson and Keammerer (1980) report, the vegetation "studies were designed to sample and characterize vegetation types within the area to be affected and to establish a reference area for major vegetation types found within the area to be affected". It is not known whether the authors of the report meant "affected" to mean disturbed or merely to be a portion of the permit area 'affected by mining (not necessarily 'disturbed')'. In the case of this community it is more practical to presume the later scenario since no obvious disturbances to this area has occurred by mining operations.</p>

**Table 59: Historical Information About Each of the Sites.**

18	Mixed Desert Shrub Reference Area	<p>Peterson and Keammerer (1980) stated that they established a mixed desert shrub reference area that was "based on characteristics of the vegetation types and other site considerations". The report also states that this reference area was selected as to closely represent the vegetation type within the area to be disturbed.</p> <p>Size of the reference area was 100 feet by 100 feet and was fenced.</p>
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**Table 59: Historical Information About Each of the Sites.**

19	Test Plot	<p>Prior to <i>Mt. Nebo Scientific's</i> sampling of the Test Plot (also called "Revegetation Demonstration Plot"), several documents were reviewed. Also reviewed was Appendix VII-1 (1987). Following only limited revegetation success, the Test Plot was reconstructed in 1987 to comply with a March 11, 1987 DOGM deficiency received by Consol and "to evaluate some innovative techniques described in the <i>Intermountain Forest and Range Experiment Station Research Report INT335 dated June, 1985</i>". The 1987 document is a good source to review all techniques and changes for the Test Plots.</p> <p>The following additional documents were also reviewed: Consolidation Coal Company (March 31, 1986), Goodrich and Denning (October 5, 1987), Denning and Larson (January 10, 1989), and Denning (March 25, 1992).</p> <p>The aforementioned reference regarding the test plot summarized each years' assessment research plot. These results were summarized well by P. Burton (July 31, 2003) who has taken excerpts from files at DOGM. Some the excerpts and comments from her summary follows below.</p> <p><i>The demonstration test plot was constructed in 1984 and reworked in 1987 in an effort to determine successful revegetation techniques for use on subsoils derived from the Mancos Shale. The chemical characteristics of the soils in this plot are described with the Vegetation Data in the 1991 Annual Report. They are extremely sodic, with average values in the top six inches of 9.3 pH and 19.8 SAR. The variables tested in the plots were:</i></p> <ul style="list-style-type: none"> <li>• <i>topsoil and no topsoil treatments;</i></li> <li>• <i>irrigation and no irrigation treatments;</i></li> <li>• <i>mulch and no mulch treatments;</i></li> <li>• <i>furrows and no furrows; and</i></li> <li>• <i>mature versus containerized transplants. The demonstration test plots were evaluated in 1989 and 1990 by Richard Denning and David Larson of Consolidation Coal Company. The results of the evaluation are included in the Annual Reports for 1988 and 1989. Mortality of transplants and containerized plants was high. At the end of the monitoring period, the 33% of the mature transplants survived and 10% of the containerized transplants were living. The most successful plots were those that received mulch and contained shallow depressions. Thus, the test plots emphasize that the most important variable is the availability of water. Water not only irrigates the plants, but also leaches the salts from the soil.</i></li> </ul>
20	Canyon Road	<p>This is a road to old portals that have been closed and sealed. At the time of sampling for this report, it had not yet been reclaimed. Therefore, no vegetation sampling was conducted.</p>

## DISCUSSION

One of the primary objectives of this study was to monitor and report the findings from quantitative sampling several areas that have been reclaimed or re-seeded at the Emery Mine site. Another objective was to attempt to interpret the data sets in a meaningful way to determine revegetation feasibility. Or, in other words, to attempt to provide explanations for apparent successes or failures of the reclaimed areas. The viability of the reclaimed areas including reclamation techniques, species lists, seeding times, climatic considerations, and other historical information makes this a complicated task.

This section therefore attempts to discuss some of the most meaningful data along with some historical and soil property aspects of the reclaimed and reference areas. As mentioned previously, a soil sampling study was also conducted on each of these sites by James Nyenhuis. The soil study also included information about the locations from which the soils of each of the reclaimed sites were probably taken. Although some of these soil results are discussed in this section, the complete report is also included in this document.

<b>Table 60: Seed Mixture for Arid Land Mixed Desert Shrub and Annual Forb Areas at the Emery Mine</b>	
Plant Species	PLS/Acre
Indian ricegrass	3.0
Alkali sacaton	0.5
Galleta	2.5
Western wheatgrass	3.0
Winterfat	4.0
Fourwing saltbush	4.0
Rubber rabbitbrush	1.0
Yellow sweetclover	1.5
Desert globemallow	0.5
Blueleaf aster	0.5
Sand dropseed	0.1
Gardner saltbush	2.0
Black Sagebrush	0.25
<b>TOTAL</b>	<b>22.85</b>

<b>Table 61: Seed Mixture for Greasewood Areas at the Emery Mine</b>	
Plant Species	PLS/Acre
Blue grama	0.75
Streamb. wheatgrass	3.0
Sand dropseed	0.35
Winterfat	4.0
Fourwing saltbush	4.0
Rubber rabbitbrush	1.0
Big sagebrush	0.25
Greasewood	2.5
Yellow sweetclover	1.0
Blue flax	1.0
Evening primrose	0.5
Gardner saltbush	2.0
Black sagebrush	0.25
<b>TOTAL</b>	<b>20.60</b>

### Seed Mixtures

Although some records reported on Table 59 implied that in some cases the seeding mixtures may have varied, the seed mixtures shown on Tables 60-62 were in the Emery Mine's approved plan (Emery Mine MPR, May 2001). Because it was not stated elsewhere in the records we reviewed, it is therefore assumed that these mixtures were seeded in the reclaimed areas.

## Living Cover

Along with other summarized data, the RESULTS section above presents tables that show the sampling results of total living cover and cover by species. One of the most meaningful parameters shown on the cover tables was the "Desirable Species Cover" which is comprised of the total living cover minus the "weedy" exotics that were common in some areas. This provides the investigators a more meaningful cover figure that can more accurately be compared to potential revegetation standards, reference areas, or other parameters that represent tangible success as compared to that in which cover has been inflated by the addition of weed plant species cover.

Table 63 shows the desirable plant cover for each of the reclaimed sample areas, listing the values from the most cover to the least amount of cover. Also shown are soil potential problems as described by J. Nyenhuis later in this document.

Table 62: Seed Mixture for Riparian Meadow Areas at the Emery Mine	
Plant Species	PLS/A cre
Western wheatgrass	5.0
Slender wheatgrass	3.0
Alkali sacaton	0.25
Spike muly	0.25
Alkaligrass	0.50
Yellow sweetclover	1.5
Blueleaf aster	0.50
Indian blanket	1.0
Jones reedgrass	1.0
Gooseberry globem.	1.0
Alfalfa (Ladak)	1.0
Winterfat	1.0
Fourwing saltbush	2.0
Wood's rose	1.0
TOTAL	19.0

**Table 63: Reclamation Areas - Desirable Living Cover (in Descending Order).**

Site No.	Site Name	Desirable Cover %	Soil Problems
19	Test Plot Area	46.30	
11	Pond 1 Banks	39.40	saline and/or sodic
6	Pond 6 Banks	38.50	saline and/or sodic
7	Pond 5 Area	18.00	
1	Subsoil Piles from Ponds 4 & 5	11.80	
4	Subsoil Pile (E) From Pond 6	11.14	
10	Topsoil Pile From Pond 1	10.53	saline and/or sodic
2	Coal Pile Topsoil Pile	10.30	
9	Substation Topsoil Pile	6.40	
14	Pond 1 Subsoil Pile	3.20	saline and/or sodic
8	Borehole Reclaimed Road	2.60	saline and/or sodic
5	Subsoil Pile (W) From Pond 6	1.38	saline and/or sodic
3	Topsoil Pile From Pond 6	0.27	
20	Canyon Bottom Road	N/A	saline and/or sodic
21	Pond 4 Area	N/A	saline and/or sodic
22	4th East Portal Topsoil Pile	N/A	

The **Test Plot** area had the most desirable cover of all the reclaimed areas. For the study several previous monitoring reports were reviewed prior to sampling the plots (see Site 19, Table 59). When the investigators arrived in the field to sample the plots for this study, as-built drawings were reviewed to determine the boundaries of the reclamation treatments employed. Unfortunately, the field plot did not match the drawings or subplots, so treatments used were unknown for sampling purposes. We then consulted more CCC documents and had conversations with Mr. Tim Kirschbaum (CCC) and DOGM representatives in an attempt to decipher the plot design, but were unsuccessful to determine this design with any degree of certainty. We later decided to sample the site in an area that had good cover, but sampling was conducted without regard to treatments. Soil sampling was accomplished in the same area by James Nyenhuis. Although not specific to reclamation treatments, the data therefore suggest that the area could be reclaimed successfully.

The next two highest cover values were those from **Pond 1** and **Pond 6** banks with very respectable values of 39.40% and 38.50%, respectively. The most accurate reference areas to be compared to these reclaimed sites would be the Site 13 (Reference Area Greasewood) and Site 12 [Greasewood Reference Area (GW3)]. Even though the soils of the reclaimed areas were saline and sodic, the desirable plant cover of Pond 1 and Pond 6 banks exceeded the cover values of their reference areas (see Tables 35-40 and Table 64 for reference area cover).

When one compares the cover values of the reclaimed areas of Table 63, it appears that *the highest cover values were those areas that had either a water supply (e.g. Pond 1 and Pond 6 banks) or were those areas that did not have saline or sodic soil problems.*

It should be noted that some of the native, undisturbed soils such as Site 12 also had saline and sodic soil conditions. Historical information may also provide a clue in revegetation success. For

example, Table 59 reports potential predation problems from resident livestock on the reclaimed areas of Pond 6 (Sites 3-6) from several inspections conducted by DOGM.

**Table 64: Reference Area Desirable Living Cover (in Descending Order).**

Site No.	Site Name	Desirable Cover %	Soil Problems
15	Riparian Meadow Reference Area -1	81.80	poor % CaCO3
16	Riparian Meadow Reference Area -3	59.38	
18	Mixed Desert Shrub Reference Area	31.60	
13	Reference Area Greasewood	29.00	
12	Greasewood Reference Area (GW3)	25.70	saline and/or sodic
17	Annual Forb Reference Area - 1	21.00	poor sat. %

**Woody Species Density**

Table 65 shows that several of the reclaimed sites had acceptable woody species density values (the number of individuals per acre), many of which came close to those reported in the reference areas (Table 66).

*Woody species densities of the reclaimed sites also seemed to be dependant on the whether or not salinity of sodicity was a factor in the soils. With only one exception, the greatest densities were those soils that did not have “poor” or “unacceptable” salt problems. The exception was the Pond 1 Banks, an area where water was more readily available than other sites.*

**Table 65: Reclamation Area Woody Species Density (in Descending Order).**

Site No.	Site Name	Number Per Acre	Soil Problems
2	Coal Pile Topsoil Pile	4382.07	
7	Pond 5 Area	3949.80	
11	Pond 1 Banks	3664.10	saline and/or sodic
19	Test Plot Area	2957.83	
9	Substation Topsoil Pile	1363.99	
1	Subsoil Piles from Ponds 4 & 5	1351.51	
6	Pond 6 Banks	1100.70	saline and/or sodic
8	Borehole Reclaimed Road	648.66	saline and/or sodic
14	Pond 1 Subsoil Pile	573.02	saline and/or sodic
4	Subsoil Pile (E) From Pond 6	197.83	
5	Subsoil Pile (W) From Pond 6	56.55	saline and/or sodic
10	Topsoil Pile From Pond 1	9.65	saline and/or sodic
3	Topsoil Pile From Pond 6	0.00	
20	Pond 4 Area	N/A	saline and/or sodic
21	4th East Portal Topsoil Pile	N/A	saline and/or sodic

**Table 66: Reference Area Woody Species Density  
(in Descending Order).**

Site No.	Site Name	Number Per Acre	Soil Problems
18	Mixed Desert Shrub Reference Area	7978.36	
12	Greasewood Reference Area (GW3)	7826.74	saline and/or sodic
17	Annual Forb Reference Area - 1	4044.09	poor sat. %
13	Reference Area Greasewood	2612.77	
15	Riparian Meadow Reference Area -1	0.00	poor % CaCO <sub>3</sub>
16	Riparian Meadow Reference Area -3	0.00	

## SUMMARY & CONCLUSIONS

The four factors that seemed to most influence desirable plant cover and woody species density were: 1) electrical conductivity (EC), 2) sodium adsorption ratios (SAR's), 3) proximity to an available water source and, 3) management practices (i.e. grazing). In other words, those areas where salinity and sodicity were not apparent in the soils or a water source was available for plant growth and livestock were not present for grazing on the reclaimed areas, desirable plant cover and woody species density were highest.

Although three of the reclaimed sites had cover and woody species densities that had the potential to meet or exceed those standards that could potentially be used to represent final revegetation success standards, two of those sites had techniques that would not be practical for final reclamation (the sites were located on the slopes of pond areas). The third area, or Test Plots, had the most cover and good density values. It appears that water availability may also have had an affect on this plot because records indicate that irrigation on the plots was implemented. This area was also fenced to preclude livestock grazing.

It also should be noted that Utah has had 5 consecutive years of drought conditions, a factor that can greatly influence successful revegetation. Many of these sites, however, were seeded prior to the drought and, although it may have greatly reduced cover, reproduction and productivity, it should not have precluded establishment of desirable plant species.

This study provided quantitative data of several reclaimed sites that strongly suggest that revegetation in this area may be challenging, but not impossible. Final reclamation and revegetation planning should emphasize water harvesting (or supplemental irrigation) and the soil characteristics, especially salts which are also inherent in the native soils.

## REFERENCES

- Appendix VII-1. 1987. Topsoil Substitution Plan, Revegetation Demonstration Plan for Areas Affected Prior to August 3, 1977. *In* Emery Mine Mining and Reclamation Plan.
- Baker, P. February 13, 1992. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.
- Baker, P. April 9, 1992. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.
- Baker, P. December 30, 1993. Memorandum to file regarding Emery Deep Topsoil Piles. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.
- Burton, P. June 18, 1992. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.
- Behling, S. October 30, 2003. (personal communications).
- Burton, P. October 17, 1991. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.
- Burton, P. November 21, 1991. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.
- Burton, P. January 21, 1992. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.
- Burton, P. July 31, 2003. Emery Reclaimability Study. Personal communications via e-mail to P. Collins, Mt. Nebo Scientific, Inc., Springville, UT.
- Consolidation Coal Company. March 31, 1986. Emery Mine Revegetation Demonstration Sites Annual Monitoring Report - 1985. Emery Mine, Emery UT.
- Demczak, S. March 27, 1992. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.
- Demczak, S. October 29, 1992. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.
- Demczak, S. June 22, 1993. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.

Demczak, S. July 9, 1993. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.

Demczak, S. May 30, 1991. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.

Denning R. and D. Larson. January 10, 1989. Emery Mine Revegetation Demonstration Sites, Annual Monitoring Report - 1988. Consolidation Coal Company, Emery Mine, Emery UT.

Denning, R. March 25, 1992. Emery Mine Revegetation Demonstration Sites, Annual Monitoring Report - 1991. Consolidation Coal Company, Emery Mine, Emery UT.

Emery Mine. October 2002. (inserted) *in* the Mining and Reclamation Plan, Chapter III, pg. 4b.

Emery Mine. May 2001. (inserted) *in* the Mining and Reclamation Plan, Chapter VIII, pg. 21-22.

Goodrich, G.W. and R. Denning. October 5, 1987. Emery Mine Revegetation Demonstration Sites, Third Annual Monitoring Report - 1987. Consolidation Coal Company, Emery Mine, Emery UT.

Haddock D. April 18-19, 1989. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.

Haddock D. September 7-8, 1989. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.

Johnson, S. November 18, 1993. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.

Johnson, S. December 21, 1993. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.

Kale B. Nov. 10, 1982. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.

Kirschbaum, T. (a) October 30, 2003. (personal communications).

Peterson, S.J. and W.R. Keammerer. 1980. Vegetation resources for the Emery, Utah Deep Mine Project. Sooecker-Keammerer and Associates, Boulder CO. Unpub. Rep. *in* an earlier version of Emery Mine's Mining and Reclamation Plan.

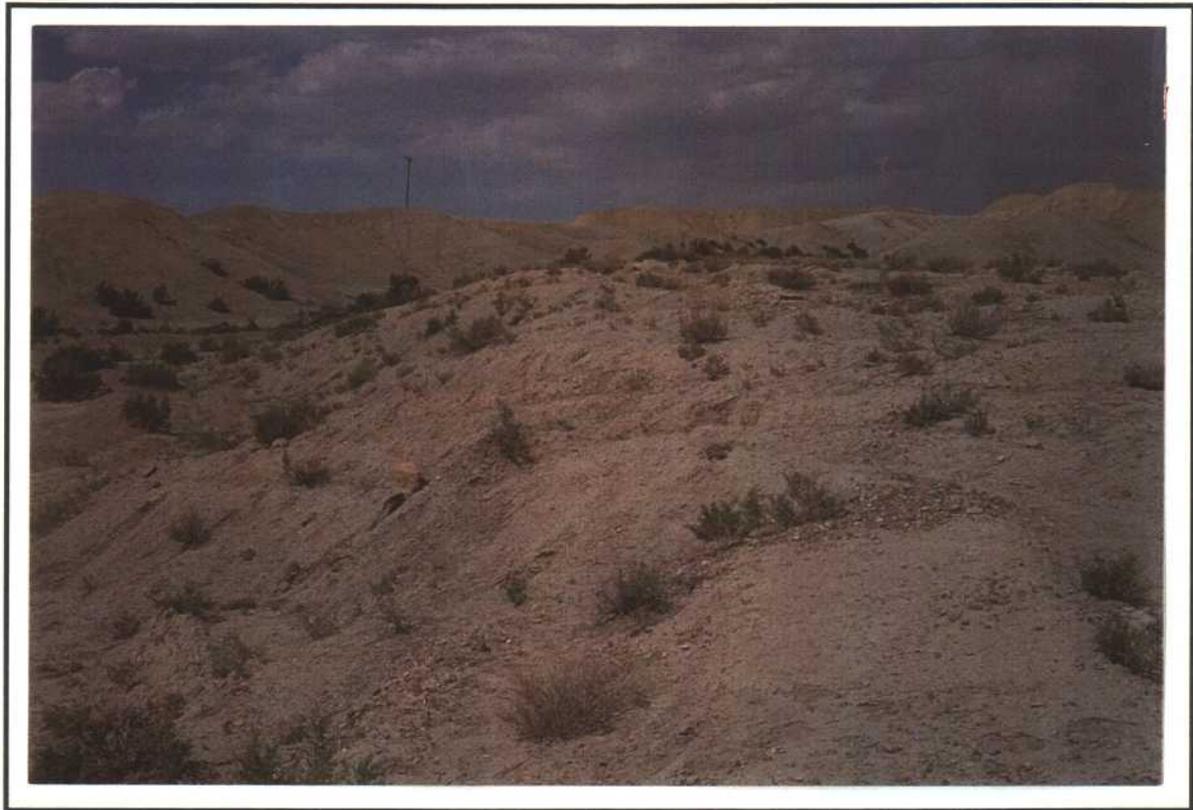
Portle, T. April 10, 1984. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.

Shepherd, H. May 29, 1987. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.

Wyatt, K and S. Pruit. January 21, 1982. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.

Wyatt K, July 14, 1982. Consol Mine Inspection Report. State of Utah, Division of Oil, Gas & Mining. Salt Lake City, UT.

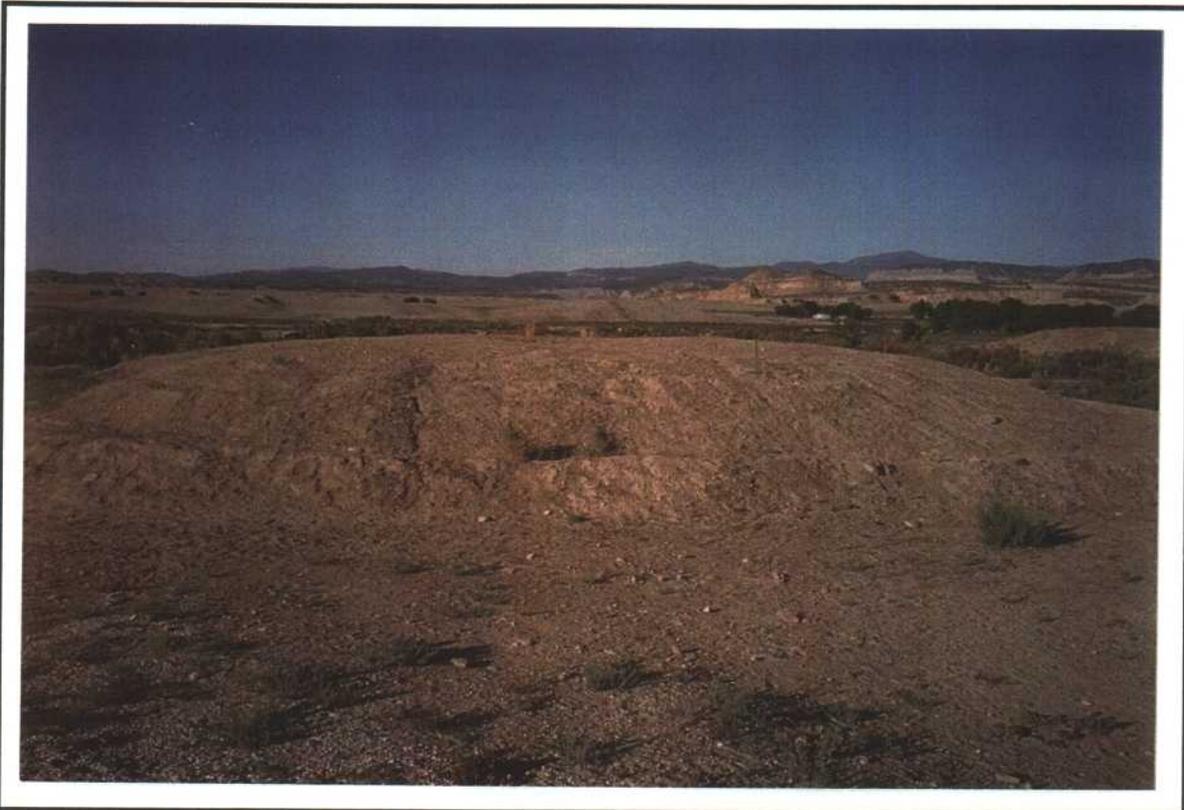
**COLOR PHOTOGRAPHS  
OF THE  
STUDY SITES**



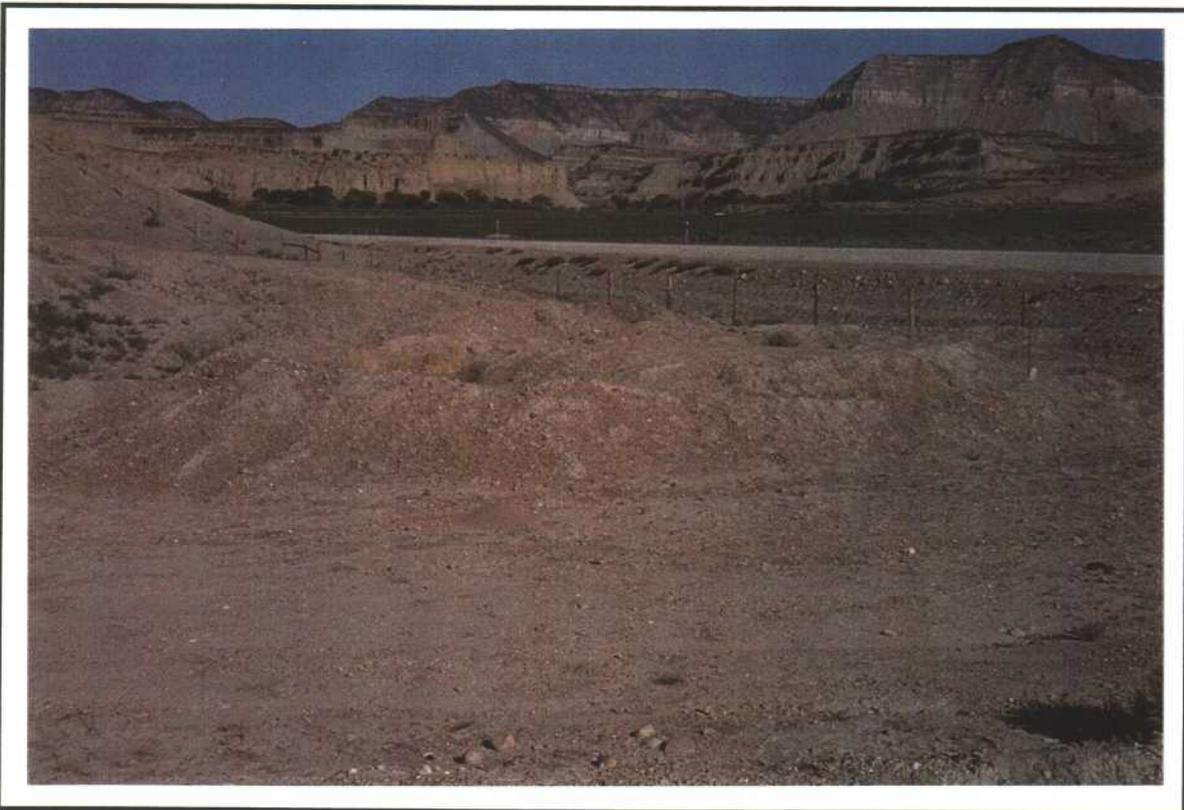
Site 1 - Subsoil Piles From Pond 4 & 5



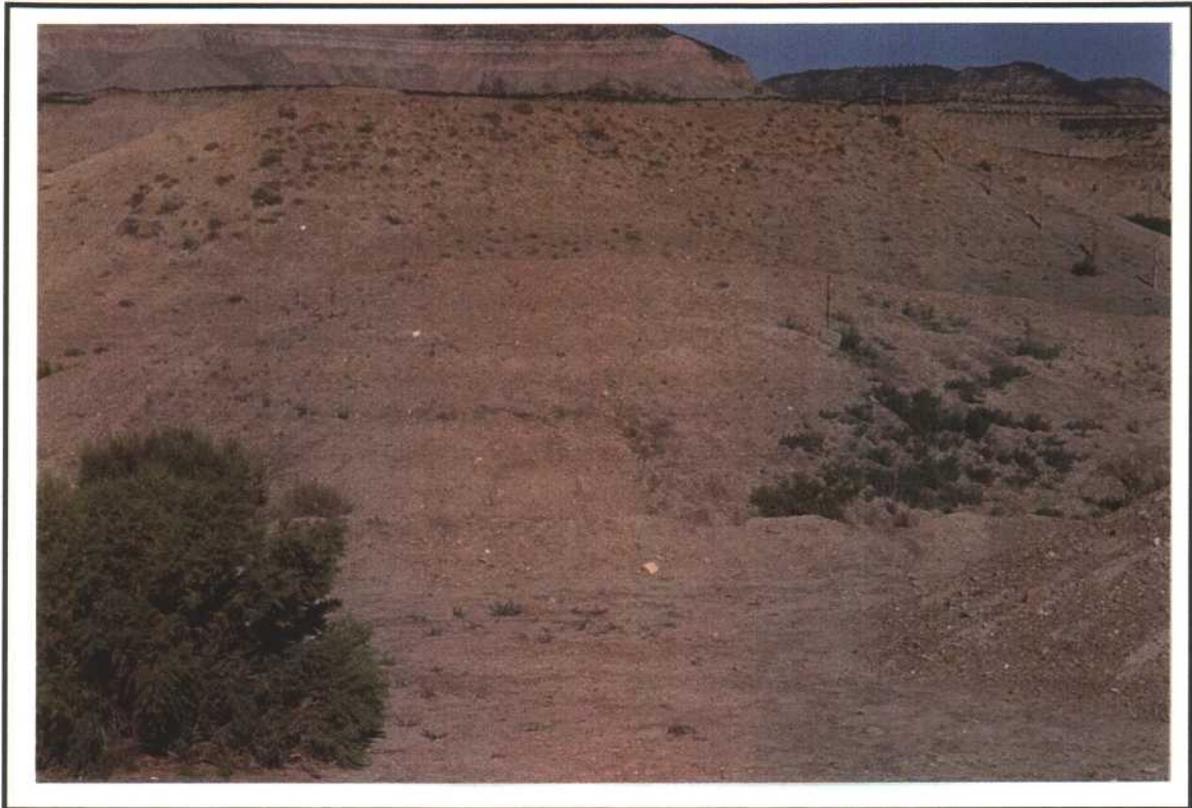
Site 2 - Coal Pile Topsoil Pile



Site 3 - Topsoil Pile From Pond 6



Site 4 - Subsoil Pile (E) From Pond 6



Site 5 - Subsoil Pile (W) From Pond 6



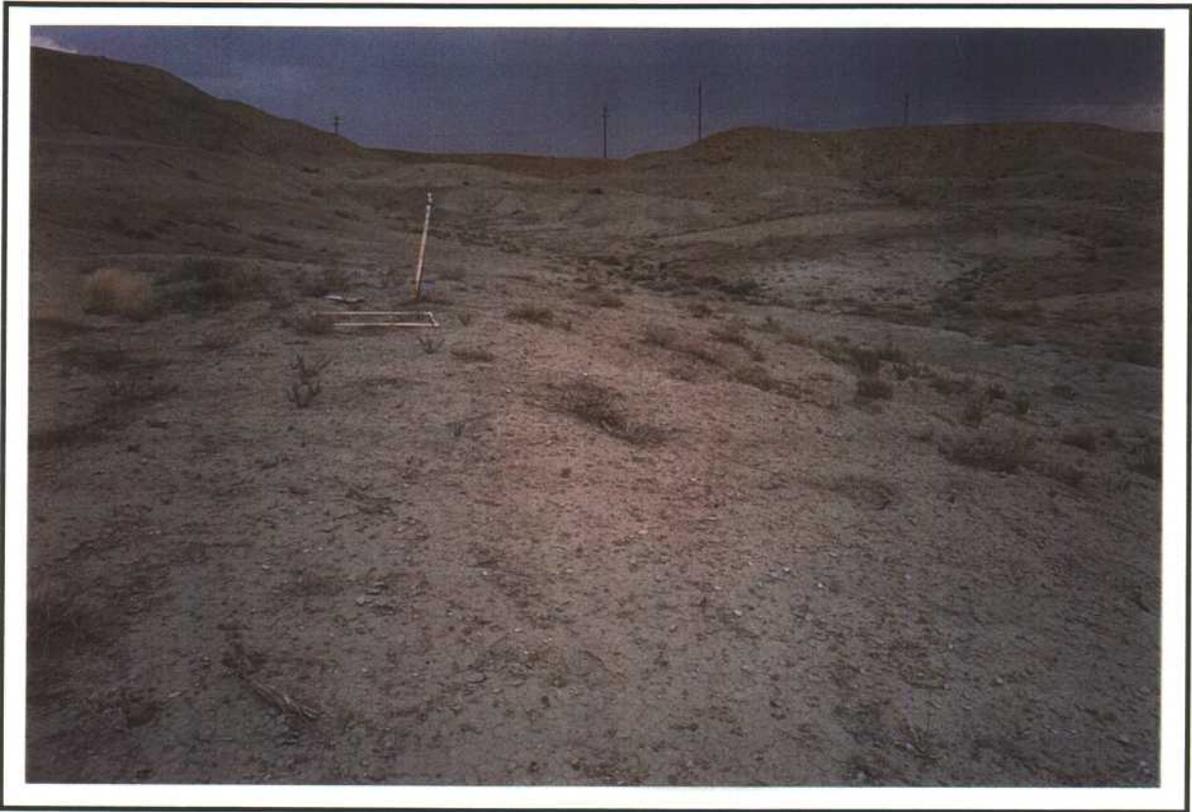
Site 6 - Pond 6 Banks



Site 7 - Pond 5 Area



Site 8 - Borehole Reclaimed Road



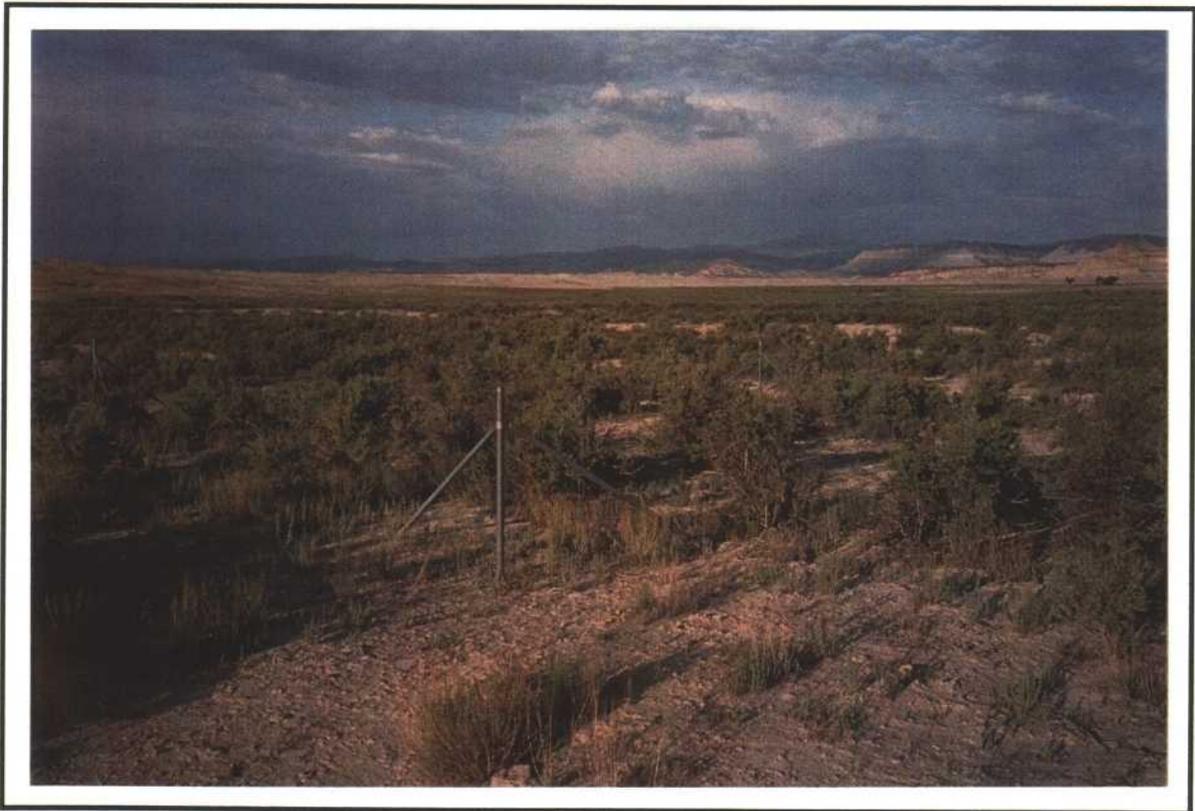
Site 9 - Substation Topsoil Pile



Site 10 - Topsoil Pile From Pond 1



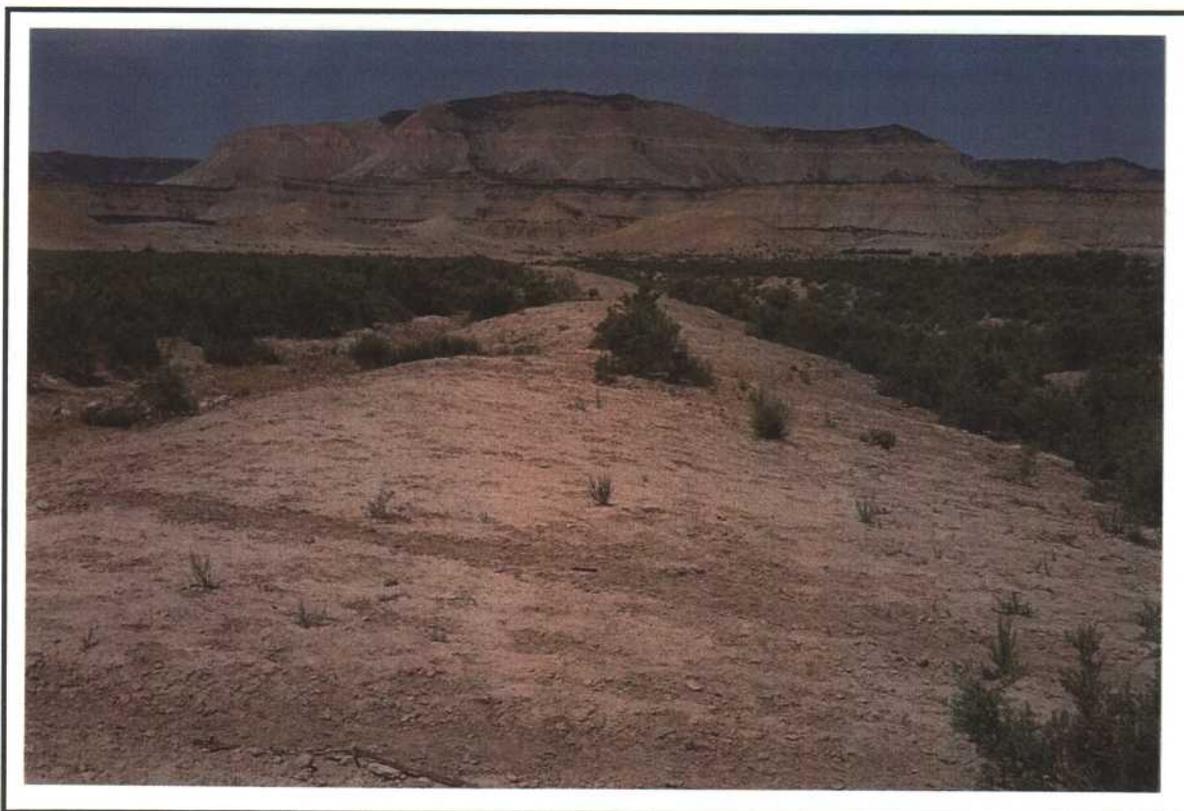
Site 11 - Pond 1 Banks



Site 12 - Greasewood Reference Area (GW3)



Site 13 - Reference Area Greasewood



Site 14 - Pond 1 Subsoil Pile



Site 15 - Riparian Meadow Reference Area - 1



Site 16 - Riparian Meadow Reference Area - 3



Site 17 - Annual Forb Reference Area - 1



Site 18 - Mixed Desert Shrub Reference Area



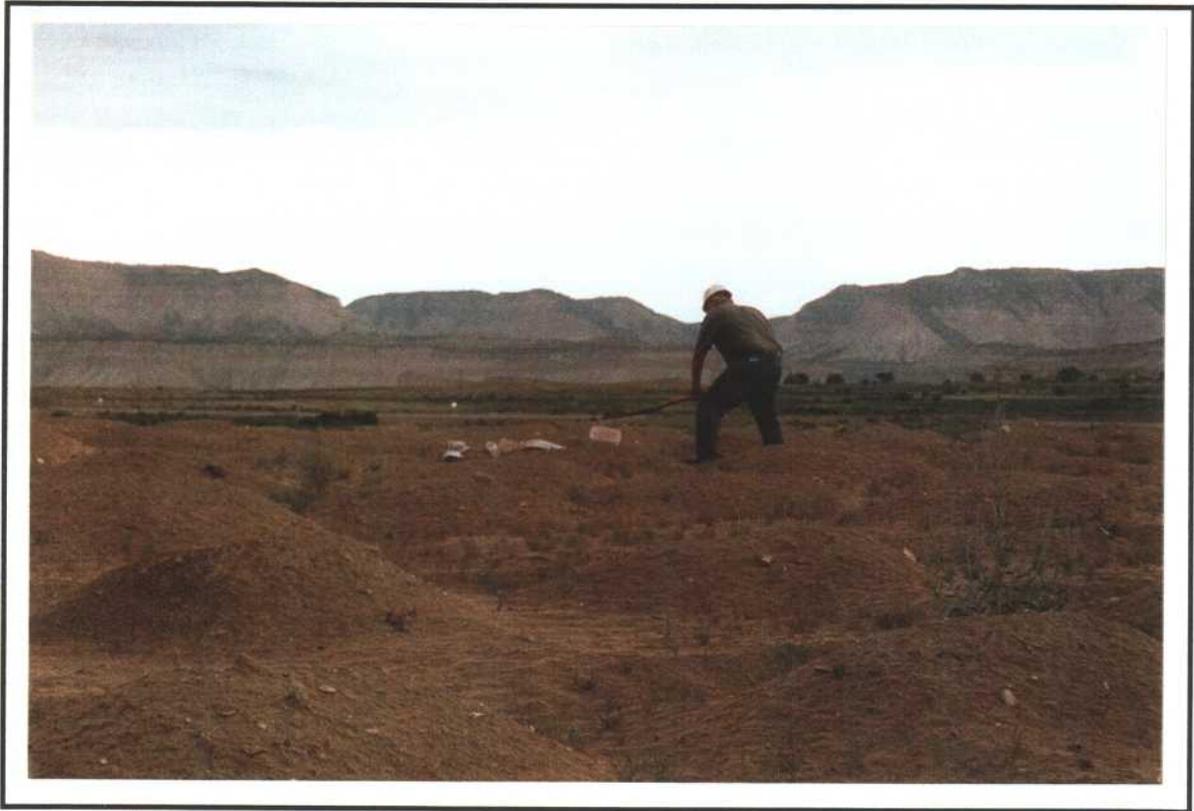
Site 19 - Test Plot Area



Site 20 - Canyon Bottom Road



Site 21 - Pond 4 Area



Site 22 - 4<sup>th</sup> East Portal Topsoil Pile

**RECLAMATION MONITORING  
STUDY FOR THE  
EMERY MINE**

**SOILS**



*Prepared by*

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

**James Nyenhuis**  
Certified Professional Soil Scientist  
(ARCPACS #2753)

*for*

**CONSOLIDATION COAL COMPANY**  
Emery, Utah 84522  
P.O. Box 1029



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## INTRODUCTION

The soils component of the Consol Energy Company Emery Reclamation Study includes soils description, sampling, and interpretation of 22 sampling sites. These sites are listed by number and name in soils Table 1. The table also contains the GPS northing and easting coordinates, as well as the topographic quadrangle map, for each site. A map showing sampling locations is on file at Mt. Nebo Scientific but is not included with this report. The resulting field and laboratory soils data was evaluated for characterization and reclamation suitability purposes. Results of this analysis are provided in Section 3.0. The soils information was also provided to Patrick Collins for integration with the vegetation results.

## METHODS

The 22 soil and vegetation sampling sites were initially listed by Mr. Tim Kirshbaum (Consol Energy) in consultation with DOGM. The sites are various reclaimed areas, topsoil and subsoil stockpiles, pond areas and banks, a test plot area, and various vegetation reference areas. Because the pond areas had multiple sampling sites (Pond 6 had four sample locations – topsoil pile, subsoil pile east, subsoil pile west, and pond banks; Ponds 4 & 5 had three sample locations – pond 5 area, pond 4 area, and subsoil pile; and Pond 1 had three sample locations – topsoil pile, subsoil pile, and pond banks), the 22 sampling locations can be grouped into 15 separate site areas. Patrick Collins, in consultation with Consol, located and delineated all 22 sampling sites. A GPS northing and easting coordinate was recorded for each sampling location.

Tim Kirschbaum submitted a draft proposal of Consol's reclamation study plan to DOGM on April 1, 2003. A subsequent meeting with DOGM personnel on April 21, including Ms. Priscilla Burton, refined the sampling and analysis protocol. Two soil samples would be collected at a representative location at each sampling site. Composite samples were collected from 0 to 3 inches and from 3 to 6 inches (Kirshbaum, 2003). The upper 6 inches was considered to be the primary rooting depth zone. A standard soil profile description would be completed for the upper 6 inches at each site (Soil Survey Staff, 1993 and 1999; and Schoeneberger et. al., 2002).

A total of 44 soil samples (22 sites x 2 samples per site) were collected and submitted to Colorado State University's Soil Testing Laboratory. The soil analysis parameters included:

- pH
- EC (mmhos/cm)
- Saturation Percent
- Lime estimate and Percent CaCO<sub>3</sub> equivalent
- Percent Organic Matter (Loss on Ignition)
- Percent Organic Matter (Walkley-Black)
- Ca, Mg, Na, K (meq/L)
- Sodium Adsorption Ratio (SAR)
- Texture (percent sand, silt, and clay)
- Selenium (Se) and Boron (B) in mg/kg
- Gypsum (meq/100g)

- NO<sub>3</sub>-N, P, K, Zn, Fe, Mn, and Cu (ppm, AB-DTPA Extract)

Previous soils information for the Consol permit area was obtained and reviewed. The review included the original Consol baseline soils report (Walsh & Associates, 1981) and the completed but unpublished NRCS soil survey information for this part of Emery County (Sasser, 2003). The soil sampling field and laboratory results were evaluated for standard soil suitability parameters contained in DOGM's Table 4, Soil and Spoil Suitability/Unsuitability Evaluation, of "Guidelines for Management of Topsoil and Overburden" (Burton and Davidson, 2002). A copy of the DOGM suitability table is included with this report (Appendix B). Based on the suitability evaluation, the soils at each of the 22 sites were described as acceptable (good and fair rated), poor, or unacceptable. All poor and/or unacceptable rated parameters were listed by soil site. The nature of the problem(s) is discussed in the results section. The soil results were provided to Patrick Collins for integration with the vegetation results.

## RESULTS

The soil laboratory results are attached as Appendix A. All soil samples were screened in the field with a No.10 (2mm) screen. Coarse fragment content was recorded on the description forms. Organic matter content was originally determined in the laboratory by the Total Organic Carbon method (TOC, by loss-on-ignition). The TOC results seemed too high for organic matter content for these soils, so a Walkley-Black test was also performed. These results were more accurate for soil organic matter content and should be considered the better results.

Soils Table 2 summarizes the soil characteristics and suitability evaluations for each of the 22 sampling sites. Fifteen of the sites are associated with ongoing reclamation activities for the Emery Mine. Six of the sites are associated with various vegetation reference areas for the Emery Mine. One site (4<sup>th</sup> East Portal Topsoil Pile) is associated with recent soil salvage for the new 4<sup>th</sup> East Portal some distance away from the main Emery Mine. Table 2 includes:

- The site name and number
- The soil texture for each depth interval, with clay percent
- The soil reaction (pH) and class name for each depth interval
- The soil suitability evaluation with all poor and/or unacceptable parameters listed with their data values.

A review of the field and laboratory results indicate many sites have all good or fair rated soil material in the upper 6 inches. These sites include:

- Pond 6: Topsoil Pile, and Subsoil Pile (E), sites 3 and 4 respectively
- Ponds 4 & 5: Pond 5 Area, and Subsoil Pile, sites 7 and 1 respectively
- Coal Pile Topsoil Pile, site 2
- Test Plot, site 19
- Substation Topsoil Pile, site 9
- Reference Area Greasewood, site 13

- Riparian Meadow Reference Area – 3, site 16
- Mixed Desert Shrub Reference Area, site 18
- 4<sup>th</sup> East Portal Topsoil Pile, site 22

Site 15 (Riparian Meadow Reference Area – 1) contains a hydric soil most like the Ferron soil series. It has poor rated carbonates with 40.2 percent in the upper 3 inches, and 31.3 percent in the 3 to 6 inch depth. The upper 3 inches also has 10.5 ppm Boron, 7.5 percent organic matter (Walkley-Black) and 100 percent saturation. EC and SAR are both low.

Site 17 (Annual Forb Reference Area) has poor rated saturation percent with 21.3% in the upper 3 inches, and 22.5% in the 3 to 6 inch depth. Soil texture is very gravelly sandy loam with 12 percent clay and 35 percent mixed gravels.

Eight of the 15 active Emery Mine reclamation sampling sites (53% of the these sites) have pH, EC, and SAR values that results in a “saline-sodic” classification. In addition, one vegetation reference area (Greasewood Reference Area GW-3, Site 12) is also “saline-sodic”. A “saline-sodic” typically has  $EC > 4$ ,  $SAR > 15$ , and  $pH < 8.5$  (DOGM, 2002). Excess soluble salts lowers the osmotic potential and plant roots cannot obtain water from the soil. Excess sodium in the soil reduces the soil permeability, and destroys the soil structure by dispersing the soil particles. Soil pores are eliminated and the soil becomes impermeable. Infiltration and drainage of air and water are severely limited, and the erosion hazard increases (DOGM, 2002).

Saline-sodic soil material is generally rated “unacceptable”. However, site 5 (Pond 6 – Subsoil Pile West) is grouped with the saline-sodic sites even though the SAR of the 3 to 6 inch depth was 13.1, not quite 15. Likewise, site 21 (Pond 4 Area) is grouped with the “saline-sodic” sites even though the SAR of the 3 to 6 inch depth is 13.3, not quite 15. These sites are grouped with the other “saline-sodic” sites because they are most like them. Both sites 5 and 21 are poor rated because the SAR value is just under 15.

The “saline-sodic” sites are:

- Pond 6 – Subsoil Pile (W), and Pond Banks, sites 5 and 6 respectively
- Ponds 4& 5 – Pond 4 Area, site 21
- Borehole Reclaimed Area, site 8
- Canyon Bottom Road, site 20
- Pond 1 – Topsoil Pile, Subsoil Pile, and Pond Banks, sites 10, 14, and 11 respectively
- Greasewood Reference Area (GW3), site 12

Results of each sampling site are discussed below. Soil profile descriptions and soil suitability discussions are provided. Site description information is also provided, including: (1) location of area and/or probable area from where the soil material was salvaged, (2) landscape of immediate area and native vegetation, (3) coarse fragment content of the site soil surface, (4) site slope, (5) site aspect, (6) site vegetation including a qualitative statement regarding revegetation condition for the 15 reclamation sites, (7) erosion state, and (8) date of sampling. The statements regarding revegetation condition are subjective, first impressions and were a product of discussion between

Patrick Collins and Jim Nyenhuis at the sampling sites. Quantitative statements regarding revegetation condition are primary and are in the main vegetation report.

Individual results for each sampling area are discussed in the order in which they were sampled, as follows:

- Pond 6 (Topsoil Pile; Subsoil Pile, East; Subsoil Pile, West; and Pond Banks)
- Ponds 4 & 5 (Pond 5 Area, Pond 4 Area, and Subsoil Pile)
- Borehole Reclaimed Road
- Coal Pile Topsoil Pile
- Test Plot
- Substation Topsoil Pile
- Canyon Bottom Road
- Pond 1 (Topsoil Pile, Subsoil Pile, Pond Banks)
- Greasewood Reference Area (GW3)
- Reference Area Greasewood
- Riparian Meadow Reference Area-1
- Riparian Meadow Reference Area-3
- Annual Forb Reference Area-1
- Mixed Desert Shrub Reference Area
- 4<sup>th</sup> East portal Topsoil Pile

### **Pond 6 Area**

Four sampling sites were located in the Pond 6 Area: Topsoil Pile (site 3), Subsoil Pile East (site 4), Subsoil Pile West (site 5), and Pond Banks (site 6). Sites 3 and 4 have good or fair rated soil material in the upper 6 inches. Sites 4 and 5 are considered "saline-sodic". Site 4 is poor rated, and site 5 is unacceptable rated.

### **Pond 6 Topsoil Pile (Site 3)**

Site 3 Site Description: Topsoil material was probably salvaged from the Pond 6 area prior to excavation of the pond. The immediate area is a low terrace to a nearby drainage. Adjacent native area supports greasewood-sueda vegetation. Topsoil pile surface has about 30% mixed gravels and cobbles consistent with salvage from a former terrace. Sample site 3 has 5% slope; SSW aspect; poor revegetation with annual weeds, halogten; slight erosion with small rills present; compacted surface; sampled 8-5-03.

### **Site 3 Soil Profile Description:**

AC horizon – 0 to 3 inches. Brown (10YR 5/3) clay loam with 10% mixed gravels, dark grayish brown (10YR 4/2 moist; moderate medium granular structure; slightly hard, friable, very sticky and plastic consistence; few fine and very fine roots; strongly effervescent, pH 7.8 (slightly alkaline); gradual smooth boundary.

C horizon – 3 to 6 inches. Brown (10YR 5/3) clay loam with 15% mixed gravels, dark grayish brown (10YR 4/2) moist; massive structure; hard, friable, very sticky and plastic consistence; very few very fine roots; strongly effervescent, pH 7.9 (moderately alkaline).

Site 3 Soil Suitability: Although the Pond 6 Topsoil Pile (Site 3) probably came from a terrace deposit with greasewood vegetation, the topsoil material is all good or fair rated. EC is 3.8 for 0 to 3 inches, and 5.7 for 3 to 6 inches. SAR is 4.2 for 0 to 3 inches, and 8.8 for 3 to 6 inches. Calcium carbonate equivalent is 19 to 20 percent. Organic matter (Walkley-Black) is 1 percent.

#### Pond 6 Subsoil Pile (E), Site 4

Site 4 Site Description: Subsoil material (east) was probably salvaged from the Pond 6 area prior to excavation of the pond. The immediate area is a low terrace to a nearby drainage. Adjacent native area supports greasewood-sueda vegetation. Subsoil pile (E) surface has about 35 to 40% mixed gravels consistent with salvage from a former terrace. Sample site 4 has 3% slope; SW aspect; poor revegetation with some shrubs including saltbush, winterfat, and some mixed grasses in small swales; slight erosion; compacted surface; sampled 8-5-03.

#### Site 4 Soil Profile Description:

AC horizon – 0 to 3 inches. Grayish brown (10YR 5/2) clay loam with 15% mixed gravels, dark grayish brown (10YR 4/2) moist; moderate medium granular structure; slightly hard, friable, sticky and plastic consistence; few fine and very fine roots; strongly effervescent, pH 7.8 (slightly alkaline); gradual smooth boundary.

C horizon – 3 to 6 inches. Grayish brown (10YR 5/2) clay loam with 15% mixed gravels, brown (10YR 4/3) moist; massive structure; hard, firm, very sticky and plastic consistence; very few very fine roots; violently effervescent, pH 7.8 (slightly alkaline).

Site 4 Soil Suitability: Although the Pond 6 Subsoil Pile (E) probably came from a terrace deposit with greasewood vegetation, the subsoil material is all good or fair rated. EC is 3.7 for 0 to 3 inches, and 4.5 for 3 to 6 inches. SAR is 4.1 for 0 to 3 inches, and 6.1 for 3 to 6 inches. Calcium carbonate equivalent is about 19.5 percent. Organic matter (Walkley-Black) is 1.2 to 1 percent.

#### Pond 6 Subsoil Pile (W), Site 5

#### Site 5 Site Description:

Subsoil Pile (W) material was probably salvaged from the Pond 6 area prior to excavation of the pond. The immediate area is a low terrace to a nearby drainage. Adjacent native area supports greasewood-sueda vegetation. Subsoil Pile (W) surface has about 50% mixed gravels consistent with salvage from a former terrace. Sample site 5 has 4% slope; SW aspect; poor revegetation; slight erosion; compacted surface; sampled 8-5-03.

#### Site 5 Soil Profile Description:

AC horizon - 0 to 3 inches. Brown (10YR 5/3) clay loam with 20% mixed gravels, brown (10YR 4/3) moist; moderate medium granular structure; slightly hard, firm, sticky and plastic consistence; few fine and very fine roots; strongly effervescent, pH 7.8 (slightly alkaline); gradual smooth boundary.

C horizon - 3 to 6 inches. Brown (10YR 5/3) clay loam with 20% mixed gravels, brown (10YR 4/3) moist; massive structure; hard, firm, sticky and plastic consistence; very few fine and very fine roots; strongly effervescent, pH 8.0 (moderately alkaline).

Site 5 Soil Suitability: Pond 6 Subsoil Pile (W) is grouped with the "saline-sodic" sites even though the SAR of the 3 to 6 inch depth is 13.1, not quite 15. Site 5 is poor rated. EC is 4.4 for the upper 3 inches, and 8.7 for the 3 to 6 inch depth. SAR is 6.3 for the upper 3 inches, and 13.1 for the 3 to 6 inch depth. Calcium carbonate equivalent is about 19 to 20 percent, and organic matter content (Walkley-Black) is 0.9 to 0.8 percent.

#### Pond 6 Pond Banks, Site 6

Site 6 Site Description: The Pond Banks soil material was probably salvaged from the Pond 6 area prior to excavation of the pond. The immediate area is a low terrace to a nearby drainage. Adjacent native area supports greasewood-sueada vegetation. Pond Banks surface have about 15% mixed gravels consistent with salvage from a former terrace. Sample site 6 has 10% slope; N aspect; good revegetation with intermediate wheatgrass, rabbitbrush, and greasewood; no erosion; sampled 8-5-03.

#### Site 6 Soil Profile Description:

AC horizon - 0 to 3 inches. Grayish brown (10YR 5/2) clay loam with 15% mixed gravels, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, friable, very sticky and plastic consistence; common fine and very fine roots; strongly effervescent, pH 8.5 (strongly alkaline); gradual smooth boundary.

C horizon - 3 to 6 inches. Brown (10YR 5/3) clay loam with 15% mixed gravels, brown (10YR 4/3) moist; massive structure; hard, firm, very sticky and plastic consistence; common fine and very fine roots; strongly effervescent, pH 8.4 (moderately alkaline).

Site 6 Soil Suitability: The Pond Banks material is unacceptable rated. EC is 37.5 for the upper 3 inches, and 19.7 for the 3 to 6 inch depth. SAR is 35.7 for the upper 3 inches, and 24.3 for the 3 to 6 inch depth. Calcium carbonate equivalent is about 21 to 22 percent. Organic matter (Walkley-Black) is 1.5 to 1.0 percent.

## **Ponds 4 & 5 Area**

Three sampling sites were located in the Ponds 4 & 5 area: Pond 5 Area (site 7); Pond 4 Area (site 21); and Subsoil Pile (site 1). Sites 7 and 1 have good or fair rated material, site 21 is grouped with the "saline-sodic" sites, and is poor rated.

### Pond 5 Area, Site 7

Site 7 Site Description: Pond 5 Area soil material was probably salvaged from the surrounding former shale slopes. The immediate area is Mancos shale slopes with greasewood vegetation. The Pond 5 Area surface has about 15% mixed gravels. Sample site 7 has 8% slope; SW aspect; fair to good revegetation with greasewood, rabbitbrush, fourwing saltbush, and shadscale; slight erosion; sampled 8-6-03.

#### Site 7 Soil Profile Description:

AC horizon – 0 to 3 inches. Pale brown (10YR 6/3) loam with 15% mixed gravels, brown (10YR 4/3) moist; moderate medium platy structure; hard, firm, sticky and plastic consistence; few fine and very fine roots; strongly effervescent, pH 7.8 (slightly alkaline); gradual smooth boundary.

C horizon – 3 to 6 inches. Pale brown (10YR 6/3) sandy clay loam with 10% mixed gravels, brown (10YR 4/3) moist; massive structure; hard, firm, very sticky and plastic consistence; few fine and very fine roots; strongly effervescent, pH 7.9 (moderately alkaline).

Site 7 Soil Suitability: Pond 5 Area material is good or fair rated. EC is 3.5 in the upper 3 inches, and 4.1 in the 3 to 6 inch depth. SAR is 2.4 in the upper 3 inches, and 3.4 in the 3 to 6 inch depth. Calcium carbonate equivalent is just under 15 percent. Organic matter (Walkley-Black) is 0.4 to 0.5 percent.

### Pond 4 Area, Site 21

Site 21 Site Description: Pond 4 Area soil material was probably salvaged from the surrounding former shale slopes. The immediate area is Mancos shale slopes with greasewood vegetation. The Pond 4 Area surface has about 20% mixed gravels. Sample site 21 has 10% slope, SE aspect; poor revegetation with greasewood and halogten; very slight erosion; sampled 8-6-03.

#### Site 21 Soil Profile Description:

AC horizon – 0 to 3 inches. Grayish brown (10YR 5/2) clay loam with 20% mixed gravels, dark grayish brown (10YR 4/2) moist; moderate medium granular structure; slightly hard, friable, sticky and plastic consistence; very few very fine roots; strongly effervescent, pH 7.9 (moderately effervescent); gradual smooth boundary.

C horizon – 3 to 6 inches. Brown (10YR 5/3) clay loam with 20% mixed gravels, brown (10YR 4/3) moist; massive structure; very hard, firm, very sticky and plastic consistence; no roots observed; strongly effervescent, pH 8.0 (moderately alkaline).

Site 21 Soil Suitability: Pond 4 Area material is considered "saline-sodic" and is poor rated. EC is 4.9 for the upper 3 inches, and 8.1 for the 3 to 6 inch depth. SAR is 6.9 for the upper 3 inches, and 13.3 for the 3 to 6 inch depth. Calcium carbonate equivalent is 14.6 percent, and organic matter (Walkley-Black) is 0.9 to 0.7 percent.

#### Subsoil Pile, Site 1

Site 1 Site Description: Subsoil Pile from Ponds 4 and 5 material was probably salvaged from the surrounding former shale slopes. The immediate area is Mancos shale slopes supporting native greasewood vegetation. The Subsoil Pile surface has about 25% mixed gravels. Sample site 1 has 6% slope; N aspect; good revegetation with greasewood and shadscale; slight erosion; compacted surface; sampled 8-6-03.

#### Site 1 Soil Profile Description:

AC horizon – 0 to 3 inches. Brown (10YR 5/3) clay loam with 20% mixed gravels, brown (10YR 4/3) moist; weak medium platy structure; slightly hard, friable, sticky and plastic consistence; very few very fine roots; strongly effervescent, pH 7.7 (slightly alkaline); gradual wavy boundary.

C horizon – 3 to 6 inches. Brown (10YR 5/3) clay loam with 20% mixed gravels, brown (10YR 4/3) moist; massive structure; hard, firm, sticky and plastic consistence; no roots observed; strongly effervescent, pH 8.0 (moderately alkaline).

Site 1 Soil Suitability: Subsoil Pile from Ponds 4 and 5 material is good to fair rated. EC is 3.2 for the upper 3 inches, and 5.8 for the 3 to 6 inch depth. SAR is 2.3 for the upper 3 inches, and 7.1 for the 3 to 6 inch depth. Calcium carbonate equivalent is about 12 to 14.5 percent. Organic matter (Walkley-Black) is 0.6 to 0.5 percent.

#### **Borehole Reclaimed Road, Site 8**

Site 8 Site description: Borehole Reclaimed Road soil material was probably salvaged from the immediate Mancos shale rolling hills where the borehole road was located. The adjacent native vegetation is mat saltbush. The Site 8 surface has 15% mixed gravels; 1% slope; W aspect; poor revegetation with greasewood; slight erosion; soft surface but weakly compacted; sampled 8-6-03.

#### Site 8 Soil Profile Description:

AC horizon – 0 to 3 inches. Grayish brown (10YR 5/2 and 2.5Y 5/2) clay with 10% mixed gravels, dark grayish brown (2.5Y 4/2) moist; weak medium platy structure; soft, very friable, very sticky and very plastic consistence; very few very fine roots; strongly effervescent, pH 8.2 (moderately alkaline); gradual wavy boundary.

C horizon – 3 to 6 inches. Grayish brown (2.5Y 5/2) clay loam with 10% mixed gravels, dark grayish brown (2.5Y 4/2) moist; massive structure; slightly hard, friable, very sticky and very plastic consistence; very few very fine roots; violently effervescent, pH 8.5 (strongly alkaline).

Site 8 Soil Suitability: Borehole Reclaimed Road soil material is "saline-sodic", and is rated unacceptable. EC is 11 for the upper 3 inches, and 15.3 for the 3 to 6 inch depth. SAR is 21.4 for the upper 3 inches, and 27.7 for the 3 to 6 inch depth. Calcium carbonate equivalent is 13 to 19 percent. Organic matter (Walkley-Black) is 0.7 to 0.6 percent.

### **Coal Pile Topsoil Pile, Site 2**

Site 2 Site Description: The Coal Pile Topsoil Pile material was probably salvaged from the immediate area with rolling Mancos shale hills with a thin sandstone slopewash material on top. The adjacent native area has shadscale vegetation. The Site 2 surface has about 30% mixed gravels; 6% slope; NW aspect; good revegetation with shadscale; slight erosion; sampled 8-6-03.

#### **Site 2 Soil Profile Description:**

AC horizon - 0 to 3 inches. Pale Brown (10YR 6/3) clay with 20% mixed gravels, yellowish brown (10YR 5/4) moist; moderate medium granular structure; slightly hard, friable, sticky and slightly plastic consistence; few fine and very fine roots; violently effervescent, pH 7.7 (slightly alkaline); gradual smooth boundary.

C horizon - 3 to 6 inches. Pale brown (10YR 6/3) clay loam with 20% mixed gravels, yellowish brown (10YR 5/4) moist; massive structure; hard, firm, sticky and slightly plastic consistence; few fine and very fine roots; violently effervescent, pH 7.9 (moderately alkaline).

Site 2 Soil Suitability: The Coal Pile Topsoil Pile is generally good to fair rated although the SAR is poor rated for the 3 to 6 inch depth. EC is 3.3 for the upper 3 inches, and 6.7 for the 3 to 6 inch depth. SAR is 2.6 for the upper 3 inches, and 11.2 for the 3 to 6 inch depth. Calcium carbonate equivalent is 13 to 18 percent. Organic matter (Walkley-Black) is 0.7 percent.

### **Test Plot, Site 19**

Site 19 Site Description: The Test Plot is an area fenced off in the early 1980's for the purpose of reclamation tests. The area is on a stream terrace of Quitcupah Creek just before the confluence with Christiansen Wash on the Walker Flat quadrangle. It is unknown whether topsoil material was previously brought in and put on the test plot area. The soil surface today appears natural although the organic matter content (Walkley-Black) of the upper 6 inches (3.0% for the upper 3 inches, and 2.6% for the 3 to 6 inch depth) is too high for a native greasewood terrace. Perhaps the soil was amended with organic matter in some manner during the reclamation trials. The sandy loam texture of the upper 6 inches is also atypical for greasewood terraces in the general area. The adjacent native area has greasewood vegetation. The Test Plot surface has about 2% mixed gravels; 0 to 2% slope; W aspect; good revegetation in some areas with greasewood and poor revegetation in other areas; no erosion; sampled 8-6-03.

#### **Site 19 Soil Profile Description:**

A horizon – 0 to 3 inches. Brown (10YR 5/3) sandy loam with 1% mixed gravels, brown (10YR 4/3) moist; moderate medium granular structure; slightly hard, friable, nonsticky and nonplastic consistence; few medium, fine and very fine roots; moderately effervescent, pH 8.0 (moderately alkaline); gradual smooth boundary.

C horizon – 3 to 6 inches. Pale brown (10YR 6/3) sandy loam with 1% mixed gravels, brown (10YR 4/3) moist; massive structure; hard, friable, nonsticky and nonplastic consistence; few fine and very fine roots; moderately effervescent, pH 8.1 (moderately alkaline).

Site 19 Soil Suitability: The Test Plot soil material is generally good to fair rated although the SAR is poor rated for the 3 to 6 inch depth. EC is 1.6 for the upper 3 inches, and 2.4 for the 3 to 6 inch depth. SAR is 4.1 for the upper 3 inches, and 9.1 for the 3 to 6 inch depth. Calcium carbonate equivalent is about 13 to 14 percent. Organic matter (Walkley-Black) is 3.0 percent for the upper 3 inches, and 2.6 percent for the 3 to 6 inch depth.

### **Substation Topsoil Pile, Site 9**

Site 9 Site Description: The Substation Topsoil Pile material was probably salvaged from the immediate substation area which is within rolling Mancos shale hills. The adjacent native vegetation is shadscale with some mat saltbush. The topsoil pile surface area has 10 to 15% mixed gravels; 6% slope; S aspect; good shadscale revegetation; slight erosion; sampled 8-6-03.

### **Site 9 Soil Profile Description:**

AC horizon – 0 to 3 inches. Brown (10YR 5/3) clay loam with 15% mixed gravels, brown (10YR 4/3) moist; moderate medium granular structure; slightly hard, friable, sticky and slightly plastic consistence; very few fine and very fine roots; violently effervescent, pH 7.9 (moderately alkaline); gradual smooth boundary.

C horizon – 3 to 6 inches. Brown (10YR 5/3) loam with 15% mixed gravels, brown (10YR 4/3) moist; massive structure; hard, friable, sticky and slightly plastic; very few very fine roots; violently effervescent, pH 7.9 (moderately alkaline).

Site 9 Soil Suitability: The Substation Pile topsoil, at site 9, is all good to fair rated. EC is 3.0 for the upper 3 inches, and 5.5 for the 3 to 6 inch depth. SAR is 1.3 for the upper 3 inches, and 7.4 for the 3 to 6 inch depth. Calcium carbonate equivalent is about 15 to 16 percent. Organic matter (Walkley-Black) is 0.9 to 0.6 percent.

### **Canyon Bottom Road, Site 20**

Site 20 Site Description: The Canyon Bottom Road site is on a narrow terrace adjacent to Christiansen Wash. Adjacent vegetation is tamarisk and greasewood. The roadside was recently regraded but not yet reseeded. Reapplied soil was present. Its source is unknown. The reclaimed soil surface has about 15% mixed gravels; 4% slope; W aspect; no revegetation due to recent regrading; no erosion; sampled on 8-6-03.

**Site 20 Soil Profile description:**

C1 horizon – 0 to 3 inches. Pale brown (10YR 6/3) clay loam with 15% mixed gravels, brown (10YR 4/3) moist; massive structure; slightly hard, friable, sticky and slightly plastic; no roots; violently effervescent, pH 8.1 (moderately alkaline); no boundary.

C1 horizon – 3 to 6 inches. Pale brown (10YR 6/3) clay loam with 15% mixed gravels, brown (10YR 4/3) moist; massive structure; hard, friable, sticky and slightly plastic; no roots; violently effervescent, pH 8.0 (moderately effervescent).

Site 20 Soil Suitability: The Site 20 soil material is considered "saline-sodic" and is rated unacceptable. EC is 9.7 in the upper 3 inches, and 9.8 in the 3 to 6 inch depth. SAR is 15.7 in the upper 3 inches, and 15.6 in the 3 to 6 inch depth. Calcium carbonate equivalent is about 17 percent. Organic matter (Walkley-Black) is 0.6 to 0.5 percent.

**Pond 1 Area**

The Pond 1 Area has three sampling sites: Topsoil Pile, Site 10; Subsoil Pile, Site 14, and Pond Banks, Site 11. All three sites are considered "saline-sodic" and are rated unacceptable.

Topsoil Pile, Site 10

Site 10 Site Description: The Topsoil Pile material was probably salvaged from the immediate Pond 1 Area which is located in bottomland alluvium with greasewood vegetation. The topsoil pile surface has about 5% mixed gravels; 15% slope; W aspect; fair revegetation with greasewood; slight erosion; sampled 8-6-03.

**Site 10 Soil Profile Description:**

AC horizon – 0 to 3 inches. Grayish brown (10YR 5/2) clay loam with 5% mixed gravels, brown (10YR 4/3) moist; moderate medium granular structure; slightly hard, friable, sticky and slightly plastic consistence; few fine and very fine roots; violently effervescent, pH 7.8 (slightly effervescent); gradual smooth boundary.

C horizon – 3 to 6 inches. Grayish brown (10YR 5/2) loam with 3% mixed gravels, brown (10YR 5/3) moist; massive structure; hard, firm, sticky and slightly plastic consistence; few very fine roots; violently effervescent, pH 8.0 (moderately alkaline).

Site 10 Soil Suitability: Topsoil Pile, Site 10, material is considered "saline-sodic" and is rated unacceptable. EC is 7.2 in the upper 3 inches, and 14.3 in the 3 to 6 inch depth. SAR is 10.5 in the upper 3 inches, and 20.5 in the 3 to 6 inch depth. Calcium carbonate equivalent is 16 to nearly 19 percent. Organic matter (Walkley-Black) is 1.8 to 0.9 percent.

### Subsoil Pile, Site 14

Site 14 Site Description: The Subsoil Pile material was probably salvaged from the immediate Pond 1 Area which is located in bottomland alluvium with greasewood vegetation. The Subsoil Pile surface has 1% mixed gravels; 6% slope; W aspect; poor revegetation with greasewood; slight erosion; sampled 8-6-03.

#### Site 14 Soil Profile Description:

AC horizon – 0 to 3 inches. Brown (10YR 5/3) clay loam with 1% mixed gravels, brown (10YR 4/3) moist; moderate medium platy structure; slightly hard, friable, sticky and slightly plastic consistence; few fine and very fine roots; violently effervescent, pH 8.6 (strongly alkaline); gradual wavy boundary.

C horizon – 3 to 6 inches. Brown (10YR 5/3) clay loam with 1% mixed gravels, brown (10YR 4/3) moist; massive structure; hard, firm, sticky and slightly plastic consistence; no roots observed; violently effervescent, pH 8.6 (strongly alkaline).

Site 14 Soil Suitability: Subsoil Pile, Site 14, material is considered "saline-sodic" and is rated unacceptable. EC is 21 for the upper 3 inches and 21.2 for the 3 to 6 inch depth. SAR is 32 for the upper 3 inches, and 30.7 for the 3 to 6 inch depth. Calcium carbonate equivalent is about 19 percent. Organic matter (Walkley-Black) is 0.7 percent.

### Pond Banks, Site 11

Site 11 Site Description: Pond Banks, Site 11, soil material was probably salvaged from the immediate Pond 1 Area which is located in bottomland alluvium with greasewood vegetation. The Pond Banks surface has 1% mixed gravels; 15% slope; W aspect; good revegetation with greasewood and rabbitbrush; slight erosion; sampled 8-6-03.

#### Site 11 Soil Profile Description:

AC horizon – 0 to 3 inches. Pale brown (10YR 6/3) loam with 1% mixed gravels, brown (10YR 4/3) moist; moderate medium granular structure; slightly hard, friable, sticky and slightly plastic consistence; few fine and very fine roots; violently effervescent, pH 8.3 (moderately alkaline); gradual wavy boundary.

C horizon – 3 to 6 inches. Pale brown (10YR 6/3) loam with 1% mixed gravels, brown (10YR 4/3) moist; massive structure; slightly hard, friable, slightly sticky and slightly plastic consistence; few fine and very fine roots; strongly effervescent, pH 8.4 (moderately alkaline).

Site 11 Soil Suitability: Pond Banks, Site 11, material is considered "saline-sodic", and is rated unacceptable. EC is 13.2 for the upper 3 inches, and 24.9 for the 3 to 6 inch depth. SAR is 20.1 for the upper 3 inches, and 29.6 for the 3 to 6 inch depth. Calcium carbonate equivalent is about 15.5 percent. Organic matter (Walkley-Black) is 0.7 to 0.6 percent.

### **Greasewood Reference Area (GW3), Site 12**

Site 12 Site Description: Site 12 is in an undisturbed slopewash alluvial area with native greasewood vegetation. The area was delineated as a greasewood reference area (GW3) years ago. The Site 12 surface has 1% mixed gravels; 1% slope; SW aspect; slight erosion; sampled 8-6-03.

#### **Site 12 Soil Profile Description:**

A horizon – 0 to 3 inches. Brown (10YR 5/3) loam with 1% mixed gravels, brown (10YR 4/3) moist; moderate medium platy structure; slightly hard, friable, sticky and plastic consistence; common fine and very fine roots; violently effervescent, pH 8.1 (moderately alkaline); clear smooth boundary.

B horizon – 3 to 6 inches. Brown (10YR 5/3) clay loam with 1% mixed gravels, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic consistence; few fine and very fine roots; violently effervescent, pH 8.2 (moderately alkaline).

Site 12 Soil Suitability: The Site 12 soil material within the Greasewood Reference Area (GW3) is considered "saline-sodic" and is rated unacceptable. EC is 6.2 for the upper 3 inches, and 11 for the 3 to 6 inches. SAR is 15.3 for the upper 3 inches, and 17.6 for the 3 to 6 inch depth. Calcium carbonate equivalent is 16 to 17 percent. Organic matter (Walkley-Black) is 0.8 percent.

### **Reference Area Greasewood, Site 13**

Site 13 Site Description: Site 13 is an undisturbed alluvial fan area with native greasewood vegetation. The area was delineated as a greasewood reference area years ago. The area has a thin gravelly slopewash over Mancos shale. The Site 13 surface has 30% mixed gravels and 5% mixed cobbles; 5% slope; SW aspect; slight erosion; sampled 8-6-03.

#### **Site 13 Soil Profile Description:**

A horizon – 0 to 3 inches. Brown (10YR 5/3) sandy loam with 30% mixed gravels and 5% mixed cobbles, brown (10YR 4/3) moist; weak medium granular structure; hard, friable, sticky and slightly plastic consistence; few coarse, medium, fine and very fine roots; strongly effervescent, pH 8.0 (moderately alkaline); gradual wavy boundary.

B horizon – 3 to 6 inches. Brown (10YR 5/3) sandy clay loam with 30% mixed gravels and 5% mixed cobbles, brown (10YR 4/3) moist; moderate medium subangular blocky structure; very hard, firm, sticky and slightly plastic consistence; few coarse, medium, fine and very fine roots; violently effervescent, pH 7.8 (slightly alkaline).

Site 13 Soil Suitability: The Site 13 soil material is good to fair rated. EC is 0.8 for the upper 3 inches, and 2.4 for the 3 to 6 inch depth. SAR is 2.7 for the upper 3 inches, and 2.0 for the 3 to 6 inch depth. Calcium carbonate equivalent is nearly 19 percent. Organic matter (Walkley-Black) is 1.3 to 1.5 percent.

### **Riparian Meadow Reference Area-1, Site 15**

Site 15 Site Description: Site 15 is within the Riparian Meadow Reference Area-1. The area is on a Mancos shale slope that has wetness due to water seepage from upslope. The soil is developing in slopewash alluvium and has a sod cover. The soil is hydric due to wetness and mottling, and is most like the Ferron soil series. Coarse fragment content is less than 2% mixed gravels. Site 15 has 6% slope; SW aspect; sedges and rushes vegetation; no erosion; sampled 8-6-03.

#### **Site 15 Soil Profile Description:**

A horizon – 0 to 3 inches. Reddish yellow (7.5YR 6/6) sandy loam, strong brown (7.5YR 5/6) moist with common high chroma mottles; sod cover/moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic consistence; many coarse, medium, fine and very fine roots; violently effervescent, pH 7.5 (slightly alkaline); clear wavy boundary.

Bg Horizon – 3 to 6 inches. Light gray (10YR 6/1) loam, dark gray (10YR 4/1) moist (gleyed); massive structure; slightly hard, friable, slightly sticky and slightly plastic consistence; many coarse, medium, fine and very fine roots; moderately effervescent, pH 7.5 (slightly alkaline).

Site 15 Soil Suitability: The soil in this Riparian Meadow Reference Area-1 meets criteria for hydric status, and is most like the Ferron soil series. The soil has poor rated carbonates with 40.2 percent in the upper 3 inches, and 31.3 percent in the 3 to 6 inch depth. EC and SAR are both low. The upper 3 inches also has 10.5 ppm Boron, 7.5 percent organic matter (Walkley-Black), and 100 percent saturation.

### **Riparian Meadow Reference Area-3, Site 16**

Site 16 Site description: Site 16 is within Riparian Meadow Reference Area-3. The area is on a Mancos shale slope with some sandstone slopewash from upslope. The soil has wetness due to water seepage from upslope. The soil is developing in slopewash alluvium with some sandstone influence. The soil surface has 1% mixed gravels. Site 16 has 2% slope; W aspect; native vegetation including bluegrass, foxtail, rushes, and saltgrass; no erosion; sampled 8-6-03. Site 16 is drier than Site 15.

#### **Site 16 Soil Profile Description:**

A horizon – 0 to 3 inches. Grayish brown (10YR 5/2) loam with 1% mixed gravels, dark grayish brown (10YR 4/2) moist; sod cover/moderate medium granular structure; slightly hard, friable, sticky and very plastic consistence; many coarse, medium, fine and very fine roots; violently effervescent, pH 7.8 (slightly alkaline); clear smooth boundary.

Bw horizon – 3 to 6 inches. Grayish brown (10YR 5/2) loam with 1% mixed gravels, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic consistence; many coarse, medium, fine and very fine roots; violently effervescent, pH 7.7 (slightly alkaline).

Site 16 Soil Suitability: Soil material at Site 16 is good to fair rated. EC and SAR are both low. Calcium carbonate equivalent is about 18 to 22 percent. Organic matter (Walkley-Black) is 3.9 to 1.8 percent.

#### **Annual Forb Reference Area-1, Site 17**

Site 17 Site Description: Site 17 is in an undisturbed Annual Forb Reference Area. The area is on a rounded ridge spur knob. The soil is developing in gravelly sandy clay loam alluvium and residuum from sandstone. The soil surface has about 45 percent mixed gravels. Site 17 has 2% slope; W aspect; native vegetation including Phacelia, shadscale, and galleta; no erosion; sampled 8-6-03.

#### **Site 17 Soil Profile Description:**

A horizon – 0 to 3 inches. Light brown (7.5YR 6/4) sandy loam with 35% mixed gravels, brown (7.5YR 5/4) moist; moderate medium granular structure; hard, friable, sticky and slightly plastic consistence; few medium, fine and very fine roots; violently effervescent, pH 8.1 (moderately alkaline); gradual smooth boundary.

C horizon – 3 to 6 inches. Light brown (7.5YR 6/4) sandy loam with 35% mixed gravels, brown (7.5YR 5/4) moist; massive structure; hard, friable, sticky and slightly plastic consistence; few fine and very fine roots; violently effervescent, pH 8.3 (moderately alkaline).

Site 17 Soil Suitability: Site 17 has poor rated saturation percent with 21.3% for the upper 3 inches, and 22.5% for the 3 to 6 inch depth. All other parameters are good to fair rated. EC and SAR are both low. Calcium carbonate equivalent is 20 to 22 percent. Organic matter (Walkley-Black) is 0.6 to 0.5 percent.

#### **Mixed Desert Shrub Reference Area, Site 18**

Site 18 Site description: Site 18 is in an undisturbed Mixed Desert Shrub Reference Area. The area is on a mid-backslope with native shadscale and galleta vegetation. The soil is developing in slopewash alluvium and residuum from sandstone. The Site 18 surface has about 10% mixed small gravels; 4% slope; E aspect; slight erosion; sampled 8-7-03.

#### **Site 18 Soil Profile Description:**

A horizon – 0 to 3 inches. Yellowish brown (10YR 5/4) sandy loam with 5% mixed gravels, brown (10YR 5/3) moist; weak medium granular structure; soft, very friable, sticky and plastic consistence; common medium, fine, and very fine roots; violently effervescent, pH 8.0 (moderately alkaline); clear smooth boundary.

Bw horizon – 3 to 6 inches. Yellowish brown (10YR 5/4) sandy loam with 5% mixed gravels, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic consistence; common medium, fine, and very fine roots; violently effervescent, pH 7.9 (moderately alkaline).

Site 18 Soil Suitability: Site 18 has good to fair rated soil material. EC and SAR are both low. Calcium carbonate equivalent is 16 to 18 percent. Organic matter (Walkley-Black) is 0.7 to 0.8 percent.

#### **4<sup>th</sup> East Portal Topsoil Pile, Site 22**

Site 22 Site Description: Site 22 is located on the Topsoil Pile for the 4<sup>th</sup> East Portal area. The topsoil pile has imprinted micro-basins with good revegetation of grasses in the basins where water collects. The area's former vegetation was shadscale. The Site 22 soil surface has about 7% mixed gravels; 3% slope; E aspect; slight to no erosion; sampled 8-7-03.

#### **Site 22 Soil Profile Description:**

C1 horizon - 0 to 3 inches. Yellowish brown (10YR 5/4) sandy loam to loamy sand with 7% mixed gravels, dark yellowish brown (10YR 4/4) moist; massive structure; hard, friable, slightly sticky and nonplastic consistence; very few fine and very fine roots; violently effervescent, pH 7.8 (slightly alkaline); gradual wavy boundary.

C2 horizon - 3 to 6 inches. Yellowish brown (10YR 5/4) sandy loam to loamy sand with 7% mixed gravels, dark yellowish brown (10YR 4/4) moist; massive structure; hard, friable, slightly sticky and nonplastic consistence; very few fine and very fine roots; violently effervescent, pH 7.9 (moderately alkaline).

Site 22 Soil Suitability: Site 22 has good to fair rated soil material. EC and SAR are both low. Calcium carbonate equivalent is only 2 to 5 percent. Organic matter (Walkley-Black) is 0.6 to 0.7 percent.

## REFERENCES

Burton P. and R. Davidson. 2002. Guidelines for Management of Topsoil and Overburden. R645-301-200 SOILS. State of Utah, Division of Oil Gas and Mining. Salt Lake City, UT. January 2002.

Kirshbaum, T. 2003. Revegetation Study - Emery Mine Site (Draft). April 1, 2003. Contains hand written refinements and revisions from a DOGM meeting on April 21, 2003. Sent to J. Nyenhuis for use in soil sampling protocol.

Sasser, L. 2003. Soil survey information for portions of Walker Flat and Emery Flat quadrangles. Unpublished. September 9, 2003.

Schoeneberger, P.J., et.al. 2002. Field Book for Describing and Sampling Soils. Version 2.0. U.S.D.A.-Natural Resources Conservation Service-National Soil Survey Center. Lincoln, Nebraska.

Soil Survey Staff. 1993. Soil Survey Manual. Agricultural Handbook 18. U.S.D.A.-Natural Resources Conservation Service.

Soil Survey Staff. 1999. Soil Taxonomy. Second Edition. Agricultural Handbook 436. U.S.D.A.-Natural Resources Conservation Service.

Walsh & Associates. 1981. Soil Resources Information, Surface and Underground Mines, Permit Applications, Emery Mine, Utah. March 1981.

TABLE 1

**LIST OF SOIL SAMPLE SITES**  
**Consol Emery Reclamation Study**

Site No.	Site Name	Easting Coord.	Northing Coord.	Quad Map
1	Subsoil Pile from Ponds 4 & 5	0477617	4301502	Walker Flat
2	Coal Pile Topsoil Pile	0477455	4301122	Walker Flat
3	Topsoil Pile from Pond 6	0475735	4302965	Emery Flat
4	Subsoil Pile (East) from Pond 6	0475735	4302965	Emery Flat
5	Subsoil Pile (West) from Pond 6	0475735	4302965	Emery Flat
6	Pond 6 Banks	0475735	4302965	Emery Flat
7	Pond 5 Area	0477377	4301439	Walker Flat
8	Borehole Reclaimed Road	0477219	4301680	Walker Flat
9	Substation Topsoil Pile	0477837	4301441	Walker Flat
10	Topsoil Pile from Pond 1	0476595	4301661	Walker Flat
11	Pond 1 Banks	0476658	4301177	Walker Flat
12	Greasewood Reference Area (GW3)	0477207	4301424	Walker Flat
13	Reference Area Greasewood	0477660	4302069	Walker Flat
14	Pond 1 Subsoil Pile	0476595	4301661	Walker Flat
15	Riparian Meadow Reference Area-1	0477646	4302263	Walker Flat
16	Riparian Meadow Reference Area-3	047747	4302167	Walker Flat
17	Annual Forb Reference Area-1	0477558	4302484	Walker Flat
18	Mixed Desert Shrub Reference Area	0477966	4302119	Walker Flat
19	Test Plot Area	0477294	4301015	Walker Flat
20	Canyon Bottom Road	0477949	4301108	Walker Flat
21	Pond 4 Area	0477377	4301439	Walker Flat
22	4 <sup>th</sup> East Portal Topsoil Pile	0479668	4302679	Walker Flat

TABLE 2

## SOIL CHARACTERISTICS AND SUITABILITY

Site Name	Site No.	Soil Texture <sup>1</sup> 0-3"/3-6", and % Clay	Soil Reaction (pH) <sup>2</sup> 0-3"/3-6"	Soil Suitability Poor/Unacceptable Parameters <sup>3</sup>
Pond 1 Topsoil Pile <sup>4</sup>	10	Clay Loam, 31% / Loam, 26%	7.8 (sl. alk), 8.0 (mod alk)	0-3": poor SAR (10.5) 3-6": poor EC (14.3), unaccept. SAR (20.5)
Subsoil Pile <sup>4</sup>	14	Clay Loam, 32% Clay	8.6 (strongly alk)	0-3": unaccept. EC (21.0), unaccept. SAR (32.0) 3-6": unaccept. EC (21.2), unaccept. SAR (30.7)
Pond Banks <sup>4</sup>	11	Loam, 17% Clay	8.3 (mod alk), 8.4 (mod alk)	0-3": poor EC (13.2), unaccept. SAR (20.1) 3-6": unaccept EC (24.9), unaccept SAR (29.6)
Greasewood Reference Area (GW3) <sup>4</sup>	12	Loam, 24% / Clay Loam, 31%	8.1 (mod alk), 8.1 (mod alk)	0-3": unaccept. SAR (15.3) 3-6": poor EC (11.0), unaccept. SAR (17.6)
Reference Area Greasewood	13	Grv. Sandy Loam, 14% / Sandy Clay Loam, 22%	8.0 (mod alk), 7.8 (sl. alk)	
Riparian Meadow Reference Area-1	15	Sandy Loam, 11% / Loam, 25%	7.6 (sl. alk), 7.5 (sl. alk)	0-3": poor % CaCO <sub>3</sub> (40.2) 3-6": poor % CaCO <sub>3</sub> (31.3)
Riparian Meadow Reference Area-3	16	Loam, 18%	7.8 (sl. alk), 7.7 (sl. alk)	
Annual Forb Reference Area-1	17	Sandy Loam, 12%	8.1 (mod alk), 8.3 (mod alk)	0-3": poor Sat % (21.3) 3-6": poor Sat % (22.5)
Mixed Desert Shrub Reference Area	18	Sandy Loam, 19%	8.0 (mod alk), 7.9 (mod alk)	
4 <sup>th</sup> East Portal Topsoil Pile	22	Loamy Sand, 7%	7.8 (sl. alk), 7.9 (mod alk)	

<sup>1</sup>See laboratory data for full texture data. Gravelly or very gravelly modifier taken from field soil profile descriptions. Coarse fragment content determined by field screening (No. 10 Screen, 2 mm).

<sup>2</sup>pH Classes (partial list):

Slightly alkaline 7.4 – 7.8

Moderately alkaline 7.9 – 8.4

Strongly alkaline 8.5 – 9.0

<sup>3</sup>Suitability criteria and thresholds contained in DOGM Table 4 "Soil and Spoil Suitability/Unsuitability Evaluation" (Burton and Davidson, 2002). All Sample sites not listed as Poor or Unacceptable are evaluated as either Good or Fair.

<sup>4</sup>Based on pH, EC, and SAR values, the site is considered "Saline-Sodic." The soil values for "Saline-Sodic" are: EC (>4), SAR (>15), and typical pH (<8.5). Saline-sodic values are taken from DOGM Table 5 "Saline and Sodic Soil Categories" (Burton and Davidson, 2002).

APPENDIX A

(Soil Laboratory Results Report)

Mr. Patrick Collins/Mt Nebo Scientific  
 330 East 400 South Suite 6  
 P O Box 337  
 Springville UT 84663

Jim Nyenhuis/Certified Soil Scientist  
 600 Ramah Drive  
 Fort Collins CO 80525

Colorado State University  
 Soil, Water and Plant Testing Laboratory  
 Natural & Environmental Sciences Bldg - A319  
 Fort Collins, CO 80523-1120

**FAXED**  
 Laboratory 10-15-03

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(970) 491-5061 FAX: 491-2930

BILLING: 5 B 21152

**RESEARCH SOIL ANALYSIS**

Consolidated Coal CO Emery Utah Reclamation Study

Lab #	Sample ID #	-----paste-----		% saturation	Lime Estimate	% OM	-----AB-DTPA Extract-----						
		pH	EC mmhos/cm				NO <sub>3</sub> -N	P	K	Zn	Fe	Mn	Cu
R754	Site 1 0-3"	7.7	3.2	33.3	High	2.3	2.7	<0.1	153	0.36	3.75	1.15	1.48
R755	Site 1 3-6"	8.0	5.8	32.8	High	2.6	2.3	0.3	139	0.33	3.16	0.64	0.67
R756	Site 2 0-3"	7.7	3.3	37.4	High	3.2	6.3	0.3	216	0.17	2.84	1.89	0.88
R757	Site 2 3-6"	7.9	6.7	33.9	High	3.5	3.8	0.9	184	0.17	2.11	1.34	1.29
R758	Site 3 0-3"	7.8	3.8	37.5	High	2.6	7.2	2.0	234	0.46	4.11	1.04	1.24
R759	Site 3 3-6"	7.9	5.7	38.1	High	2.7	15.1	2.0	218	0.52	4.01	0.93	1.26
R760	Site 4 0-3"	7.8	3.7	35.9	High	2.2	20.0	3.3	330	0.48	5.73	1.88	1.37
R761	Site 4 3-6"	7.8	4.5	36.9	High	2.3	25.8	3.1	318	0.47	4.00	0.81	1.72
R762	Site 5 0-3"	7.8	4.4	36.7	High	2.7	10.4	1.4	189	0.56	3.98	1.17	2.53
R763	Site 5 3-6"	8.0	8.7	37.2	High	2.6	12.9	1.6	165	0.52	3.78	0.80	2.04
R764	Site 6 0-3"	8.5	37.5	41.4	High	3.0	3.5	9.8	547	0.92	11.8	2.28	1.12
R765	Site 6 3-6"	8.4	19.7	44.8	High	2.5	1.7	1.7	343	0.65	12.4	1.08	1.54
R766	Site 7 0-3"	7.8	3.5	31.8	High	2.1	1.7	1.3	152	0.31	2.96	1.31	1.49
R767	Site 7 3-6"	7.9	4.1	30.8	High	2.1	1.5	1.2	145	0.31	3.38	1.36	1.05
R768	Site 8 0-3"	8.2	11.0	48.9	High	2.7	12.0	1.1	346	0.53	5.26	0.99	2.58
R769	Site 8 3-6"	8.5	15.3	46.7	High	3.2	6.4	0.7	324	0.60	4.61	0.81	1.12
R770	Site 9 0-3"	7.9	3.0	34.3	High	2.7	4.6	1.2	205	0.30	2.97	1.01	1.66
R771	Site 9 3-6"	7.9	5.5	33.3	High	2.3	3.4	3.6	120	0.27	2.73	0.58	1.42
R772	Site 10 0-3"	7.8	7.2	38.1	High	2.3	16.4	1.8	271	0.46	6.13	1.94	2.22
R773	Site 10 3-6"	8.0	14.3	33.4	High	1.8	17.8	2.5	403	0.39	5.00	1.40	1.33
R774	Site 11 0-3"	8.3	13.2	32.2	High	1.2	4.9	2.3	206	0.39	11.9	1.92	2.05
R775	Site 11 3-6"	8.4	24.9	33.4	High	2.1	1.1	1.5	266	0.48	10.2	0.89	2.61

*Jan R. Seft*  
 Director, Soil, Water & Plant Testing Laboratory  
 Ph.D.

Mr. Patrick Collins/Mt Nebo Scientific  
 330 East 400 South Suite 6  
 P O Box 337  
 Springville UT 84663

Jim Nyenhuis/Certified Soil Scientist  
 600 Ramah Drive  
 Fort Collins CO 80525

Colorado State University  
 Soil, Water and Plant Testing Laboratory  
 Natural & Environmental Sciences Bldg - A319  
 Fort Collins, CO 80523-1120

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(970) 491-5061 FAX: 491-2930

BILLING: 5B21152

RESEARCH SOIL ANALYSIS

Consolidated Coal CO Emery Utah Reclamation Study

Lab #	Sample ID #	-----paste-----		% saturation	Lime Estimate	% OM	-----AB-DTPA Extract-----						
		pH	EC mmhos/cm				NO <sub>3</sub> -N	P	K	Zn	Fe	Mn	Cu
R776	Site 12 0-3"	8.1	6.2	34.6	High	1.6	13.5	5.4	332	0.31	5.37	1.75	2.31
R777	Site 12 3-6"	8.2	11.0	39.6	High	2.3	7.5	1.8	240	0.26	3.37	1.26	1.89
R778	Site 13 0-3"	8.0	0.8	30.6	High	1.5	6.0	20.5	289	0.69	4.96	2.42	1.14
R779	Site 13 3-6"	7.8	2.4	31.6	High	1.5	3.2	4.4	283	0.37	3.98	1.42	1.58
R780	Site 14 0-3"	8.6	21.0	41.8	High	2.1	14.7	3.4	504	0.39	10.4	1.80	2.25
R781	Site 14 3-6"	8.6	21.2	45.3	High	2.2	6.9	2.1	477	0.35	8.91	0.97	1.49
R782	Site 15 0-3"	7.6	4.4	100	High	6.9	2.1	1.6	83.6	1.50	113	2.75	1.99
R783	Site 15 3-6"	7.5	3.3	58.5	High	3.8	1.2	1.7	111	2.10	107	1.42	4.46
R784	Site 16 0-3"	7.8	2.0	49.2	High	4.5	2.7	1.6	195	2.20	26.6	0.54	3.66
R785	Site 16 3-6"	7.7	3.2	39.7	high	3.3	1.9	0.6	161	1.67	30.7	0.32	2.84
R786	Site 17 0-3"	8.1	0.8	21.3	High	1.1	2.2	4.2	303	0.20	3.90	2.04	1.43
R787	Site 17 3-6"	8.3	0.7	22.5	High	1.2	1.9	2.8	325	0.20	3.72	1.68	2.12
R788	Site 18 0-3"	8.0	0.4	31.1	High	1.7	2.3	3.4	223	0.18	3.08	1.35	1.81
R789	Site 18 3-6"	7.9	0.4	29.3	High	1.9	1.0	2.4	182	0.19	2.97	0.96	2.80
R790	Site 19 0-3"	8.0	1.6	38.7	High	2.3	18.7	10.6	433	1.29	5.34	3.84	2.53
R791	Site 19 3-6"	8.1	2.4	34.7	High	4.2	7.3	4.0	420	0.67	4.89	1.85	0.88
R792	Site 20 0-3"	8.1	9.7	40.4	High	2.5	25.3	1.3	185	0.37	4.54	1.19	0.69
R793	Site 20 3-6"	8.0	9.8	39.4	High	2.9	28.8	1.1	170	0.29	3.45	0.83	0.64
R794	Site 21 0-3"	7.9	4.9	37.1	High	2.4	18.9	2.6	207	0.35	4.34	1.51	0.99
R795	Site 21 3-6"	8.0	8.1	43.0	High	2.8	31.8	1.0	153	0.38	4.52	0.93	0.93
R796	Site 22 0-3"	7.8	2.9	26.3	High	1.0	5.7	2.5	134	0.18	2.86	3.44	0.69
R797	Site 22 3-6"	7.9	3.2	26.0	High	1.0	4.2	2.5	152	0.15	3.25	1.13	0.86

Mr. Patrick Collins/Mt Nebo Scientific  
 330 East 400 South Suite 6  
 P O Box 337  
 Springville UT 84663

Jim Nyenhuis/Certified Soil Scientist  
 600 Ramah Drive  
 Fort Collins CO 80525

Colorado State University  
 Soil, Water and Plant Testing Laboratory  
 Natural & Environmental Sciences Bldg - A319  
 Fort Collins, CO 80523-1120

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(970) 491-5061 FAX: 491-2930

BILLING: 5821152

### RESEARCH SOIL ANALYSIS

Consolidated Coal CO Emery Utah Reclamation Study

Lab #	Sample ID #	-----meq/L-----				SAR	-----%-----			Texture	-----mg/kg-----		meq/100g gypsum
		Ca	Mg	Na	K		Sand	Silt	Clay		Se	B	
R754	Site 1 0-3"	19.7	10.6	8.8	0.8	2.3	39	31	30	Clay Loam	0.003	2.3	19.6
R755	Site 1 3-6"	17.3	18.8	30.3	0.8	7.1	43	27	30	Clay Loam	0.010	2.3	20.0
R756	Site 2 0-3"	21.5	7.2	9.8	1.3	2.6	23	33	44	Clay	0.004	3.1	19.3
R757	Site 2 3-6"	18.7	11.1	43.2	1.4	11.2	31	31	38	Clay Loam	0.008	3.6	20.9
R758	Site 3 0-3"	20.4	10.4	16.3	0.9	4.2	36	29	35	Clay Loam	0.007	3.1	20.5
R759	Site 3 3-6"	19.1	11.0	34.0	0.9	8.8	36	31	33	Clay Loam	0.012	2.5	16.8
R760	Site 4 0-3"	21.7	6.0	15.2	1.6	4.1	36	29	35	Clay Loam	0.013	2.3	6.6
R761	Site 4 3-6"	21.0	7.4	23.0	1.4	6.1	36	30	34	Clay Loam	0.007	2.0	8.2
R762	Site 5 0-3"	19.5	9.5	24.1	0.7	6.3	42	27	31	Clay Loam	0.001	2.4	22.3
R763	Site 5 3-6"	18.8	15.3	54.1	0.8	13.1	38	29	33	Clay Loam	0.005	2.3	24.3
R764	Site 6 0-3"	15.2	38.9	185.5	7.7	35.7	40	26	34	Clay Loam	0.007	2.2	21.6
R765	Site 6 3-6"	15.8	28.2	114.0	3.7	24.3	40	23	37	Clay Loam	0.008	2.1	16.6
R766	Site 7 0-3"	20.8	11.8	9.5	0.9	2.4	51	28	21	Loam	0.010	1.9	21.2
R767	Site 7 3-6"	19.9	14.3	14.0	0.8	3.4	52	26	22	Sandy Clay Loam	0.003	2.2	21.1
R768	Site 8 0-3"	15.6	9.4	75.5	1.7	21.4	18	37	45	Clay	0.008	2.9	11.4
R769	Site 8 3-6"	14.5	13.6	103.6	2.0	27.7	24	38	38	Clay Loam	0.008	2.3	11.3
R770	Site 9 0-3"	21.5	8.9	5.0	0.8	1.3	41	31	28	Clay Loam	0.007	2.3	22.6
R771	Site 9 3-6"	18.0	14.9	30.1	0.8	7.4	45	29	26	Loam	0.010	2.5	21.1
R772	Site 10 0-3"	20.9	9.7	41.1	1.6	10.5	37	32	31	Clay Loam	0.015	2.3	8.3
R773	Site 10 3-6"	18.8	14.3	83.3	3.3	20.5	45	29	26	Loam	0.009	2.0	12.7
R774	Site 11 0-3"	16.2	16.3	81.2	2.3	20.1	45	39	16	Loam	0.010	2.1	6.6
R775	Site 11 3-6"	13.2	30.6	138.6	4.2	29.6	47	35	18	Loam	0.011	2.3	7.7

Mr. Patrick Collins/Mt Nebo Scientific  
 330 East 400 South Suite 6  
 P O Box 337  
 Springville UT 84663

Jim Nyenhuis/Certified Soil Scientist  
 600 Ramah Drive  
 Fort Collins CO 80525

Colorado State University  
 Soil, Water and Plant Testing Laboratory  
 Natural & Environmental Sciences Bldg - A319  
 Fort Collins, CO 80523-1120

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(970) 491-5061 FAX: 491-2930

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**RESEARCH SOIL ANALYSIS**

Consolidated Coal CO Emery Utah Reclamation Study

Lab #	Sample ID #	-----meq/L-----				SAR	-----%-----			Texture	-----mg/kg-----		meq/100g gypsum
		Ca	Mg	Na	K		Sand	Silt	Clay		Se	B	
R776	Site 12 0-3"	10.3	6.7	44.5	1.4	15.3	36	40	24	Loam	0.012	1.8	2.0
R777	Site 12 3-6"	17.2	14.6	70.2	1.1	17.6	33	36	31	Clay Loam	0.010	2.5	16.5
R778	Site 13 0-3"	2.6	1.1	3.6	0.9	2.7	66	20	14	Sandy Loam	0.009	1.0	0.5
R779	Site 13 3-6"	14.4	6.5	6.6	1.4	2.0	56	22	22	Sandy Clay Loam	0.008	1.2	0.3
R780	Site 14 0-3"	14.9	17.2	128.1	4.6	32.0	26	40	34	Clay Loam	0.010	2.6	14.5
R781	Site 14 3-6"	13.6	21.2	128.0	4.2	30.7	34	36	30	Clay Loam	0.012	2.7	10.4
R782	Site 15 0-3"	18.6	17.9	12.4	1.1	2.9	69	20	11	Sandy Loam	0.018	10.5	14.5
R783	Site 15 3-6"	19.9	13.0	6.3	0.5	1.5	42	33	25	Loam	0.009	4.1	13.8
R784	Site 16 0-3"	10.6	9.5	4.1	0.8	1.3	46	36	18	Loam	0.012	4.2	0.5
R785	Site 16 3-6"	19.1	13.7	4.9	0.7	1.2	47	35	18	Loam	0.015	3.0	20.8
R786	Site 17 0-3"	1.6	1.4	4.3	0.7	3.6	71	17	12	Sandy Loam	0.011	1.4	1.2
R787	Site 17 3-6"	1.0	0.9	4.9	0.6	5.0	71	17	12	Sandy Loam	0.008	1.7	1.5
R788	Site 18 0-3"	2.1	0.8	0.7	0.1	0.6	66	16	18	Sandy Loam	0.009	0.8	0.7
R789	Site 18 3-6"	1.8	0.7	1.1	0.1	1.0	60	20	20	Sandy Loam	0.010	1.1	0.9
R790	Site 19 0-3"	3.9	2.2	7.1	3.5	4.1	64	32	4	Sandy Loam	0.012	1.4	0.3
R791	Site 19 3-6"	3.4	2.0	15.5	3.6	9.4	54	40	6	Sandy Loam	0.007	1.5	0.6
R792	Site 20 0-3"	16.5	14.8	62.0	0.9	15.7	43	27	30	Clay Loam	0.009	5.6	14.1
R793	Site 20 3-6"	16.5	15.4	62.3	0.8	15.6	41	29	30	Clay Loam	0.008	5.5	14.2
R794	Site 21 0-3"	20.8	7.9	25.9	1.0	6.9	42	28	30	Clay Loam	0.012	3.4	15.2
R795	Site 21 3-6"	17.2	12.9	51.6	0.6	13.3	38	28	34	Clay Loam	0.013	5.8	15.8
R796	Site 22 0-3"	19.8	10.6	3.0	0.9	0.8	80	13	7	Loamy Sand	0.010	1.3	2.7
R797	Site 22 3-6"	19.1	13.3	5.0	1.0	1.2	81	12	7	Loamy Sand	0.009	1.3	6.9

Mr. Patrick Collins/Mt Nebo Scientific  
 330 East 400 South Suite 6  
 P O Box 337  
 Springville UT 84663

Jim Nyenhuis/Certified Soil Scientist  
 600 Ramah Drive  
 Fort Collins CO 80525

Colorado State University  
 Soil, Water and Plant Testing Laboratory  
 Natural & Environmental Sciences Bldg - A319  
 Fort Collins, CO 80523-1120

DATE RECEIVED: 08-18-2003  
 DATE PARTIAL REPORTED: 09-16-2003  
 DATE REPORTED: 09-19-2003

(970) 491-5061 FAX: 491-2930

BILLING: 5021152

**RESEARCH SOIL ANALYSIS**

Consolidated Coal CO Emery Utah Reclamation Study

Lab #	Sample ID #	% CaCO <sub>3</sub> equiv	Walkley Black % OM	Lab #	Sample ID #	% CaCO <sub>3</sub> equiv	Walkley Black % OM
R754	Site 1 0-3"	14.4	0.6	R776	Site 12 0-3"	16.1	0.8
R755	Site 1 3-6"	12.3	0.5	R777	Site 12 3-6"	16.8	0.8
R756	Site 2 0-3"	18.2	0.7	R778	Site 13 0-3"	18.9	1.3
R757	Site 2 3-6"	13.2	0.7	R779	Site 13 3-6"	18.5	1.5
R758	Site 3 0-3"	20.3	1.0	R780	Site 14 0-3"	18.9	0.7
R759	Site 3 3-6"	19.1	1.0	R781	Site 14 3-6"	19.1	0.7
R760	Site 4 0-3"	19.6	1.2	R782	Site 15 0-3"	40.2	7.5
R761	Site 4 3-6"	19.5	1.0	R783	Site 15 3-6"	31.3	4.3
R762	Site 5 0-3"	20.5	0.9	R784	Site 16 0-3"	21.5	3.9
R763	Site 5 3-6"	19.3	0.8	R785	Site 16 3-6"	18.6	1.8
R764	Site 6 0-3"	21.4	1.5	R786	Site 17 0-3"	21.6	0.6
R765	Site 6 3-6"	22.3	1.0	R787	Site 17 3-6"	20.3	0.5
R766	Site 7 0-3"	14.8	0.4	R788	Site 18 0-3"	16.6	0.7
R767	Site 7 3-6"	14.9	0.5	R789	Site 18 3-6"	18.0	0.8
R768	Site 8 0-3"	13.3	0.7	R790	Site 19 0-3"	13.0	3.0
R769	Site 8 3-6"	18.8	0.6	R791	Site 19 3-6"	13.6	2.6
R770	Site 9 0-3"	15.7	0.9	R792	Site 20 0-3"	17.0	0.6
R771	Site 9 3-6"	15.6	0.6	R793	Site 20 3-6"	17.3	0.5
R772	Site 10 0-3"	18.5	1.8	R794	Site 21 0-3"	14.6	0.9
R773	Site 10 3-6"	16.1	0.9	R795	Site 21 3-6"	14.6	0.7
R774	Site 11 0-3"	15.6	0.7	R796	Site 22 0-3"	2.3	0.6
R775	Site 11 3-6"	15.8	0.6	R797	Site 22 3-6"	5.3	0.7

## APPENDIX B

Table 4 from "Guidelines for Management of Topsoil and Overburden"  
(Burton and Davidson, 2002).

**Table 4. Soil and Spoil Suitability/Unsuitability Evaluation**

CRITERIA	GOOD	FAIR	POOR	UNACCEPTABLE
Saturation %	25 to 80		<25 >80	
pH	6.5 to 8.2	6.0 to 6.4 8.2 to 8.5	5.5 to 6.0 8.6 to 9.0	< 5.5 > 9.0
EC (mS/cm 25°C)	0 to 4	4 to 8	8 to 15	> 15
SAR <sup>a,b</sup>	0 to 4	5 to 10	10 to 15	> 15 <sup>a</sup>
%CaCO <sub>3</sub>	<15	15 - 30	>30	
Texture <sup>c</sup>	sl, l, sil, scl, vfsl, fsl	c, sicl, sc, ls, lfs	sic, s, sc, c, cos, fs, vfs	g, vcoss
Total Organic Carbon	<10%			≥10%
Available Water Capacity <sup>d</sup>	> 0.10 moderate	0.05 to 0.10 low	< 0.05 very low	
K factor <sup>e</sup>	< 0.37		> 0.37	

<sup>a</sup> For clay textured soils unacceptable is SAR >14. For sandy textured soils unacceptable is >20.

<sup>b</sup> For most Western soils, the SAR to ESP relationship is usually 1:1, up to ESP ≈ 20. If SAR>20, then determine ESP. (Evangelou, 2000.)

<sup>c</sup> s=sand, l= loam, si= silt, c= clay, v= very, f= fine, co=coarse, g=gravel

<sup>d</sup> Available Water Capacity is adjusted for texture.

<sup>e</sup> K factor recommendations from the USDA Soil Conservation Service. 1978. National Soils Handbook Notice 24. (3/31/78). NSH Part II -403.6(a).

**CONSOL ENERGY - 4<sup>th</sup> EAST PORTAL  
MACROINVERTEBRATE  
SAMPLING RESULTS  
FALL, 2003**

**D R A F T**

Submitted to:

CONSOL ENERGY  
John Gefferth, Environmental Engineer  
Consolidation Coal Company  
P.O. Box 566  
Sesser, IL 62884

Submitted by:

JBR Environmental Consultants, Inc.  
8160 South Highland Drive  
Sandy, UT 84093

November 2003

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## LIST OF APPENDICES

Appendix A -- Data Tables from Dr. Baumann's Report

## ACRONYMS

BCI	Biotic Condition Index
CONSOL	Consolidation Coal Company
CTQa	Actual Community Tolerance Quotients
CTQd	Dominance Community Tolerance Quotients
CTQp	Predicted Community Tolerance Quotients
JBR	JBR Environmental Consultants, Inc.
UDOGM	Utah Division of Oil, Gas, and Mining
UDWR	Utah Department of Wildlife Resources

# 4<sup>th</sup> EAST PORTAL MACROINVERTEBRATE SAMPLING RESULTS FROM SEPTEMBER, 2003

## 1.0 Introduction

The 4<sup>th</sup> East Portal is located near the confluence of Quitchupah Creek and Christiansen Wash, southeast of Emery Town in Emery County, Utah (Figure 1). Consolidation Coal Company (CONSOL) developed the portal and associated facilities as part of its Emery Deep Mine. Located near the workings of the old Browning Mine, which was started in 1937, the Emery Deep Mine discharges water into Quitchupah Creek.

In the Fall of 2002, Utah Division of Oil, Gas, and Mining (UDOGM) requested that CONSOL initiate an aquatic macroinvertebrate data collection program that could be used to track temporal and spatial differences in habitat quality in Quitchupah Creek and Christiansen Wash above and below their confluence. Aquatic macroinvertebrates help maintain the health of the water ecosystem by eating bacteria and dead, decaying plants and animals. Overall water quality affects which types of organisms can survive in a body of water.

CONSOL contracted with JBR Environmental Consultants, Inc. (JBR) to collect aquatic macroinvertebrate data from Quitchupah Creek and Christiansen Wash. UDOGM and the Utah Division of Wildlife Resources (UDWR) were consulted regarding sampling locations and study design. Three sampling stations were established, as suggested by UDWR. Station CW-1 was located on Christiansen Wash approximately 0.30 miles upstream from the confluence with Quitchupah Creek. Station QC-2 was located on Quitchupah Creek approximately 0.30 miles upstream from the confluence Christiansen Wash (Figure 2). Station QC-1 was located 0.15 miles downstream of the confluence of the two drainages.

In some seasons of some years, the flow in Quitchupah Creek at Station QC-2 is almost entirely due to groundwater that is pumped out of the mine and discharge to the stream just upstream from the sampling station. Christiansen Wash usually maintains flow due to springs, and seasonally includes irrigation return flows.

JBR sampled the three selected study sites on September 12, 2003; brief site descriptions are given below. The sampling methodologies, areas, and results are discussed in the following sections of this report.

### **QC-1 Lower Quitchupah**

This station is on lower Quitchupah Creek, downstream of the confluence with Christiansen Wash. There are no defined riffle areas within the reach; the stream in this section consists of shallow drops and pools within a long run. The substrate is comprised of cobble-sized particles surrounded by and cemented with clay particles. There are very few gravel or sandy sized particles. The vegetation in the area is mostly shrubby riparian with tamarisk, willow, and rabbitbrush dominating. Some grasses, rushes, greasewood, and russian olive are present.

During the September 2003 sampling, flow depth was about 6 inches, water was turbid, and substrate was cemented.

### **QC-2 Upper Quitchupah**

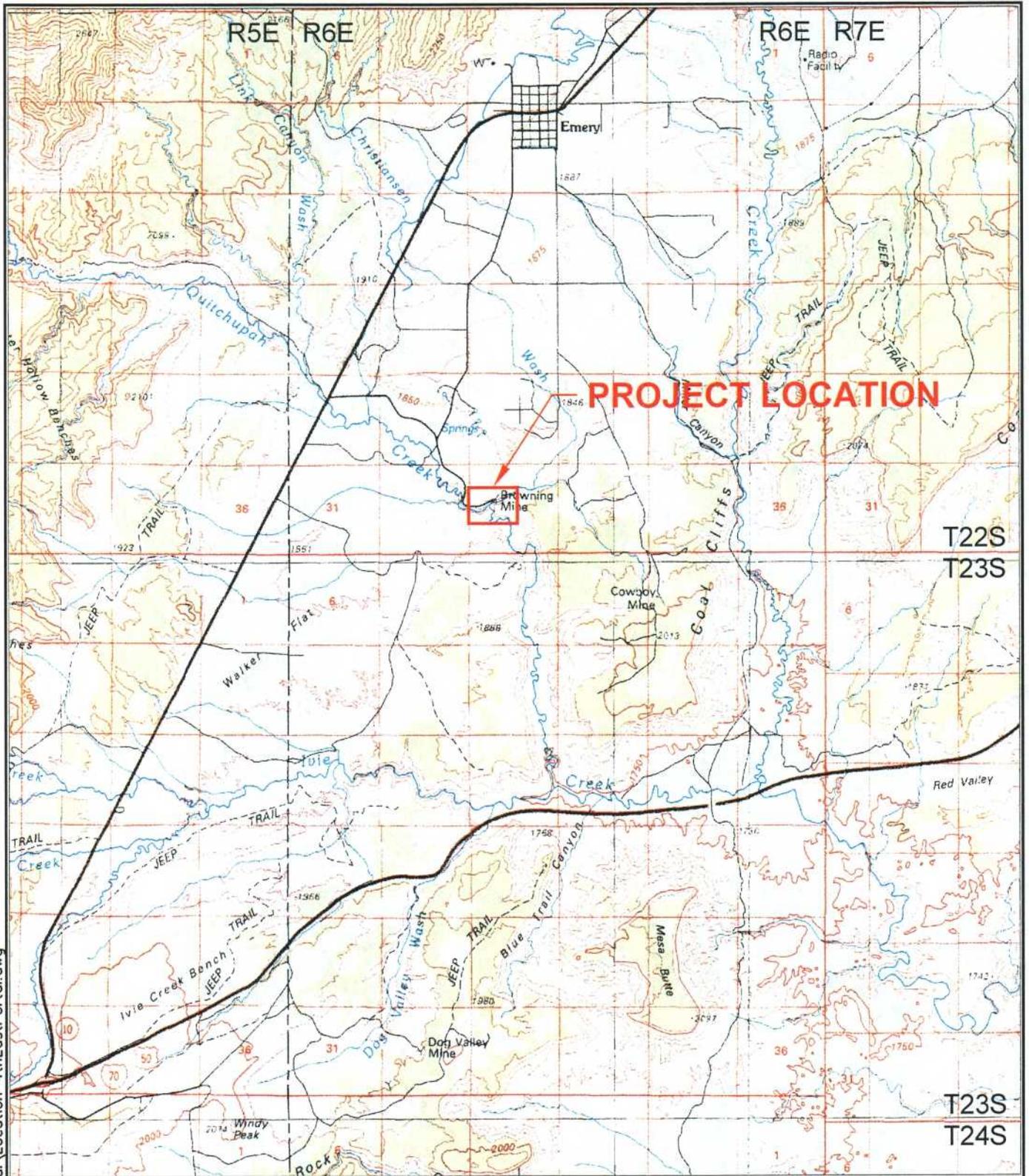
This station is located on Quitchupah Creek above its confluence with Christiansen Wash. In this reach there are long pools, essentially due to mine discharge. The substrate is noncohesive, and includes very fine particles of sand and coarse sands mixed with clay. The riparian vegetation includes tall grasses, tamarisk, and abundant willow; the streamside area grades into a terrace of greasewood, rabbitbrush, and clematis.

During the September 2003 sampling, flow depth was about 18 inches, water was turbid, and substrate contained odorous organics.

### **CW-1 Christiansen Wash**

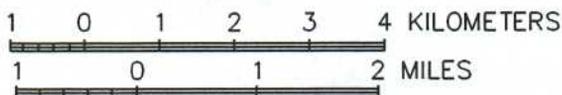
This station is located on Christiansen Wash above the confluence with Quitchupah Creek. It is narrow and rocky in this area, flowing through exposed bedrock with no alluvial corridor. The substrate is similar to QC-1, cemented with larger rock. The riparian area is similar to QC-1 with larger banks of rush and grasses. The terrace habitat is narrower; few large trees are present.

During the September 2003 sampling, flow depth was about 6 inches, water was turbid, and substrate was heavily cemented.



drawings\Consol-074thEastPortal\Location 4thEastPortal.dwg

BASE: SALINA UT (1980) - 1:100,000 USGS



## CONSOL ENERGY 4th East Portal

FIGURE 1  
PROJECT LOCATION MAP

**jbr**  
environmental consultants, inc.

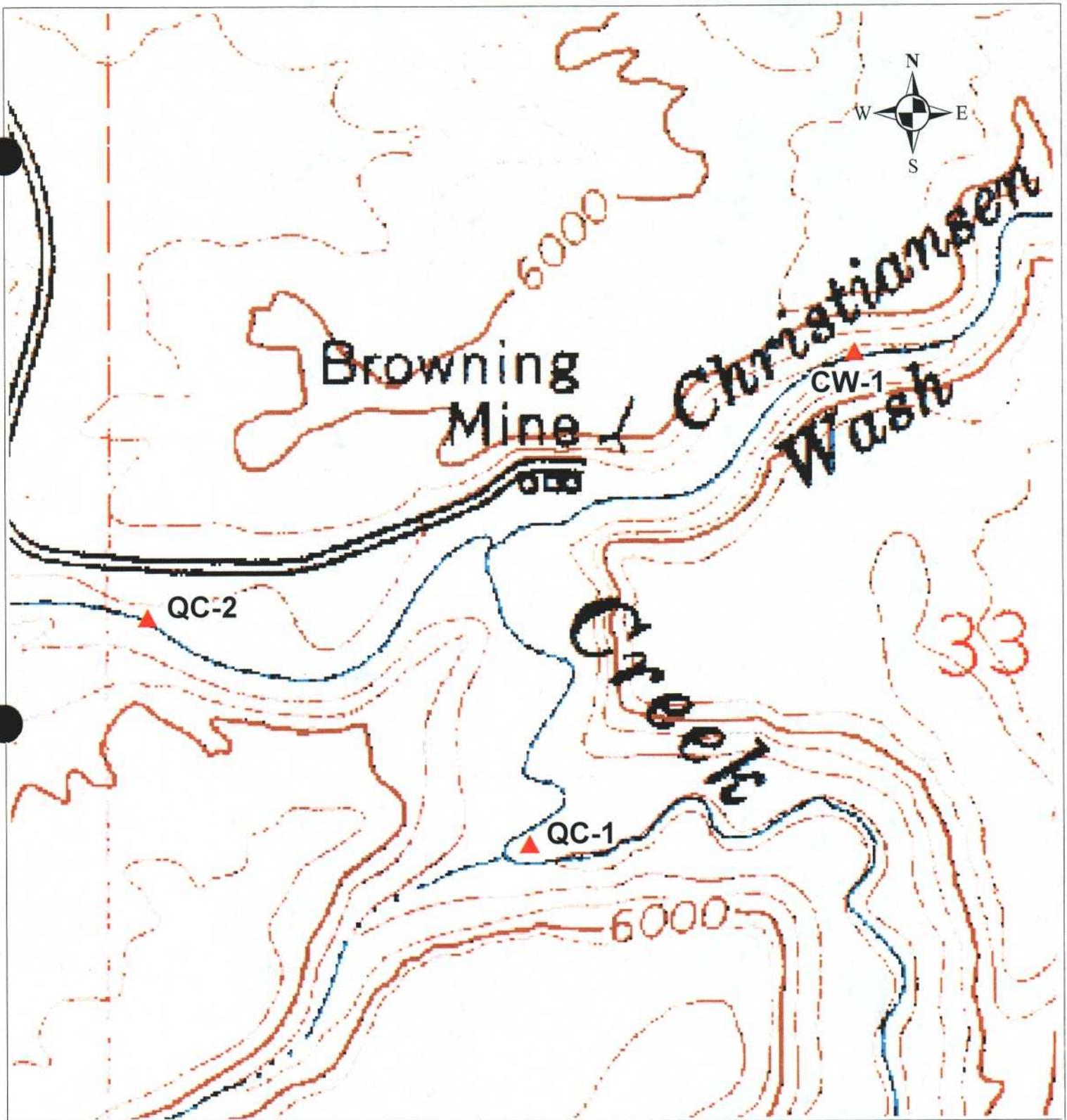
Salt Lake City, Utah Cedar City, Utah Reno, Nevada Elko, Nevada Boise, Idaho

DESIGN BY LM DRAWN BY CP CH'D BY

SCALE 1:100,000

DATE DRAWN 11/26/02

REVISION	

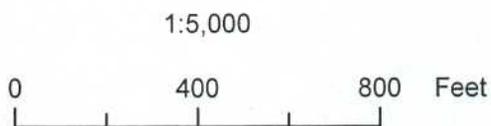


Base: Walker Flat, UT (1968) - 1:24,000 USGS

**CONSOL ENERGY**  
4th East Portal

▲ Macroinvertebrate Stations

Figure 2. Macroinvertebrate Sampling Stations



**jbr**  
environmental consultants, inc.  
Salt Lake City Cedar City Boise Reno Elko

Created: 25 September 2002  
Edited: Version 1  
Printed: 12 November 2003

## 2.0 Methods

Sampling for macroinvertebrates was conducted by using a Surber sampler, a widely accepted method for macroinvertebrate collection. The Surber sampling methodology is described on EPA's website, Biological Indicators of Watershed Health ([http://www.epa.gov/bioindicators/html/box\\_2.html](http://www.epa.gov/bioindicators/html/box_2.html)) from Karr & Chu (1999) *Restoring Life in Running Waters*, "How to Sample Benthic Invertebrates". In general, riffle areas or areas that contain gravels, rocks, or debris (areas most abundant with macroinvertebrates) are preferred sample locations, however all three station locations lack this type of substrate.

For each sample, a modified Surber sampler was placed on the creek bottom with the opening of the sampler facing upstream so that the creek current fills the collecting bag. Only the substrate that is within the 0.1 m<sup>2</sup> frame is sampled. Insects are dislodged and carried into the collecting bag by the current. This process was continued until only small substrate material remained within the sampler frame. The small substrate was gently agitated by hand or a metal stake to a depth of three to four inches. The sampler was then removed and the contents of the net transferred to a pan. Debris was removed and the sample was washed with a salt solution by decanting and sieving. The washing was repeated until the sample was free of sediment and organic algae. The sample was rinsed from the sieve and placed in a bottle containing 70 percent isopropyl alcohol.

Six macroinvertebrate samples were taken at each station. The labeled bottles were delivered to Dr. Richard Baumann in the entomology laboratory at Brigham Young University where the macroinvertebrates are sorted, identified, counted, and analyzed. Taxonomic decisions were made using the following references: Baumann et al. (1977), Edmunds et al. (1976), Merritt and Cummins (1996), Thorp and Covich (1991), Wiggins (1996).

## 3.0 Results

The entomology lab at Brigham Young University prepared a written report based upon their analyses of the submitted samples (Baumann, 2003). Several types of information were derived from the samples and were reported in tabular form in Baumann's report; these tables are contained in Appendix A. A complete list of taxa found at each station was prepared, including total numbers, biomass, and density (numbers/square meter). Further, species were categorized according to their trophic level (scrapers, shredders, collectors, filter feeders, and predators) and their tolerance quotient. Some macroinvertebrates, such as stoneflies and mayflies require a high level of dissolved oxygen and their abundance is an indication of good

water quality. Aquatic worms are indicative of water systems with lower dissolved oxygen. The number of taxa (or richness) also relates to community composition (or diversity), and the Shannon-Weaver Diversity Index was used to indicate diversity.

Various tolerance quotients were also derived from the sample data. A tolerance quotient relates to the ability of a given species to withstand stressors such as poor water quality, high sediment levels, and extremes in water temperature; taxa have differing abilities to respond to various stressors or environmental conditions. Species with low tolerances are considered to be more fragile taxa, and can typically only be found in locations with relatively high quality that do not have environmental stressors present. The Actual Community Tolerance Quotients (CTQa) given in the data are simply arithmetic means of the tolerance quotients of the sampled macroinvertebrates.

Still another measurement, the predicted Community Tolerance Quotient (CTQp) is the mean of the tolerance quotients for a predicted macroinvertebrate community, and represents the ideal tolerance quotient mean for a community in a given area. The ratio of the CTQp to the CTQa is known as the Biotic Condition Index, or BCI. It provides an indication of how close to its potential a particular stream site is, given the existing stream and watershed conditions.

Baumann reports Quitchupah Creek below Christiansen Wash (QC-1) to be in the best condition biologically of the three sampling areas, however it is still considered to be in only fair condition. There were six macroinvertebrate taxa present, including two types of mayflies (*Ephemeroptera*), *Baetis* and *Tricorythodes minutus*, and a caddisfly genus (*Trichoptera*), *Hydropsyche*. These are fairly sensitive orders of macroinvertebrates, however, the most sensitive organisms such as stoneflies were not found during the sampling. The CTQa score was 99 and the BCI value is 78. The Shannon Weaver index was 0.6. The sampling results at this station are quite similar to what was reported from the September 2002 sampling (JBR 2002) at this site.

According to Dr. Baumann, the upstream Quitchupah Creek station at QC-2 appears to be the most degraded of the three sites, though the numbers were somewhat improved over the fall 2002 sampling. A few member of the caddisfly order were reported, as was a single individual of the *Notonecta* genus. (Baumann notes that the latter is a flying organism, so its presence may not be indicative of site specific conditions.) The CTQa and CTQd value was 104, the BCI score was 72 and the Shannon Weaver Index was 2.2.

Christiansen Wash at CW-1 exhibited habitat conditions slightly worse than at QC-1 and slightly better than at QC-2. No mayflies were present, but one individual beetle

(*Hydraenidae*) with a somewhat sensitive tolerance was collected. The CTQa value was 102 and the BCI score was 74, which place it into the fair/poor range, and similar to the previous year's values. The Shannon Weaver index was 1.0.

#### 4.0 Summary

In September 2003, macroinvertebrate sampling was conducted near CONSOL's 4<sup>th</sup> East Portal at three locations, two on Quitchupah Creek and one on Christiansen Wash. This was the second time these sites had been sampled; the first round of sampling took place in September 2002.

Sampling appears to show somewhat better habitat quality at the downstream site (QC-1) below the confluence of the two drainages in comparison to the upstream sites (QC-2 and CW-1). However none of the sites are in good condition based upon the measured indices. Results were similar to the fall 2002 sampling results, although QC-2 appeared to show a minor improvement over that time. Future sampling will provide additional data to further characterize the macroinvertebrate communities at these locations.

## 5.0 References

- Baumann, Richard W. October 2003. Macroinvertebrate Studies of the Lower Quitchapah Creek Drainage, Emery County, Utah. Samples Collected September 12, 2003. Prepared for JBR Environmental Consultants.
- Baumann, R. W., A. R. Gaufin, and R. F. Surdick. 1977. The stoneflies (Plecoptera) of the Rocky Mountains. Mem. American Entomology Society, 31:1-208.
- Edmunds, G. F., Jr., S. L. Jensen, and L. Berner. 1976. The mayflies of North and Central America. University of Minnesota Press, 330 pp.
- JBR Environmental Consultants, Inc. December 2002. CONSOL Energy - 4<sup>th</sup> East Portal, Macroinvertebrate and Fish Sampling Results Fall, 2002.
- Merritt, R. W. and K. W. Cummins. 1996. An introduction to the aquatic insects of North America. Kendall/Hunt, 732 p.
- Wiggins, G. B. 1996. Larvae of the North American caddisfly genera. Univ. of Toronto Press, 401 pp.
- Winget, R. N. and F. A. Mangum. 1979. Biotic Condition Index: Integrated biological, physical, and chemical stream parameters for management. Aquatic ecosystem inventory: Macroinvertebrate analysis, U. S. Forest Service, Intermountain Region, 51 pp.

# **Appendix A**

## **Data Tables From Baumann's Report**

**Table 1. Macroinvertebrates obtained from lower Quitcupah Creek drainage, Emery County, Utah, samples collected September 12, 2003.**

Organism	Trophic Level*	Tolerance Quotient	Stations		
			QC1	QC2	CW1
<b>Ephemeroptera (Mayflies)</b>					
Baetis	C-G	72	4		
Tricorythodes minutus	C-G	92	1		
<b>Trichoptera (Caddisflies)</b>					
Hydropsyche	C-F	108	121	13	29
<b>Coleoptera (Beetles)</b>					
Hydraenidae	C-G	72			1
<b>Hemiptera (Bugs)</b>					
Ambrysus mormon	Pred	90			3
Notonecta	Pred	90	1	1	
<b>Odonata (Dragonflies)</b>					
Argia	Pred	108			2
Ophiogomphus	Pred	108	4	3	1
<b>Diptera (Flies)</b>					
Chironomidae	C-G	108			9
Ceratopogonidae	Pred	108			7
Empididae	Pred	95	1		
<b>Annelida (Worms)</b>					
Oligochaeta	C-G	108			5

\*C-F = collectors-filterers

Pred = predators

Shr = shredders

Scr = scrapers

C-G = collectors-gatherers

**Table 2. Summary of macroinvertebrate data from lower Quitchupah Creek drainage Emery County, Utah, samples collected September 12, 2003.**

Parameter	Stations		
	QC1	QC2	CW1
Total number of taxa	6	3	8
Mean number/square meter	237	30	102
Standard Deviation	157	79	49
Grams/square meter	< 0.1	< 0.1	< 0.1
Dominance Community TQ=CTQd	99	105	104
Shannon Weaver Index = d	0.6	2.2	1.0
Average Community TQ=CTQa	96	104	102
Predicted Community TQ =CTQp	75	75	75
Percent of Predicted = BCI	78	72	74

BCI

Above 90  
80-90  
70-80  
Below 70

SCALE

Excellent  
Good  
Fair  
Poor

CTQa

Below 60  
60-70  
70-80  
Above 80

SCALE

Excellent  
Good  
Fair  
Poor

TOTAL SAMPLE STATISTICS

STATION: QC1

Lower Quitchupah Creek, Emery County, Utah

DATE: 09 12 03

Repl	Total No. Species	Mean /SQM	Confidence Limits (80 Percent)		Standard Deviation	Percent SE of Mean	Coeff. of Variation	DBAR	CTQA	CTQD
			LL	UL						
6	6	237	65	408	157.36	27.13	66.45	0.5809	96	99

## SPECIES ANALYSIS

STATION: QC1

Lower Quitchupah Creek, Emery County, Utah

DATE: 09 12 03

## TAXONOMIC LIST

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN N/SQM	LOG10 N/SQM	LOG10 TQ	LOG10 XTQ
INSECTA	EPHEMEROPTERA	TRICORYTHIDAE	TRICORYTHODES	MINUTUS	2	0.254	108	27
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		7	0.856	72	61
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		217	2.337	108	252
INSECTA	HEMIPTERA	NOTONECTIDAE	NOTONECTA		2	0.254	90	22
INSECTA	ODONATA	GOMPHIDAE	OPHIOGOMPHUS		7	0.856	108	92
INSECTA	DIPTERA	EMPIDIDAE			2	0.254	95	24

MEAN BIOMASS GM/SQM: 0.1

TOTALS: 237 2.374

TOTAL SAMPLE STATISTICS

STATION: QC2

Upper Quitchupah Creek, Emery County, Utah

DATE: 09 12 03

Repl	Total No. Species	Mean /SQM	Confidence Limits (80 Percent)		Standard Deviation	Percent SE of Mean	Coeff. of Variation	DBAR	CTQA	CTQD
			LL	UL						
6	3	30	17	188	78.72	31.43	76.98	2.1938	104	105

## SPECIES ANALYSIS

STATION: QC2

Upper Quitchupah Creek, Emery County, Utah

09 12 03

TAXONOMIC LIST  
CLASS

	ORDER	FAMILY	GENUS	SPECIES	MEAN N/SQM	LOG10 N/SQM	LOG10 TQ	LOG10 XTQ
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		23	1.368	108	147
INSECTA	HEMIPTERA	NOTONECTIDAE	NOTONECTA		2	0.254	90	22
INSECTA	ODONATA	GOMPHIDAE	OPHIOGOMPHUS		5	0.731	108	78

MEAN BIOMASS GM/SQM: 0.1

TOTALS:

30 1.484

TOTAL SAMPLE STATISTICS

STATION: CW1

Christiansen Wash above Quitchupah Creek, Emery County, Utah

DATE: 09 12 03

Repl	Total No. Species	Mean /SQM	Confidence Limits (80 Percent)		Standard Deviation	Percent SE of Mean	Coeff. of Variation	DBAR	CTQA	CTQD
			LL	UL						
6	8	102	0	84	48.99	65.58	160.64	0.9780	102	104

## SPECIES ANALYSIS

STATION: CW1

Christiansen Wash above Quitcupah Creek, Emery County, Utah

DATE: 09 12 03

TAXONOMIC LIST					MEAN	LOG10	LOG10
CLASS	ORDER	FAMILY	GENUS	SPECIES	N/SQM	N/SQM	TQ XTQ
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		52	1.716	108 185
INSECTA	COLEOPTERA	HYDRAENIDAE			2	0.254	100 25
INSECTA	HEMIPTERA	NAUCORIDAE	AMERYCUS	MORMON	5	0.731	90 65
INSECTA	ODONATA	GOMPHIDAE	OPHIOGOMPHUS		2	0.254	108 27
INSECTA	ODONATA	COENAGRIONIDAE	ARGIA		4	0.555	108 59
INSECTA	DIPTERA	CHIRONOMIDAE			16	1.208	108 130
INSECTA	DIPTERA	CERATOPOGONIDAE			13	1.099	108 118
OLIGOCHAETA					9	0.953	108 102

MEAN BIOMASS GM/SQM: 0.1

TOTALS: 102 2.010

**APPENDIX C**

**Legal Financial, Compliance and Related Information**

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

Other change in ownership and control information  
As required under R645-301-110

**CONTENTS**

DEPARTMENT of COMMERCE ANNUAL REPORT  
CURRENT LISTING of OFFICERS & DIRECTORS



P.O. Box 25125, Salt Lake City, Utah 84125-0125

ANNUAL REPORT / RENEWAL FORM

Entity Number	Entity Type	Renewal Fee	Delinquent Date	Total Late renewal Fee	Date Entity Can No Longer Renew
599621-0143	Corporation - Foreign - Profit	\$12.00	08/22/2003	\$22.00	10/21/200

SUBMIT SEPARATE PAYMENTS FOR MULTIPLE RENEWALS

CHANGES MADE ON THE FORM ON THE REVERSE MUST BE TYPE WRITTEN OR COMPUTER GENERATED

C T CORPORATION SYSTEM  
 CONSOLIDATION COAL COMPANY  
 50 W BROADWAY 8TH FLOOR  
 SALT LAKE CITY UT 84101-2006

000000864619C0R0000599621014300000000000000001000

(Detach coupon above even if changes are made on the reverse side of this form)

**INSTRUCTIONS FOR ANNUAL REPORT/RENEWAL - PLEASE READ CAREFULLY**

**TIMELY RENEWAL:** Pursuant to Utah Law, all renewals must be filed within their legally prescribed time. Failure to do so may result in the loss of all protection and privileges in the State of Utah.

**RENEWAL FEES:** Application fees are subject to change by the Legislature each July 1<sup>st</sup>. The fees quoted above are current at the time this renewal form was printed. The "Total Late Renewal Fee" quoted above is the total amount due if renewing after the entity's Delinquent Date.

**RENEWAL:** Please submit original form only. If no changes need to be made to registered information, carefully detach the coupon above and submit with the appropriate fee in the enclosed return envelope. For multiple renewals please submit separate payments. Payments are accepted by check or money order and should be payable to "State of Utah" DO NOT SEND CASH. Please indicate registration number and/or business name on check.

**CHANGES:** At the time of renewal changes can be made to the entity's registered information with no fee by using the form printed on the reverse. If making changes, return the detached coupon, the form with changes and the appropriate fee in the enclosed return envelope. Ensure that the changes made on the reverse side of this form are being made to the entity with which this renewal is associated.

If you have questions concerning this renewal or would like to check the status of your record please contact the Corporations Information Center at: (801) 530-4949 or toll free in-state (877) 526-3994 or go to <http://www.state.ut.us/cercv/bes>. Forms may be downloaded from our Web site: <http://www.commerce.state.ut.us>

**ENTITY SPECIFIC INFORMATION:**

[www.utah.gov/commerce/abr](http://www.utah.gov/commerce/abr)

**Corporation - Domestic - Profit:** ONE (1) corporate officer with address {UCA 16-10A-830} & THREE (3) directors with addresses {UCA 16-10A-803} (exception: 16-10A-803-1b) must be reported by the entity's first anniversary annual report.

**Corporation - Foreign - Profit:** What the home state law requires

**Professional Corporation:** ONE (1) director with address and ONE (1) corporate officer with address, each must be an individual licensed to render the same specific professional services as those for which the corporation is organized or be qualified to be an officer or director under the applicable licensing act for which the corporation is organized {UCA 16-11-8}.

Use the form on the reverse to set forth any change in registered information, there is no additional fee involved when changing registered information for an entity in conjunction with that entity's renewal. When filling out the form, it must be type written or computer generated.

**REGISTERED PRINCIPAL INFORMATION**

To view principal information go to <http://www.utah.gov/commerce/abr>  
You will need to enter the following information on the internet:

ENTITY NUMBER: 599621-0143  
RENEWAL ID: 864619

RENEWAL INFORMATION

RENEWAL INFORMATION

- To check current registered information, follow the instructions printed on the bottom portion on the reverse side of this form
- Include the Entity File Number and Registered Name on their respective lines below
- When replacing the Registered Agent the new Agent **MUST** sign
- Place an "x" in the  Add box next to the position when adding a position
- Place an "x" in the  Remove box next to the position when removing a position
- If changing or correcting existing information, enter the position and then the name & address as they should read - **do not** "x" either the Add or Remove box
- Sign and date the bottom of this form

(Do not write in space below)

- Submit the detached coupon, form with changes and appropriate fee in the enclosed return envelope
- There is no additional fee for making changes to registered information when the changes are made in conjunction with the entity's renewal
- The form below **must** be type written or computer generated

Please make all corrections or changes to registered information on this form. Please include Entity File Number and Registered Name along with all changes. There is no fee involved with making changes or corrections to registered information when the changes are made in conjunction with the entity renewal.

**WHEN REPLACING THE REGISTERED AGENT THE NEW AGENT MUST SIGN**

Do not use this form if you are resigning as a Officer, Director, or Registered Agent. You must submit a Letter of Resignation. There is no fee associated with a Letter of Resignation.

ENTITY FILE # \_\_\_\_\_ REGISTRATION DATE \_\_\_\_\_

1 REGISTERED NAME \_\_\_\_\_  
(Required Information)

2 REGISTERED AGENT \_\_\_\_\_  
First Middle Last New Agent Must Sign Above

REGISTERED ADDRESS \_\_\_\_\_  
Street Address Required

3 CITY & ZIP CODE \_\_\_\_\_  
City **UTAH** (Registered Agent Must Be In Utah) Zip

5 PURPOSE OF THE BUSINESS \_\_\_\_\_

3 ADDRESS OF THE PRINCIPAL OFFICE IN THE HOME STATE \_\_\_\_\_  
Street Address

SEE ATTACHED \_\_\_\_\_  
City State or Country Zip

POSITION TO CHANGE	NAME	ADDRESS
<input type="checkbox"/> Add	_____	ADDRESS _____
<input type="checkbox"/> Remove	_____	CITY _____ STATE _____ ZIP _____
<input type="checkbox"/> Add	_____	ADDRESS _____
<input type="checkbox"/> Remove	_____	CITY _____ STATE _____ ZIP _____
<input type="checkbox"/> Add	_____	ADDRESS _____
<input type="checkbox"/> Remove	_____	CITY _____ STATE _____ ZIP _____
<input type="checkbox"/> Add	_____	ADDRESS _____
<input type="checkbox"/> Remove	_____	CITY _____ STATE _____ ZIP _____
<input type="checkbox"/> Add	_____	ADDRESS _____
<input type="checkbox"/> Remove	_____	CITY _____ STATE _____ ZIP _____
<input type="checkbox"/> Add	_____	ADDRESS _____
<input type="checkbox"/> Remove	_____	CITY _____ STATE _____ ZIP _____

Under penalties of perjury and as an authorized authority, I declare that this statement of change(s), has been examined by me and is, to the best of my knowledge and belief, true, correct, and complete.

BY: G. J. BENCH

(Printed Name of Authorized Party & Position Held)

*Gary J. Bench*  
(Signature of Authorized Party)

Title: ASSISTANT SECRETARY

Date: 8/15/2003

# CONSOLIDATION COAL COMPANY

## List of Officers and Directors

### Officers:

J. Brett Harvey President	102 Troutwood Drive, Venetia, PA 15317 1800 Washington Road, Pittsburgh, PA 15241
P. B. Lilly Chief Operating Officer	113 Baywood Avenue, Pittsburgh, PA 15228 1800 Washington Road, Pittsburgh, PA 15241
A. A. Aloia VP/General Mgr.	434 Independence Blvd., Washington, PA 15301 1800 Washington Road, Pittsburgh, PA 15241
B. D. Dangerfield VP/General Mgr.	14960 Washington Way, Bristol, VA 24202 1800 Washington Road, Pittsburgh, PA 15241
D. L. Fassio V. P. & Secretary	238 Orr Drive, Pittsburgh, PA 15241 1800 Washington Road, Pittsburgh, PA 15241
B. J. Hyita Vice President	172 Route 519, Eighty Four, PA 15330 1800 Washington Road, Pittsburgh, PA 15241
W. J. Lyons V.P.& Controller	3203 Washington Pike, Bridgeville, PA 15017 1800 Washington Road, Pittsburgh, PA 15241
J. J. McCaffrey VP/General Mgr.	104 Eastpointe Drive, Washington, PA 15301 1800 Washington Road, Pittsburgh, PA 15241
W. J. Scheller Vice President	2083 Blairmont Drive, Pittsburgh, PA 15241 1800 Washington Road, Pittsburgh, PA 15241
J. M. Reilly Treasurer	819 Hillcrest Circle, Wexford, PA 15090 1800 Washington Road, Pittsburgh, PA 15241
G. J. Bench Asst. Secretary	2842 Locust Drive, Pittsburgh, PA 15241 1800 Washington Road, Pittsburgh, PA 15241
S. P. Skeen Asst. Secretary	65 Will Scarlet Drive, McMurray, PA 15317 1800 Washington Road, Pittsburgh, PA 15241
J. F. Zachwieja General Manager	4 Highland Park, Wheeling, WV 26003 1800 Washington Road, Pittsburgh, PA 15241

Directors:

J. Brett Harvey      102 Troutwood Drive, Venetia, PA 15317  
1800 Washington Road, Pittsburgh, PA 15241

W. J. Lyons            3203 Washington Pike, Bridgeville, PA 15017  
1800 Washington Road, Pittsburgh, PA 15241

D. L. Fassio            238 Orr Drive, Pittsburgh, PA 15241  
1800 Washington Road, Pittsburgh, PA 15241

R. E. Smith            141 Druid Drive, McMurray, PA 15317  
1800 Washington Road, Pittsburgh, PA 15241

P. B. Lilly             113 Baywood Avenue, Pittsburgh, PA 15228  
1800 Washington Road, Pittsburgh, PA 15241

C. Koether             1750 Hempstead Lane, Upper St. Clair, PA 15241  
1800 Washington Road, Pittsburgh, PA 15241

J. M. Reilly            819 Hillcrest Circle, Wexford, PA 15090  
1800 Washington Road, Pittsburgh, PA 15241



State Online Services Agency List Business Utah Gov

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Utah Department of Commerce

# Business Entity Search



Name	Type	City	Status
CONSOLIDATION COAL COMPANY	Corporation	PITTSBURGH	Active

**Business Name:** CONSOLIDATION COAL COMPANY  
**Entity Number:** 599621-0143  
**Registration Date:** 08/22/1966  
**State of Origin:** DE

### Address

1800 WASHINGTON RD  
PITTSBURGH , PA 15241

### Status

**Status:** Active  
**Status Description:** Good Standing  
**This Status Date:** 09/14/2000  
**Last Renewed:** 08/19/2003  
**License Type:** Corporation - Foreign - Profit  
**Delinquent Date:** 08/22/2004

(Note: If your renewal is not received within 60 days of delinquency date your filing will expire )

### Registered Agent

**Registered Agent:** C T CORPORATION SYSTEM  
**Address Line 1:** 50 W BROADWAY 8TH FLOOR  
**Address Line 2:**  
**City:** SALT LAKE CITY  
**State:** UT  
**Zip:** 841012006

### Additional Information

**Additional Principals:** YES  
**NAICS Title:** 3111-Tobacco Manufacturing  
**Stock Class 1 Amount:** 0000075000  
**Stock Class 1 Type:** C  
**Stock Class 2 Amount:** 0000000000

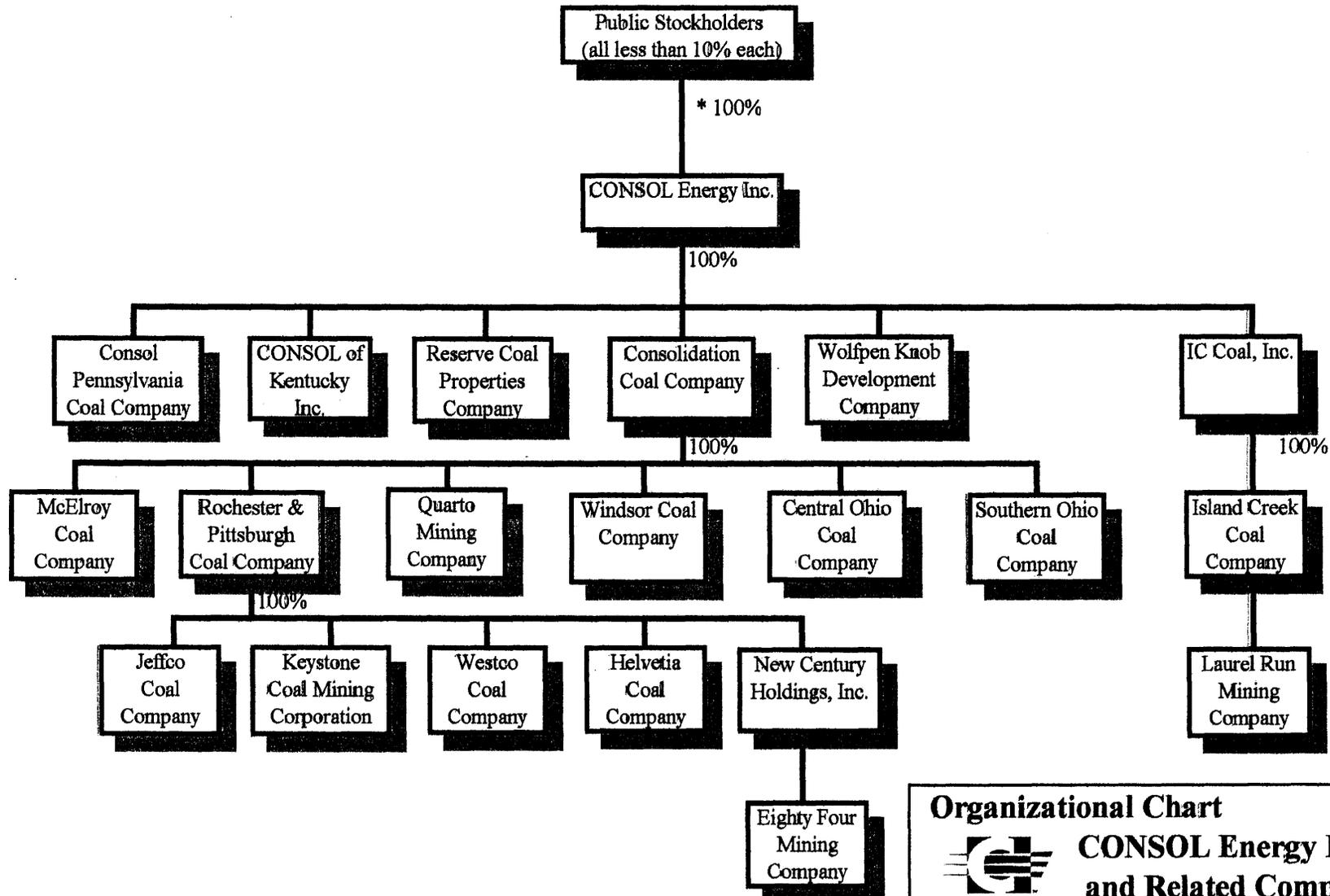
With this information, you can...



If you would like to purchase a Certificate of Existence for this business entity, select the button to the left. You will be assessed a \$12.00 fee for this service. You will need Adobe Reader to view this certificate. If you do not have Adobe Reader, click on the button below and download it.



If you would like to receive information on the principal individuals associated with this entity, click the button on the left. You will be assessed a \$1.00 fee for this information.



### Organizational Chart



## CONSOL Energy Inc. and Related Companies

Revised March 12, 2004 Replaces October 3, 2002

\* Percentages as of February 20, 2004

**Officers, Directors, and Stockholders of  
Central Ohio Coal Company**

**Name:** Consolidation Coal Company  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** FEIN: 13-2566594  
**Title:** Sole Shareholder **Title Effective Date:** 07/02/2001  
**Percent Ownership:** 100% **Ownership Effective Date:** 07/02/2001  
**Ending Date:**

---

**Name:** Gary J. Bench  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** 187-48-7192 **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 07/02/2001  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Rodney E. Ford  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 06/15/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Paige M. Greene  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 12/01/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** J. Brett Harvey  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Director **Title Effective Date:** 07/02/2001  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Peter B. Lilly  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Director **Title Effective Date:** 11/01/2002  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

Officers, Directors, and Stockholders of  
Central Ohio Coal Company

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25-Mar-04

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: President Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Lloyd C. Price  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: John M. Reilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Treasurer Title Effective Date: 07/02/2001  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Walter J. Scheller  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: John W. Schlueter  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Samuel P. Skeen  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Secretary Title Effective Date: 01/16/2004  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
Central Ohio Coal Company

25-Mar-04

**Name:** William D. Stanhagen  
**Address:** 1800 Washington Road.  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a  
**Title:** Vice President  
**Percent Ownership:** zero  
**Ending Date:**  
**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Ownership Effective Date:**

---

**Name:** Stephen E. Williams  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a  
**Title:** Director  
**Percent Ownership:** zero  
**Ending Date:**  
**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Ownership Effective Date:**

---

**Name:** John F. Zachwieja  
**Address:** 172 Route 519  
Eighty Four PA 15330  
**Telephone:** 724-206-2005  
**Social Security No:** n/a  
**Title:** Vice President  
**Percent Ownership:** zero  
**Ending Date:**  
**FEIN:**  
**Title Effective Date:** 12/01/2003  
**Ownership Effective Date:**

---

Officers, Directors, and Stockholders of  
CONSOL Energy Inc.

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25-Mar-04

Name: James E. Altmeyer  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 11/07/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Philip W. Baxter  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 08/01/1999  
Percent Ownership: <10% Ownership Effective Date:  
Ending Date:

---

Name: Gary J. Bench  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: 187-48-7192 FEIN:  
Title: Assistant Secretary Title Effective Date: 11/01/1999  
Percent Ownership: <10% Ownership Effective Date:  
Ending Date:

---

Name: Frank P. Burke  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 09/30/2000  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Rowland H. Burns, Jr.  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 09/30/2000  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: William E. Davis  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 01/20/2004  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
CONSOL Energy Inc.

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25-Mar-04

Name: Nicholas J. Deluliis  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 01/01/2002  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Danny L. Fassio  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: 182-38-2744 FEIN:  
Title: Vice President Title Effective Date: 11/01/1999  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Paige M. Greene  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 12/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Raj K. Gupta  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 02/23/2004  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Patricia A. Hammick  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 06/11/2001  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: J. Brett Harvey  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Pres,CEO,& Dir. Title Effective Date: 01/01/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
CONSOL Energy Inc.

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25-Mar-04

Name: Thomas F. Hoffman  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: 202-36-9233 FEIN:  
Title: Vice President Title Effective Date: 09/30/2000  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Jack A. Holt  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 09/30/2000  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: James D. Kingsley  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 09/30/2000  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Chief Operating Officer Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: William J. Lyons  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Senior Vice President Title Effective Date: 12/01/2000  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: William J. Lyons  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Chief Financial Officer Title Effective Date: 12/01/2000  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
CONSOL Energy Inc.

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25-Mar-04

Name: William J. Lyons  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Controller Title Effective Date: 01/01/1995  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: William P. Powell  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 01/20/2004  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Robert F. Pusateri  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 09/30/2000  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: John M. Reilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Treasurer Title Effective Date: 10/23/2002  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: William G. Rieland  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 09/30/2000  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Walter J. Scheller  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 04/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
CONSOL Energy Inc.

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25-Mar-04

Name: William J. Lyons  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Controller Title Effective Date: 01/01/1995  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: William P. Powell  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 01/20/2004  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Robert F. Pusateri  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 09/30/2000  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: John M. Reilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Treasurer Title Effective Date: 10/23/2002  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: William G. Rieland  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 09/30/2000  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Walter J. Scheller  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 04/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
CONSOL Energy Inc.

25-Mar-04

Name: **Ronald E. Smith**  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: 503-52-8341  
Title: Executive VP  
Percent Ownership: n/a  
Ending Date:  
FEIN:  
Title Effective Date: 09/30/2000  
Ownership Effective Date:

---

Name: **Ronald G. Stovash**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: 211-36-5558  
Title: Senior Vice President  
Percent Ownership: n/a  
Ending Date:  
FEIN:  
Title Effective Date: 12/01/2003  
Ownership Effective Date:

---

Name: **John L. Whitmire**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a  
Title: Director  
Percent Ownership: <10%  
Ending Date:  
FEIN:  
Title Effective Date: 03/03/1999  
Ownership Effective Date:

---

Name: **Joseph T. Williams**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a  
Title: Director  
Percent Ownership: n/a  
Ending Date:  
FEIN:  
Title Effective Date: 01/20/2004  
Ownership Effective Date:

---

Name: **Stephen E. Williams**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No:  
Title: Secretary  
Percent Ownership: n/a  
Ending Date:  
FEIN:  
Title Effective Date: 04/01/2003  
Ownership Effective Date:

---

Name: **Stephen E. Williams**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No:  
Title: Vice President  
Percent Ownership: n/a  
Ending Date:  
FEIN:  
Title Effective Date: 04/01/2003  
Ownership Effective Date:

---

**Officers, Directors, and Stockholders of  
CONSOL Energy Inc.**

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25-Mar-04

**Name:** Stephen E. Williams  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** FEIN:  
**Title:** General Counsel **Title Effective Date:** 04/01/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Stephen G. Young  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** 234-54-4913 **FEIN:**  
**Title:** Vice President **Title Effective Date:** 09/30/2000  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

Officers, Directors, and Stockholders of  
CONSOL of Kentucky Inc.

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25-Mar-04

Name: CONSOL Energy Inc.  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: (412) 831-4000  
Social Security No: FEIN: 51-0337383  
Title: Sole Shareholder Title Effective Date: 01/01/1993  
Percent Ownership: 100% Ownership Effective Date: 1/1/2001  
Ending Date:

---

Name: Gary J. Bench  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: 187-48-7192 FEIN:  
Title: Assistant Secretary Title Effective Date: 07/01/2001  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Rodney E. Ford  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Paige M. Greene  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 12/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: J. Brett Harvey  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: (412) 831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 08/31/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
CONSOL of Kentucky Inc.

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25-Mar-04

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: President Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: John M. Reilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: (412) 831-4000  
Social Security No: n/a FEIN:  
Title: Treasurer Title Effective Date: 09/01/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Jack K. Richardson  
Address: 184 Fourmile Branch  
Mousie KY 41839  
Telephone: 606/946-3101  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 12/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Walter J. Scheller  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Samuel P. Skeen  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Secretary Title Effective Date: 01/16/2004  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: William D. Stanhagen  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

**Officers, Directors, and Stockholders of  
CONSOL of Kentucky Inc.**

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25-Mar-04

**Name:** Ronald G. Stovash  
**Address:** 1800 Washington Rd.  
Pittsburgh  
**Telephone:** 412/831-4000  
**Social Security No:** n/a  
**Title:** Vice President  
**Percent Ownership:** n/a  
**Ending Date:**

PA 15241  
**FEIN:**  
**Title Effective Date:** 12/01/2003  
**Ownership Effective Date:**

---

**Name:** Stephen E. Williams  
**Address:** 1800 Washington Road  
Pittsburgh  
**Telephone:** 412-831-4000  
**Social Security No:** n/a  
**Title:** Director  
**Percent Ownership:** zero  
**Ending Date:**

PA 15241  
**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Ownership Effective Date:**

---

**Officers, Directors, and Stockholders of  
Consol Pennsylvania Coal Company**

25-Mar-04

**Name:** CONSOL Energy Inc.  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** **FEIN:** 51-0337383  
**Title:** Sole Shareholder **Title Effective Date:** 01/01/1993  
**Percent Ownership:** 100% **Ownership Effective Date:** 01/01/2001  
**Ending Date:**

---

**Name:** Gary J. Bench  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** 187-48-7192 **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 07/01/2001  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Rodney E. Ford  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 06/15/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Paige M. Greene  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 12/01/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** J. Brett Harvey  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Director **Title Effective Date:** 08/31/1998  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** David D. Hudson  
**Address:** 172 Route 519  
Eighty Four PA 15330  
**Telephone:** 724-206-2005  
**Social Security No:** n/a **FEIN:**  
**Title:** Vice President **Title Effective Date:** 03/01/2002  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

Officers, Directors, and Stockholders of  
Consol Pennsylvania Coal Company

25-Mar-04

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: President Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: John M. Reilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Treasurer Title Effective Date: 11/01/1999  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Walter J. Scheller  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Samuel P. Skeen  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Secretary Title Effective Date: 01/16/2004  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: William D. Stanhagen  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

**Officers, Directors, and Stockholders of  
Consol Pennsylvania Coal Company**

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25-Mar-04

**Name:** Stephen E. Williams  
**Address:** 1800 Washington Road  
Pittsburgh

PA 15241

**Telephone:** 412-831-4000

**Social Security No:** n/a

**FEIN:**

**Title:** Director

**Title Effective Date:** 06/15/2003

**Percent Ownership:** zero

**Ownership Effective Date:**

**Ending Date:**

---

Officers, Directors, and Stockholders of  
Consolidation Coal Company

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25-Mar-04

Name: CONSOL Energy Inc.  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: FEIN: 51-0337383  
Title: Sole Shareholder Title Effective Date: 01/01/1992  
Percent Ownership: 100% Ownership Effective Date: 1/1/2001  
Ending Date:

---

Name: Albert A. Aloia  
Address: 172 Route 519  
Eighty Four PA 15330  
Telephone: 724-206-2005  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 03/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Gary J. Bench  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: 187-48-7192 FEIN:  
Title: Assistant Secretary Title Effective Date: 07/01/2001  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Rodney E. Ford  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Paige M. Greene  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 12/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: J. Brett Harvey  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412 - 831-4000  
Social Security No: n/a FEIN:  
Title: President & Director Title Effective Date: 01/01/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
Consolidation Coal Company

25-Mar-04

Name: David D. Hudson  
Address: 172 Route 519  
Eighty Four PA 15330  
Telephone: 724-206-2005  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 12/01/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Bart J. Hyita  
Address: 172 Route 519  
Eighty Four PA 15330  
Telephone: 724-206-2005  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 03/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Chief Operating Officer - Coal Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: William J. Lyons  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412 - 831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 09/30/2000  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: William J. Lyons  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412 - 831-4000  
Social Security No: n/a FEIN:  
Title: VP & Controller Title Effective Date: 01/01/1995  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

**Officers, Directors, and Stockholders of  
Consolidation Coal Company**

25-Mar-04

**Name:** James J. McCaffrey  
**Address:** 172 Route 519  
Eighty Four PA 15330  
**Telephone:** 724-206-2005  
**Social Security No:** n/a **FEIN:**  
**Title:** Vice President **Title Effective Date:** 03/01/2002  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** John M. Reilly  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** (412) 831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Director **Title Effective Date:** 07/10/2002  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** John M. Reilly  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412 - 831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Treasurer **Title Effective Date:** 11/01/1999  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Walter J. Scheller  
**Address:** 172 Route 519  
Eighty Four PA 15330  
**Telephone:** 724-206-2005  
**Social Security No:** n/a **FEIN:**  
**Title:** Vice President **Title Effective Date:** 03/01/2002  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Samuel P. Skeen  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** 236-76-7594 **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 06/01/1995  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Ronald E. Smith  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412 - 831-4000  
**Social Security No:** 503-52-8341 **FEIN:**  
**Title:** Director **Title Effective Date:** 02/01/1999  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

Officers, Directors, and Stockholders of  
Consolidation Coal Company

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25-Mar-04

Name: William D. Stanhagen  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Ronald G. Stovash  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 12/01/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Ronald G. Stovash  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 12/01/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Stephen E. Williams  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Stephen E. Williams  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Stephen E. Williams  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Secretary Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

**Officers, Directors, and Stockholders of  
Consolidation Coal Company**

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25-Mar-04

**Name:** John F. Zachwieja  
**Address:** 172 Route 519  
Eighty Four  
**Telephone:** 724-206-2005  
**Social Security No:** n/a  
**Title:** Vice President  
**Percent Ownership:** zero  
**Ending Date:**

PA 15330  
**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Ownership Effective Date:**

---

**Name:** John F. Zachwieja  
**Address:** 172 Route 519  
Eighty Four  
**Telephone:** 724-206-2005  
**Social Security No:** n/a  
**Title:** General Manager  
**Percent Ownership:** zero  
**Ending Date:**

PA 15330  
**FEIN:**  
**Title Effective Date:** 03/01/2002  
**Ownership Effective Date:**

---

Officers, Directors, and Stockholders of  
Eighty Four Mining Company

25-Mar-04

Name: **New Century Holdings, Inc.**  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: FEIN: 51-0344312  
Title: Sole shareholder Title Effective Date: 12/21/1992  
Percent Ownership: 100 % Ownership Effective Date:  
Ending Date:

---

Name: **Gary J. Bench**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: 187-48-7192 FEIN:  
Title: Assistant Secretary Title Effective Date: 07/01/2001  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **Rodney E. Ford**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: **Paige M. Greene**  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 12/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: **J. Brett Harvey**  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 09/22/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **David D. Hudson**  
Address: 172 Route 519  
Eighty Four PA 15330  
Telephone: 724-206-2005  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 12/01/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
Eighty Four Mining Company

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25-Mar-04

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: President Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: John M. Reilly  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Treasurer Title Effective Date: 11/01/1999  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Walter J. Scheller  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Samuel P. Skeen  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Secretary Title Effective Date: 01/16/2004  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Ronald E. Smith  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: 503-52-8341 FEIN:  
Title: Director Title Effective Date: 09/22/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

**Officers, Directors, and Stockholders of  
Eighty Four Mining Company**

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25-Mar-04

**Name:** William D. Stanhagen

**Address:** 1800 Washington Rd.  
Pittsburgh

PA 15241

**Telephone:** 412-831-4000

**Social Security No:** n/a

**FEIN:**

**Title:** Vice President

**Title Effective Date:** 06/15/2003

**Percent Ownership:** zero

**Ownership Effective Date:**

**Ending Date:**

---

**Name:** Stephen E. Williams

**Address:** 1800 Washington Road  
Pittsburgh

PA 15241

**Telephone:** 412-831-4000

**Social Security No:** n/a

**FEIN:**

**Title:** Director

**Title Effective Date:** 06/15/2003

**Percent Ownership:** zero

**Ownership Effective Date:**

**Ending Date:**

---

**Officers, Directors, and Stockholders of  
Helvetia Coal Company**

25-Mar-04

**Name:** Rochester & Pittsburgh Coal Company  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** FEIN: 25-0761480  
**Title:** Sole shareholder **Title Effective Date:** 04/07/1966  
**Percent Ownership:** 100% **Ownership Effective Date:** 04/07/1966  
**Ending Date:**

---

**Name:** Gary J. Bench  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** 187-48-7192 **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 07/01/2001  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Rowland H. Burns, Jr.  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Secretary **Title Effective Date:** 09/22/1998  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Rodney E. Ford  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 06/15/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Paige M. Greene  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 12/01/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** J. Brett Harvey  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Director **Title Effective Date:** 09/22/1998  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

Officers, Directors, and Stockholders of  
Helvetia Coal Company

Name: Bart J. Hyita  
Address: 172 Route 519  
Eighty Four PA 15330  
Telephone: 724-206-2005  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 12/01/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: President Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: William J. Lyons  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 08/02/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: William J. Lyons  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: (412) 831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 07/10/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Lloyd C. Price  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
Helvetia Coal Company

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25-Mar-04

Name: John M. Reilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Treasurer Title Effective Date: 11/01/1999  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Walter J. Scheller  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: John W. Schlueter  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: William D. Stanhagen  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

**Officers, Directors, and Stockholders of  
IC Coal, Inc.**

25-Mar-04

---

**Name:** CONSOL Energy Inc.  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** FEIN: 51-0337383  
**Title:** Sole Shareholder **Title Effective Date:** 01/01/2001  
**Percent Ownership:** 100% **Ownership Effective Date:** 1/1/2001  
**Ending Date:**

---

**Name:** Gary J. Bench  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** 187-48-7192 **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 07/01/2001  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Paige M. Greene  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 12/01/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** J. Brett Harvey  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Director **Title Effective Date:** 11/01/1998  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** William J. Lyons  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** VP; Controller **Title Effective Date:** 01/01/1995  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** John M. Reilly  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Treasurer **Title Effective Date:** 11/01/1999  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

Officers, Directors, and Stockholders of  
IC Coal, Inc.

25-Mar-04

Name: **Ronald E. Smith**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 12/01/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **Ronald E. Smith**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: President Title Effective Date: 08/02/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **Stephen E. Williams**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Secretary Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **Stephen E. Williams**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **Stephen E. Williams**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
Island Creek Coal Company

25-Mar-04

Name: IC Coal, Inc.  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: FEIN: 95-2917408  
Title: sole shareholder Title Effective Date: 03/31/2000  
Percent Ownership: 100% Ownership Effective Date: 3/31/2000  
Ending Date:

---

Name: Gary J. Bench  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: 187-48-7192 FEIN:  
Title: Assistant Secretary Title Effective Date: 07/01/2001  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Rodney E. Ford  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Paige M. Greene  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 12/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: J. Brett Harvey  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 08/31/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
Island Creek Coal Company

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25-Mar-04

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: President Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: John M. Reilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Treasurer Title Effective Date: 07/01/1993  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Walter J. Scheller  
Address: 1800 Washington Road  
Pittsburgh PA : 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Samuel P. Skeen  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Secretary Title Effective Date: 01/16/2004  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: William D. Stanhagen  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Ronald G. Stovash  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 12/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

**Officers, Directors, and Stockholders of  
Island Creek Coal Company**

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25-Mar-04

**Name:** Terry L. Suder  
**Address:** Route 460  
Oakwood  
**Telephone:** 276/498-8205  
**Social Security No:** n/a  
**Title:** Vice President  
**Percent Ownership:** zero  
**Ending Date:**

VA 24631  
**FEIN:**  
**Title Effective Date:** 12/01/2003  
**Ownership Effective Date:**

---

**Name:** Stephen E. Williams  
**Address:** 1800 Washington Road  
Pittsburgh  
**Telephone:** 412-831-4000  
**Social Security No:** n/a  
**Title:** Director  
**Percent Ownership:** zero  
**Ending Date:**

PA 15241  
**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Ownership Effective Date:**

---

**Officers, Directors, and Stockholders of  
Jeffco Coal Company**

25-Mar-04

**Name:** Rochester & Pittsburgh Coal Company  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** FEIN: 25-0761480  
**Title:** Sole shareholder **Title Effective Date:** 06/01/1980  
**Percent Ownership:** 100% **Ownership Effective Date:** 6/1/1980  
**Ending Date:**

---

**Name:** Gary J. Bench  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** 187-48-7192 **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 07/01/2001  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Rodney E. Ford  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 06/15/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Paige M. Greene  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 12/01/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** J. Brett Harvey  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Director **Title Effective Date:** 09/22/1998  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** William J. Lyons  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** V.P., Controller **Title Effective Date:** 09/22/1998  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Officers, Directors, and Stockholders of  
Jeffco Coal Company**

25-Mar-04

**Name:** Lloyd C. Price  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a  
**Title:** Vice President  
**Percent Ownership:** n/a  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Ownership Effective Date:**

---

**Name:** John M. Reilly  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a  
**Title:** Treasurer  
**Percent Ownership:** zero  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 11/01/1999  
**Ownership Effective Date:**

---

**Name:** Walter J. Scheller  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a  
**Title:** Vice President  
**Percent Ownership:** n/a  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Ownership Effective Date:**

---

**Name:** John W. Schlueter  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a  
**Title:** Vice President  
**Percent Ownership:** n/a  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Ownership Effective Date:**

---

**Name:** Ronald E. Smith  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** 503-52-8341  
**Title:** Director  
**Percent Ownership:** zero  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 11/01/1999  
**Ownership Effective Date:**

---

**Name:** William D. Stanhagen  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a  
**Title:** President  
**Percent Ownership:** zero  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 12/01/2003  
**Ownership Effective Date:**

---

Officers, Directors, and Stockholders of  
Jeffco Coal Company

25-Mar-04

Name: Stephen E. Williams  
Address: 1800 Washington Road  
Pittsburgh  
Telephone: 412-831-4000  
Social Security No: n/a  
Title: Director  
Percent Ownership: zero  
Ending Date:

PA 15241  
FEIN:  
Title Effective Date: 06/15/2003  
Ownership Effective Date:

---

Name: Stephen E. Williams  
Address: 1800 Washington Road  
Pittsburgh  
Telephone: 412-831-4000  
Social Security No: n/a  
Title: Secretary  
Percent Ownership: zero  
Ending Date:

PA 15241  
FEIN:  
Title Effective Date: 06/15/2003  
Ownership Effective Date:

---

Name: Stephen E. Williams  
Address: 1800 Washington Road  
Pittsburgh  
Telephone: 412-831-4000  
Social Security No: n/a  
Title: Vice President  
Percent Ownership: zero  
Ending Date:

PA 15241  
FEIN:  
Title Effective Date: 06/15/2003  
Ownership Effective Date:

---

Officers, Directors, and Stockholders of  
Keystone Coal Mining Corporation

25-Mar-04

Name: Rochester & Pittsburgh Coal Company  
Address: 1800 Washington Rd  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: FEIN: 25-0761480  
Title: Sole shareholder Title Effective Date: 08/08/1977  
Percent Ownership: 100% Ownership Effective Date: 08/08/1977  
Ending Date:

---

Name: Gary J. Bench  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: 187-48-7192 FEIN:  
Title: Assistant Secretary Title Effective Date: 07/01/2001  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Rowland H. Burns, Jr.  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Secretary Title Effective Date: 09/22/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Rodney E. Ford  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Paige M. Greene  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 12/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: J. Brett Harvey  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 09/22/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
Keystone Coal Mining Corporation

Name: **Bart J. Hyita**  
Address: 172 Route 519  
Eighty Four PA 15330  
Telephone: 724-206-2005  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 12/01/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **Peter B. Lilly**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **Peter B. Lilly**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: President Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **Lloyd C. Price**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: **John M. Reilly**  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Treasurer Title Effective Date: 11/01/1999  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **Walter J. Scheller**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

**Officers, Directors, and Stockholders of  
Keystone Coal Mining Corporation**

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25-Mar-04

**Name:** John W. Schlueter  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a  
**Title:** Vice President  
**Percent Ownership:** n/a  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Ownership Effective Date:**

---

**Name:** William D. Stanhagen  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a  
**Title:** Vice President  
**Percent Ownership:** zero  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Ownership Effective Date:**

---

**Name:** Stephen E. Williams  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a  
**Title:** Director  
**Percent Ownership:** zero  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 12/01/2003  
**Ownership Effective Date:**

---

Officers, Directors, and Stockholders of  
Laurel Run Mining Company

Name: **Island Creek Coal Company**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: FEIN: 55-0479426  
Title: sole shareholder Title Effective Date:  
Percent Ownership: 100% Ownership Effective Date: 07/01/1993  
Ending Date:

---

Name: **Gary J. Bench**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: 187-48-7192 FEIN:  
Title: Assistant Secretary Title Effective Date: 07/01/2001  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **Rodney E. Ford**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: **Paige M. Greene**  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 12/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: **J. Brett Harvey**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 08/31/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **William J. Lyons**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Controller Title Effective Date: 07/01/1993  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
Laurel Run Mining Company

25-Mar-04

Name: Lloyd C. Price  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: John M. Reilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Treasurer Title Effective Date: 07/01/1993  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Walter J. Scheller  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: John W. Schlueter  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Ronald E. Smith  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: 503-52-8341 FEIN:  
Title: President Title Effective Date: 11/01/1999  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Ronald E. Smith  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: 503-52-8341 FEIN:  
Title: Director Title Effective Date: 07/01/1993  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
Laurel Run Mining Company

25-Mar-04

Name: William D. Stanhagen  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Ronald G. Stovash  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 12/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Ronald G. Stovash  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 12/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Terry L. Suder  
Address: Route 460  
Oakwood VA 24631  
Telephone: 276/498-8205  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 12/01/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Robert M. Vukas  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: 235-80-9868 FEIN:  
Title: Secretary Title Effective Date: 07/01/1994  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Stephen E. Williams  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 12/01/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

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Officers, Directors, and Stockholders of  
McElroy Coal Company

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25-Mar-04

Name: Consolidation Coal Company  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: FEIN: 13-2566594  
Title: Sole Shareholder Title Effective Date: 06/30/1987  
Percent Ownership: 100% Ownership Effective Date: 06/30/1987  
Ending Date:

---

Name: Gary J. Bench  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: 187-48-7192 FEIN:  
Title: Assistant Secretary Title Effective Date: 07/01/2001  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Rodney E. Ford  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Paige M. Greene  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 12/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: J. Brett Harvey  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 08/31/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

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Officers, Directors, and Stockholders of  
McElroy Coal Company

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25-Mar-04

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: President Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: John M. Reilly  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Treasurer Title Effective Date: 09/01/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Walter J. Scheller  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Samuel P. Skeen  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Secretary Title Effective Date: 01/16/2004  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: William D. Stanhagen  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Stephen E. Williams  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

**Officers, Directors, and Stockholders of  
McElroy Coal Company**

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25-Mar-04

**Name:** John F. Zachwieja

**Address:** 172 Route 519

Eighty Four

PA 15330

**Telephone:** 724-206-2005

**Social Security No:** n/a

**FEIN:**

**Title:** Vice President

**Title Effective Date:** 12/01/2003

**Percent Ownership:** zero

**Ownership Effective Date:**

**Ending Date:**

---

**Officers, Directors, and Stockholders of  
New Century Holdings, Inc.**

25-Mar-04

**Name:** Rochester & Pittsburgh Coal Company  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** FEIN: 25-0761480  
**Title:** Sole shareholder **Title Effective Date:** 11/20/1992  
**Percent Ownership:** 100% **Ownership Effective Date:** 11/20/1992  
**Ending Date:**

---

**Name:** Gary J. Bench  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** 187-48-7192 **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 07/01/2001  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** John P. Garniewski  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 11/01/1999  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Paige M. Greene  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 12/01/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** J. Brett Harvey  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** President **Title Effective Date:** 12/01/2003  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** J. Brett Harvey  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Director **Title Effective Date:** 09/22/1998  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

Officers, Directors, and Stockholders of  
New Century Holdings, Inc.

25-Mar-04

Name: William J. Lyons  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 09/30/2000  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: William J. Lyons  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: V.P., Controller Title Effective Date: 09/22/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: John M. Reilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 12/01/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: John M. Reilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Treasurer Title Effective Date: 11/01/1999  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Stephen E. Williams  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Stephen E. Williams  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

**Officers, Directors, and Stockholders of  
New Century Holdings, Inc.**

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25-Mar-04

**Name:** Stephen E. Williams  
**Address:** 1800 Washington Road

Pittsburgh

PA 15241

**Telephone:** 412-831-4000

**Social Security No:** n/a

**FEIN:**

**Title:** Secretary

**Title Effective Date:** 06/15/2003

**Percent Ownership:** zero

**Ownership Effective Date:**

**Ending Date:**

---

**Officers, Directors, and Stockholders of  
Quarto Mining Company**

25-Mar-04

Name: **Consolidation Coal Company**  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: FEIN: 13-2566594  
Title: Sole Shareholder Title Effective Date: 04/10/1987  
Percent Ownership: 100% Ownership Effective Date: 04/10/1987  
Ending Date:

---

Name: **Gary J. Bench**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: 187-48-7192 FEIN:  
Title: Assistant Secretary Title Effective Date: 07/01/2001  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **Rodney E. Ford**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: **Paige M. Greene**  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 12/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: **J. Brett Harvey**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 08/31/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **Bart J. Hyita**  
Address: 172 Route 519  
Eighty Four PA 15330  
Telephone: 724-206-2005  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 12/01/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
Quarto Mining Company

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25-Mar-04

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: President Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: William J. Lyons  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President and Controller Title Effective Date: 01/01/1995  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Lloyd C. Price  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: John M. Reilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Treasurer Title Effective Date: 11/01/1999  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Walter J. Scheller  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

**Officers, Directors, and Stockholders of  
Quarto Mining Company**

25-Mar-04

**Name:** John W. Schlueter  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a  
**Title:** Vice President  
**Percent Ownership:** n/a  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Ownership Effective Date:**

---

**Name:** Samuel P. Skeen  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a  
**Title:** Secretary  
**Percent Ownership:** zero  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 01/16/2004  
**Ownership Effective Date:**

---

**Name:** William D. Stanhagen  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a  
**Title:** Vice President  
**Percent Ownership:** zero  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Ownership Effective Date:**

---

**Name:** Stephen E. Williams  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a  
**Title:** Director  
**Percent Ownership:** zero  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 12/01/2003  
**Ownership Effective Date:**

---

Officers, Directors, and Stockholders of  
Reserve Coal Properties Company

25-Mar-04

Name: **CONSOL Energy Inc.**  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: FEIN: 51-0337383  
Title: Sole Shareholder Title Effective Date: 01/01/1993  
Percent Ownership: 100% Ownership Effective Date: 01/01/2001  
Ending Date:

---

Name: **Gary J. Bench**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: 187-48-7192 FEIN:  
Title: Assistant Secretary Title Effective Date: 07/01/2001  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **Rodney E. Ford**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: **Paige M. Greene**  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 12/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: **J. Brett Harvey**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 11/01/1999  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **Lloyd C. Price**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
Reserve Coal Properties Company

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25-Mar-04

Name: **Walter J. Scheller**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: **John W. Schlueter**  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 05/29/1992  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **John W. Schlueter**  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 02/15/1989  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **Samuel P. Skeen**  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: 236-76-7594 FEIN:  
Title: Secretary Title Effective Date: 08/24/1988  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **William D. Stanhagen**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: (412) 831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 12/01/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: **William D. Stanhagen**  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: (412) 831-4000  
Social Security No: n/a FEIN:  
Title: President Title Effective Date: 12/01/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
Rheinbraun AG

25-Mar-04

Name: **Rudolf Bertram**  
Address: Stuttgartweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:

FEIN:  
Title Effective Date: 10/01/2000  
Ownership Effective Date:

---

Name: **Dietrich Böcker**  
Address: Stuttgartweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Vorstand  
Percent Ownership: zero  
Ending Date:

FEIN:  
Title Effective Date: 01/01/1992  
Ownership Effective Date:

---

Name: **Walther Boecker**  
Address: Stuttgartweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:

FEIN:  
Title Effective Date: 10/01/2000  
Ownership Effective Date:

---

Name: **Berthold A. Bonekamp**  
Address: Stuttgartweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Chairman of Vorstand  
Percent Ownership: n/a  
Ending Date:

FEIN:  
Title Effective Date: 10/19/1999  
Ownership Effective Date:

---

Name: **Bernd Jobst Breloer**  
Address: Stuttgartweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Vorstand  
Percent Ownership: zero  
Ending Date:

FEIN:  
Title Effective Date: 01/01/1993  
Ownership Effective Date:

---

Name: **Wilfried EBer**  
Address: Stuttgartweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:

FEIN:  
Title Effective Date: 09/02/1998  
Ownership Effective Date:

---

Officers, Directors, and Stockholders of  
Rheinbraun AG

25-Mar-04

Name: Dieter Faust  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:

FEIN:  
Title Effective Date: 06/27/2002  
Ownership Effective Date:

Name: Horst Grosspeter  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:

FEIN:  
Title Effective Date: 10/01/2000  
Ownership Effective Date:

Name: Norbert Haak  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:

FEIN:  
Title Effective Date: 01/18/2001  
Ownership Effective Date:

Name: Manfred Holz  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:

FEIN:  
Title Effective Date: 09/05/2000  
Ownership Effective Date:

Name: Hans Peter Lafos  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:

FEIN:  
Title Effective Date: 06/27/2002  
Ownership Effective Date:

Name: Johannes Lambertz  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Vorstand  
Percent Ownership: zero  
Ending Date:

FEIN:  
Title Effective Date: 04/01/2002  
Ownership Effective Date:

Officers, Directors, and Stockholders of  
Rheinbraun AG

25-Mar-04

Name: Hans-Detlef Loosz  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:  
FEIN:  
Title Effective Date: 06/27/2002  
Ownership Effective Date:

---

Name: Gert Maichel  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Chairman of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:  
FEIN:  
Title Effective Date: 10/01/2000  
Ownership Effective Date:

---

Name: Carl Meulenbergh  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:  
FEIN:  
Title Effective Date: 10/01/2000  
Ownership Effective Date:

---

Name: Edgar Moron  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:  
FEIN:  
Title Effective Date: 11/16/2000  
Ownership Effective Date:

---

Name: Alfons Müller  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:  
FEIN:  
Title Effective Date: 01/01/1992  
Ownership Effective Date:

---

Name: Wilhelm Nölling  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:  
FEIN:  
Title Effective Date: 01/01/1992  
Ownership Effective Date:

---

Officers, Directors, and Stockholders of  
Rheinbraun AG

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25-Mar-04

Name: Alfred Freiherr von Oppenheim  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:  
FEIN:  
Title Effective Date: 01/01/1992  
Ownership Effective Date:

---

Name: Dieter Patt  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:  
FEIN:  
Title Effective Date: 10/01/2000  
Ownership Effective Date:

---

Name: RWE AG  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Sole Shareholder  
Percent Ownership: 100%  
Ending Date:  
FEIN:  
Title Effective Date: 01/01/1992  
Ownership Effective Date:

---

Name: Fritz Schramma  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:  
FEIN:  
Title Effective Date: 09/19/2001  
Ownership Effective Date:

---

Name: Hermann-Josef Sester  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:  
FEIN:  
Title Effective Date: 06/27/2002  
Ownership Effective Date:

---

Name: Gerd Spaniol  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Vorstand  
Percent Ownership: zero  
Ending Date:  
FEIN:  
Title Effective Date: 02/15/2001  
Ownership Effective Date:

---

Officers, Directors, and Stockholders of  
Rheinbraun AG

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25-Mar-04

Name: Klaus-Dieter Südhofer  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:

FEIN:  
Title Effective Date: 01/01/1992  
Ownership Effective Date:

---

Name: Horst R. Wolf  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:

FEIN:  
Title Effective Date: 10/01/2000  
Ownership Effective Date:

---

Name: Jan Zilius  
Address: Stuttgenweg 2  
50935 Köln (Lindenthal), Germany  
Telephone: 011 49 221-4801  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: zero  
Ending Date:

FEIN:  
Title Effective Date: 09/21/1998  
Ownership Effective Date:

---

**Officers, Directors, and Stockholders of  
Rheinbraun US GmbH**

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25-Mar-04

**Name:** Achim Görtz  
**Address:** Stuttgenweg 2  
50935 Koln (Lindenthal), Germany  
**Telephone:** 011 49 221-4801  
**Social Security No:** n/a  
**Title:** Geschäftsführer  
**Percent Ownership:** zero  
**Ending Date:** 01/01/2002

**FEIN:**  
**Title Effective Date:** 01/01/2001  
**Ownership Effective Date:**

---

**Name:** Rheinbraun AG  
**Address:** Stuttgenweg 2  
50935 Koln (Lindenthal), Germany  
**Telephone:** 011 49 221-4801  
**Social Security No:** n/a  
**Title:** Sole Shareholder  
**Percent Ownership:** 100%  
**Ending Date:** 01/01/2002

**FEIN:**  
**Title Effective Date:** 06/20/1995  
**Ownership Effective Date:** 06/20/1995

---

**Name:** Rolf Zimmermann  
**Address:** Stuttgenweg 2  
50935 Koln (Lindenthal), Germany  
**Telephone:** 011 49 221-4801  
**Social Security No:** n/a  
**Title:** Geschäftsführer  
**Percent Ownership:** zero  
**Ending Date:** 01/01/2002

**FEIN:**  
**Title Effective Date:** 03/23/1994  
**Ownership Effective Date:**

---

**Officers, Directors, and Stockholders of  
Rochester & Pittsburgh Coal Company**

25-Mar-04

**Name:** Consolidation Coal Company  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** FEIN: 13-2566594  
**Title:** Sole shareholder **Title Effective Date:** 09/22/1998  
**Percent Ownership:** 100% **Ownership Effective Date:** 09/22/1998  
**Ending Date:**

---

**Name:** Gary J. Bench  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** 187-48-7192 **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 07/01/2001  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Rodney E. Ford  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 06/15/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Paige M. Greene  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 12/01/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** J. Brett Harvey  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Director and President **Title Effective Date:** 09/22/1998  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Bart J. Hyita  
**Address:** 172 Route 519  
Eighty Four PA 15330  
**Telephone:** 724-206-2005  
**Social Security No:** n/a **FEIN:**  
**Title:** Vice President **Title Effective Date:** 12/01/2003  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Officers, Directors, and Stockholders of  
Rochester & Pittsburgh Coal Company**

**Name:** William J. Lyons  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Director **Title Effective Date:** 12/01/2003  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** William J. Lyons  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Vice President and Controller **Title Effective Date:** 09/22/1998  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Lloyd C. Price  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Vice President **Title Effective Date:** 06/15/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** John M. Reilly  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Treasurer **Title Effective Date:** 11/01/1999  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** John W. Schlueter  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Vice President **Title Effective Date:** 12/01/2003  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Ronald E. Smith  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** 503-52-8341 **FEIN:**  
**Title:** Director **Title Effective Date:** 11/01/1999  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Officers, Directors, and Stockholders of  
Rochester & Pittsburgh Coal Company**

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25-Mar-04

**Name:** William D. Stanhagen  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a  
**Title:** Vice President  
**FEIN:**  
**Title Effective Date:** 09/22/1998  
**Percent Ownership:** zero  
**Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Stephen E. Williams  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a  
**Title:** Director  
**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Percent Ownership:** zero  
**Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Stephen E. Williams  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a  
**Title:** Vice President  
**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Percent Ownership:** zero  
**Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Stephen E. Williams  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a  
**Title:** Secretary  
**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Percent Ownership:** zero  
**Ownership Effective Date:**  
**Ending Date:**

---

Officers, Directors, and Stockholders of  
RWE AG

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25-Mar-04

Name: Paul Achleitner  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 09/11/2000  
Ownership Effective Date:

Name: Carl-Ludwig von Boehm-Bezing  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 01/05/2001  
Ownership Effective Date:

Name: Franz Bsirske  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 01/09/2001  
Ownership Effective Date:

Name: Burkhard Drescher  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 01/05/2001  
Ownership Effective Date:

Name: Wilfried Eickenberg  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 11/08/2001  
Ownership Effective Date:

Name: Ralf Hiltenkamp  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 05/23/2001  
Ownership Effective Date:

Officers, Directors, and Stockholders of  
RWE AG

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25-Mar-04

Name: Heinz-Eberhard Holl  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 09/11/2000  
Ownership Effective Date:

Name: Berthold Huber  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 01/09/2001  
Ownership Effective Date:

Name: Richard R. Klein  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Vorstand  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 11/24/2000  
Ownership Effective Date:

Name: Berthold Krell  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 01/09/2001  
Ownership Effective Date:

Name: Dietmar Kuhnt  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Chairman of Vorstand  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 01/01/1995  
Ownership Effective Date:

Name: Gerhard Langemeyer  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 01/05/2001  
Ownership Effective Date:

Officers, Directors, and Stockholders of  
RWE AG

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25-Mar-04

Name: Gert Maichel  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Vorstand  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 11/24/2000  
Ownership Effective Date:

---

Name: Friedel Neuber  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 12/10/1992  
Ownership Effective Date:

---

Name: Josef Pitz  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 11/08/2001  
Ownership Effective Date:

---

Name: Wolfgang Reiniger  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 01/05/2001  
Ownership Effective Date:

---

Name: Manfred Rimmel  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Vorstand  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 11/24/2000  
Ownership Effective Date:

---

Name: Günter Reppien  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 01/09/2001  
Ownership Effective Date:

---

Officers, Directors, and Stockholders of  
RWE AG

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25-Mar-04

Name: **Bernhard von Rothkirch**  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 01/09/2001  
Ownership Effective Date:

Name: **Manfred Schneider**  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 12/10/1992  
Ownership Effective Date:

Name: **Klaus Sturany**  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Vorstand  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 09/11/2000  
Ownership Effective Date:

Name: **Klaus-Dieter Südhofer**  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 01/09/2001  
Ownership Effective Date:

Name: **Alfons Friedrich Titzrath**  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 01/05/2001  
Ownership Effective Date:

Name: **Karel Van Miert**  
Address: Kruppstrasse 5  
45128 Essen, Germany  
Telephone: 011 49 201-1850  
Social Security No: n/a  
Title: Member of Aufsichtsrat  
Percent Ownership: N/A  
Ending Date:

FEIN:  
Title Effective Date: 06/07/2001  
Ownership Effective Date:

**Officers, Directors, and Stockholders of  
RWE AG**

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25-Mar-04

**Name:** Erwin Winkel  
**Address:** Kruppstrasse 5  
45128 Essen, Germany  
**Telephone:** 011 49 201-1850  
**Social Security No:** n/a  
**Title:** Member of Aufsichtsrat  
**Percent Ownership:** N/A  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 09/11/2000  
**Ownership Effective Date:**

---

**Name:** Jan Zilius  
**Address:** Kruppstrasse 5  
45128 Essen, Germany  
**Telephone:** 011 49 201-1850  
**Social Security No:** n/a  
**Title:** Member of Vorstand  
**Percent Ownership:** N/A  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 09/11/2000  
**Ownership Effective Date:**

---

Officers, Directors, and Stockholders of  
Southern Ohio Coal Company

25-Mar-04

Name: Consolidation Coal Company  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: FEIN: 13-2566594  
Title: Sole Shareholder Title Effective Date: 07/02/2001  
Percent Ownership: 100% Ownership Effective Date: 07/02/2001  
Ending Date:

---

Name: Gary J. Bench  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: 187-48-7192 FEIN:  
Title: Assistant Secretary Title Effective Date: 07/02/2001  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Rodney E. Ford  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Paige M. Greene  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Assistant Secretary Title Effective Date: 12/01/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: J. Brett Harvey  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 07/02/2001  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Bart J. Hyita  
Address: 172 Route 519  
Eighty Four PA 15330  
Telephone: 724-206-2005  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 12/01/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
Southern Ohio Coal Company

25-Mar-04

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: President Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Lloyd C. Price  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: John M. Reilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Treasurer Title Effective Date: 07/02/2001  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Walter J. Scheller  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: John W. Schlueter  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
Southern Ohio Coal Company

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25-Mar-04

Name: Samuel P. Skeen  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Secretary Title Effective Date: 01/16/2004  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: William D. Stanhagen  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Stephen E. Williams  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 06/15/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: John F. Zachwieja  
Address: 172 Route 519  
Eighty Four PA 15330  
Telephone: 724-206-2005  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 12/01/2003  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Officers, Directors, and Stockholders of  
Westco Coal Company

25-Mar-04

Name: Rochester & Pittsburgh Coal Company  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: FEIN: 25-0761480  
Title: Sole shareholder Title Effective Date: 07/09/1980  
Percent Ownership: 100% Ownership Effective Date: 07/09/1980  
Ending Date:

---

Name: Gary J. Bench  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: 187-48-7192 FEIN:  
Title: Assistant Secretary Title Effective Date: 07/01/2001  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Danny L. Fassio  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: 182-38-2744 FEIN:  
Title: V.P., Secretary Title Effective Date: 09/22/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: J. Brett Harvey  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Director Title Effective Date: 09/22/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: William J. Lyons  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: V.P., Controller Title Effective Date: 09/22/1998  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: John M. Reilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Treasurer Title Effective Date: 11/01/1999  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

**Officers, Directors, and Stockholders of  
Westco Coal Company**

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25-Mar-04

**Name:** Ronald E. Smith  
**Address:** 1800 Washington Road  
Pittsburgh

PA 15241

**Telephone:** 412/831-4000

**Social Security No:** 503-52-8341

**FEIN:**

**Title:** Director

**Title Effective Date:** 11/01/1999

**Percent Ownership:** zero

**Ownership Effective Date:**

**Ending Date:**

---

**Officers, Directors, and Stockholders of  
Windsor Coal Company**

25-Mar-04

**Name:** Consolidation Coal Company  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** FEIN: 13-2566594  
**Title:** Sole Shareholder **Title Effective Date:** 07/02/2001  
**Percent Ownership:** 100% **Ownership Effective Date:** 07/02/2001  
**Ending Date:**

---

**Name:** Gary J. Bench  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** 187-48-7192 **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 07/02/2001  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Rodney E. Ford  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 06/15/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Paige M. Greene  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 12/01/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** J. Brett Harvey  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Director **Title Effective Date:** 07/02/2001  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Peter B. Lilly  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Director **Title Effective Date:** 11/01/2002  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

Officers, Directors, and Stockholders of  
Windsor Coal Company

25-Mar-04

Name: Peter B. Lilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: President Title Effective Date: 11/01/2002  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Lloyd C. Price  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: John M. Reilly  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412-831-4000  
Social Security No: n/a FEIN:  
Title: Treasurer Title Effective Date: 07/02/2001  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

---

Name: Walter J. Scheller  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: John W. Schlueter  
Address: 1800 Washington Road  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Vice President Title Effective Date: 06/15/2003  
Percent Ownership: n/a Ownership Effective Date:  
Ending Date:

---

Name: Samuel P. Skeen  
Address: 1800 Washington Rd.  
Pittsburgh PA 15241  
Telephone: 412/831-4000  
Social Security No: n/a FEIN:  
Title: Secretary Title Effective Date: 01/16/2004  
Percent Ownership: zero Ownership Effective Date:  
Ending Date:

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**Officers, Directors, and Stockholders of  
Windsor Coal Company**

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25-Mar-04

**Name:** William D. Stanhagen  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Vice President **Title Effective Date:** 06/15/2003  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Stephen E. Williams  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Director **Title Effective Date:** 06/15/2003  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** John F. Zachwieja  
**Address:** 172 Route 519  
Eighty Four PA 15330  
**Telephone:** 724-206-2005  
**Social Security No:** n/a **FEIN:**  
**Title:** Vice President **Title Effective Date:** 12/01/2003  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Officers, Directors, and Stockholders of  
Wolfpen Knob Development Company**

25-Mar-04

**Name:** CONSOL Energy Inc.  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** FEIN: 51-0337383  
**Title:** SoleShareholder **Title Effective Date:** 01/01/1993  
**Percent Ownership:** 100% **Ownership Effective Date:** 01/01/2001  
**Ending Date:**

---

**Name:** Gary J. Bench  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** 187-48-7192 **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 07/01/2001  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Rodney E. Ford  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 06/15/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Paige M. Greene  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Assistant Secretary **Title Effective Date:** 12/01/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** J. Brett Harvey  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** (412) 831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Director **Title Effective Date:** 08/31/1998  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Bart J. Hyita  
**Address:** 172 Route 519  
Eighty Four PA 15330  
**Telephone:** 724-206-2005  
**Social Security No:** n/a **FEIN:**  
**Title:** Vice President **Title Effective Date:** 12/01/2003  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

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**Officers, Directors, and Stockholders of  
Wolfpen Knob Development Company**

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25-Mar-04

**Name:** Peter B. Lilly  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** President **Title Effective Date:** 11/01/2002  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** William J. Lyons  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** (412) 831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Director **Title Effective Date:** 07/10/2002  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** James N. Magro  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** (412) 831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Vice President **Title Effective Date:** 11/01/1999  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Lloyd C. Price  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Vice President **Title Effective Date:** 06/15/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** John M. Reilly  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** (412) 831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Treasurer **Title Effective Date:** 09/01/1998  
**Percent Ownership:** zero **Ownership Effective Date:**  
**Ending Date:**

---

**Name:** Walter J. Scheller  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a **FEIN:**  
**Title:** Vice President **Title Effective Date:** 06/15/2003  
**Percent Ownership:** n/a **Ownership Effective Date:**  
**Ending Date:**

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**Officers, Directors, and Stockholders of  
Wolfpen Knob Development Company**

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25-Mar-04

**Name:** John W. Schlueter  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** n/a  
**Title:** Vice President  
**Percent Ownership:** n/a  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Ownership Effective Date:**

---

**Name:** Ronald E. Smith  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412/831-4000  
**Social Security No:** 503-52-8341  
**Title:** Director  
**Percent Ownership:** zero  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 04/01/1990  
**Ownership Effective Date:**

---

**Name:** William D. Stanhagen  
**Address:** 1800 Washington Rd.  
Pittsburgh PA 15241  
**Telephone:** 412-831-4000  
**Social Security No:** n/a  
**Title:** Vice President  
**Percent Ownership:** zero  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 06/15/2003  
**Ownership Effective Date:**

---

**Name:** Robert M. Vukas  
**Address:** 1800 Washington Road  
Pittsburgh PA 15241  
**Telephone:** (412) 831-4000  
**Social Security No:** 235-80-9868  
**Title:** Secretary  
**Percent Ownership:** zero  
**Ending Date:**

**FEIN:**  
**Title Effective Date:** 05/01/1993  
**Ownership Effective Date:**

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**APPENDIX D**

**Mine Maps**

As required under R645-302-525-270

**CONTENTS**

ANNUAL MINE MAP

**APPENDIX E**

**Other Information**

In accordance with the requirements of R645-301 and R645-302

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