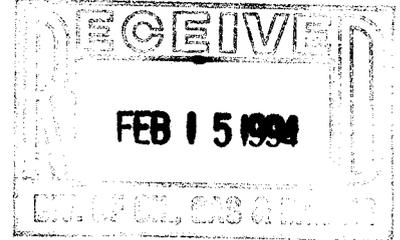


Sunnyside Coal Company

Operations • Highway 123 • P.O. Box 99 • Sunnyside, Utah 84539

February 15, 1994



Ms. Pamela Grubaugh-Littig
Permit Supervisor
Utah Division of Oil, Gas & Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

Dear Pam:

Re: Removal of Sunnyside Cogeneration Associates' Permit
Area from Sunnyside Coal Company's Permit

*File ACT/007/007 #2
(all original to file)
Copy to Jessad & Wayne
Copy from clipped
parts.*

Sunnyside Coal Company requests approval of an amendment removing from its Permit ACT/007/007 the area of Sunnyside Cogeneration Associates' Permit ACT/007/035.

The request, as described more fully in the attached Application for Permit Amendment, is for an area of approximately 310 acres. This represents a decrease in the size of the surface and surface-disturbed area of Sunnyside Coal Company's permit.

The bond calculations for the new permit area should be adequate for the Mid-Term Review also. Since a bond reduction is involved, this will require public notification and comments. A proposed legal notice is included for your approval.

Please let me know as soon as possible your comments. I appreciate your attention to this request.

Sincerely,

Gary E. Gray
Chief Engineer

GEG:th
Enclosures

Corporate Offices
The Registry
1113 Spruce Street
Boulder, CO 80302
303-938-1506
FAX: 303-938-5050

Operations
Highway 123
P.O. Box 99
Sunnyside, UT 84539
801-888-4421
FAX: 801-888-2581

APPLICATION FOR PERMIT CHANGE

Title of Change:

Removal of CRP Area (SCA) from Permit Area

Permit Number: ACT / 007 / 007

Mine: Sunnyside

Permittee: Sunnyside Coal Company

Description, include reason for change and timing required to implement:

The area used for coal refuse and waste disposal is now permitted by Sunnyside Cogeneration Associates

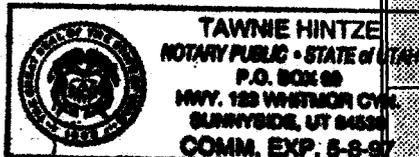
- Yes No 1. Change in the size of the Permit Area? 310 acres increase decrease.
- Yes No 2. Change in the size of the Disturbed Area? 153 acres increase decrease.
- Yes No 3. Will permit change include operations outside the Cumulative Hydrologic Impact Area?
- Yes No 4. Will permit change include operations in hydrologic basins other than currently approved?
- Yes No 5. Does permit change result from cancellation, reduction or increase of insurance or reclamation bond?
- Yes No 6. Does permit change require or include public notice publication?
- Yes No 7. Permit change as a result of a Violation? Violation #
- Yes No 8. Permit change as a result of a Division Order? D.O.#
- Yes No 9. Permit change as a result of other laws or regulations? Explain:
- Yes No 10. Does permit change require or include ownership, control, right-of-entry, or compliance information?
- Yes No 11. Does the permit change affect the surface landowner or change the post mining land use?
- Yes No 12. Does permit change require or include collection and reporting of any baseline information?
- Yes No 13. Could the permit change have any effect on wildlife or vegetation outside the current disturbed area?
- Yes No 14. Does permit change require or include soil removal, storage or placement?
- Yes No 15. Does permit change require or include vegetation monitoring, removal or revegetation activities?
- Yes No 16. Does permit change require or include construction, modification, or removal of surface facilities?
- Yes No 17. Does permit change require or include water monitoring, sediment or drainage control measures?
- Yes No 18. Does permit change require or include certified designs, maps, or calculations?
- Yes No 19. Does permit change require or include underground design or mine sequence and timing?
- Yes No 20. Does permit change require or include subsidence control or monitoring?
- Yes No 21. Have reclamation costs for bonding been provided or revised for any change in the reclamation plan?
- Yes No 22. Is permit change within 100 feet of a public road or perennial stream or 500 feet of an occupied dwelling?
- Yes No 23. Is this permit change coal exploration activity inside outside of the permit area?

Attach 3 complete copies of proposed permit change as it would be incorporated into the Mining and Reclamation Plan.

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

[Signature] 2/15/94
Signed - Name - Position - Date

Subscribed and sworn to before me this 15th day of February, 19 94.
Tawne Hintze
Notary Public
My Commission Expires: May 8, 19 97
Attest: STATE OF Utah
COUNTY OF Carbon



Received by Oil, Gas & Mining

FEB 15 1994

ASSIGNED PERMIT CHANGE NUMBER

Application for Permit Change

DETAILED SCHEDULE OF CHANGES TO THE PERMIT

Title of Change: Removal of CRP Area from Permit Area	Permit Number: ACT / 007 / 007
	Mine: Sunnyside
	Permittee: Sunnyside Coal Company

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit change. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the exiting mining and reclamation plan. Include page, section and drawing numbers as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Pages 38 through 42 in Chapter II, Book 1
<input checked="" type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Page 7 in Chapter III, Book 1 Page 7a in Chapter III, Book 1
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Page 10 in Chapter III, Book 1
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Pages 33 through 54 in Chapter III, Book 1
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Pages 53 through 55 in Chapter III, Book 1
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Pages 57 through 58 in Chapter III, Book 1
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Pages 63 through 65 in Chapter III, Book 1
<input type="checkbox"/> ADD	<input checked="" type="checkbox"/> REPLACE	<input type="checkbox"/> REMOVE	Pages 67 through 72 in Chapter III, Book 1
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Figure III-1 MSHA Fire Extinguishing Plan
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Figure III-2 Approval of Industrial Waste Dump
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Figure III-6 Certification of Slurry Cells and CRP
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Figure III-7 Landfill Use Approval Letter
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Appendix III-5 Geotechnical Investigation & Slurry Impoundments
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Appendix III-7 Coarse Refuse Revegetation Plots
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Appendix III-13 Geotechnical Report on Refuse Pile
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Appendix III-14 Coarse Refuse Pile Compaction Test Results
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Appendix III-15 Coarse Refuse Sample Analytical Results
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Plate III-5 Coarse Refuse Toe Pond
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Plate III-6 Railcut Pond
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Plate III-7 Pasture Pond
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Plate III-13 Slurry Pond
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Plate III-40 Refuse Area Drainage Plans & Terrace Drain
<input type="checkbox"/> ADD	<input type="checkbox"/> REPLACE	<input checked="" type="checkbox"/> REMOVE	Plate III-43 Coarse Refuse Extension West Cell

Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

LEGAL NOTICE

Pursuant to Utah Mining Code R645-301-117.200 notice is hereby given that Sunnyside Coal Company, P.O. Box 99, Sunnyside, Utah 84539, has submitted a Significant Coal Mine Permit Change Application for the Sunnyside Mine to the Utah Division of Oil, Gas, and Mining.

The Sunnyside Mine Permit Area is located near the town of Sunnyside, approximately twenty-five miles east of Price, Utah via U.S. Highway 6 and State Highway 123. The following are the legal descriptions of the Permit Area:

1. Fee Land

T14S, R14E, SLB&M, Utah

Sect. 6: N1/2, S1/2 SW1/4, S1/2 SE1/4, NW1/4 SE1/4

Sect. 7: NW1/4, SW1/4 NE1/4, E1/2 SW1/4, S1/2 SE1/4, NW1/4 SE1/4

Sect. 17: NE1/4, SE1/4 NW1/4, SW1/4, S1/2S E1/4

Sect. 18: E1/2, S1/2 SW1/4, NE1/4 SW1/4, NW1/4 SW1/4 SW1/4 NW1/4 less the following described area:

Beginning at the NW corner of SW1/4 NW1/4 of Section 18, T14S, R14E:

thence S 45° 05' E, 1,577.42 ft;

thence S 39° 25' W, 1,759.22 ft;

thence N 2,472.87 ft to point of beginning.

Sect. 19 and 20: All

Sect. 21: W1/2

Sect. 28 and 29: All

Sect. 30: NE1/4, NE1/4 NW1/4, NW1/4 SE1/4

Sect. 31: S1/2 NE1/4, NE1/2 NE1/4

Sect. 32 and 33: All

Sect. 34: W1/2

T15S, R14E, SLB&M, Utah

Sect. 3: W1/2

Sect. 4: All

Sect. 5: NE1/4, N1/2 SE1/4, SE1/4 SE1/4

Sect. 8: NE1/4 NE1/4

Sect. 9: All

Sect. 10: W1/2, SE1/4

Sect. 15: W1/2, N1/2 NE1/4

Sect. 16: E1/2, NW1/4, E1/2 SW1/4

Sect. 17: E1/2 NE1/4

2. Federal Leases

Federal Coal Leases numbers Salt Lake 062966-063383-Utah 010140, Utah 32083 and SL-068754. Areas within both the leases and the permit area are described as follows:

T14S, R13E, SLB&M, Utah

Sect. 1: SE1/4

Sect. 12: NE1/4, N1/2 NW1/4, SE1/4 NW1/4,
SE1/4 SE1/4, N1/2 SE1/4, SW1/4 NW1/4
NE1/4 SW1/4, SW1/4 SE1/4 less the
following described area:

Beginning at a point which bears South 1320 ft from the NW corner of Section 12:

thence South, 1320 ft;

thence S 89°55'30" E, 1327.01 ft;

thence South, 1320 ft;

thence S89°53'15"E, 1327.22 ft;

thence South, 1320 ft;

thence S89°51'E, 1327.43 ft;

thence N45°05'07"W, 5623.40 ft to the place of beginning.

Sect. 13: Portions of: NE1/4 NE1/4, E1/2 SE1/4,
SW1/4 SE1/4, SE1/4 SW1/4, NE1/4 SW1/4,
NW1/4 SW1/4, SW1/4, NW1/4 which are described
as follows:

Beginning at a point which bears 2850 ft S89°51'E from the SW corner of Section 13:

thence N42°30'W, 4215 ft;

thence North 610 ft;

thence S42°30'E, 3730 ft;

thence N47°30'E, 100 ft;

thence S42°30'E, 1450 ft;

thence N89°50'W, 710 ft to the point of beginning.

Beginning at the SE corner of Section 13:

thence North, 1487.13 ft;

thence S39°25'W, 1920.39 ft;

thence S89°50'E, 1219.36 ft to the point of beginning.

Less the following described area:

Beginning at a point which bears South 1320 ft from the NE corner of Section 13:

thence N89°51'W, 1327.76 ft;

thence North 1320 ft;

thence S 45°05'33"E, 1874 ft to the point of beginning.

Sect. 24: S1/2 SE1/4, Portions of: N1/2 NE1/4,
SE1/4 NE1/4, N1/2 SE1/4 and NE1/4 SW1/4 which are
described as follows:

Beginning at the NE corner of Section 24:

thence S0°07'W, 1814.87 ft;

DRAFT

thence S57°11'W, 430 ft;
thence N38°23'W, 1165 ft;
thence N42°26'W, 860.51 ft;
thence N39°5'E, 709.31 ft;
thence S89°50'E, 1219.36 ft;
thence South, 45.54 ft to the place of beginning.

Beginning at a point which bears N 0°02'E, 1,294.59 ft from the SE corner of said Section 24:

thence N0°02'E, 1294.59 ft;
thence N0°07'E, 830.41 ft;
thence S57°11'W, 3905.58 ft;
thence S89°E, 3280.00 ft to the place of beginning and containing 80 acres more or less.

Beginning at a point which bears N89°50'W 1720 ft from the NE corner of Section 24:

thence N89°50'W, 750 ft;
thence S42°30'E, 2900 ft;
thence N57°11'E, 100 ft;
thence N38°23'W, 1165 ft;
thence N42°26'W, 860.51 ft;
thence N39°25'E, 350 ft;
thence N42°30'W, 400 ft to the point of beginning.

Sect. 14: Portions of: NW1/4 which is described as follows:

Beginning at a point which bears 1915 ft N89°41'W from the NE corner of Section 14:

thence S42°30'E, 2090 ft;
thence South, 600 ft;
thence N42°30'W, 1400 ft;
thence S48°00'W, 1525 ft;
thence South, 175 ft;
thence N89°41'W, 315 ft;
thence North, 300 ft;
thence N48°00'E, 1775 ft;
thence N42°30'W, 1125 ft;
thence S89°41'E, 500 ft to the point of beginning.

Sect. 11: Portions SW1/4 SE1/4 which is described as follows:

Beginning at a point which bears 1915 ft N89°41'W from the SE corner of Section 11:

thence N40°30'W, 1150 ft;
thence S48°00'W, 380 ft;
thence S42°30'E, 780 ft;
thence S89°41'E, 520 ft to the point of beginning.

Sect. 25: NE1/2 NE1/4

T14S, R14E, SLB&M, Utah:

DRAFT

Sect. 6: NW1/2 SW1/4
Sect. 7: W1/2 SW1/4
Sect. 8: SW1/4, SW1/4 SE1/4
Sect. 17: W1/2 NW1/4, NE1/4 NW1/4, N1/2 SE1/4
Sect. 18: E1/2 NW1/4, NW1/4 NW1/4
Sect. 30: NW1/4 NW1/4, SE1/4 NW1/4, NE1/4 SW1/4
S1/2 SE1/4, NE1/4 SE1/4
Sect. 31: NW1/4 NE1/4

3. Carbon County Leases

Coal lease, dated November 8, 1989, granted by Carbon County of the State of Utah, the lessor, to Sunnyside Reclamation and Salvage, Inc., the lessee. The lease embraces the following described lands in Carbon County, Utah all of which are within the permit area:

Salt Lake Meridian, Utah
T14S, R14E
Sect. 21: SE 1/4, NE 1/4
Sect. 27: SW 1/4, SW 1/4 of NW 1/4
Sect. 34: E 1/2.

T15S, R14E
Sect. 3: E 1/2
Sect. 10: NE 1/4.

4. State Lease

Coal lease agreement, dated February 21, 1990, entered into with Geneva Steel granting a partial sublease of Utah Coal Lease ML-43715. The lease covers the following described lands:

Part of Section 16, T14S, R14E, SLBM described as:
Beginning at the Southwest section corner of said Section 16; running thence N0°03'W 3,281.79 Ft; thence S45°00'02"E 4,728.36 Ft; thence N88°56'35"W 3,341.19 Ft. to the point of beginning, containing 125.84 acres more or less.

5. Surface Rights

The specific land and surface rights for the Sunnyside permit area are included in the deed described in paragraph (1) of this section. Those lands are identified and described as follows:

T14S, R14E, SLB&M, Utah
Sect. 31: SE1/4
T15S, R14E, SLB&M, Utah
Sect. 5: W1/2, SW1/4 SE1/4
Sect. 6: S1/2S E1/4, SE1/4 SW1/4,
portions of N1/2 SE1/4 and NE1/4 NW1/4
South of the D&RGW railroad right-of-way.

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Sect. 7: N1/2 NE1/4, N3/4 NW1/4
Sect. 8: N1/2 NW1/4, NW1/4 NE1/4

The described areas are contained on the following U.S. Geological Survey 7.5 minute quadrangle maps: Sunnyside, Patmos Head, Bruin Point, and Mt. Bartles, all in Utah.

A copy of the permit change application is available at the office of the County Recorder of Carbon County, Carbon County Courthouse, Price, Utah 84501. Written comments, objections, or requests for informal conferences may be made to the Utah Division of Oil, Gas and Mining, 355 West North Temple, 3 Triad Center Suite 350, Salt Lake City, Utah, 84180-1203.

(To be published in the Sun Advocate, Price, Utah)

CHAPTER II

Informal conference held May 20, 1985.
No penalty assessed.
Terminated March 15, 1985

1.23 Right of Entry Information

(a) A description of the documents upon which the applicant, Sunnyside Coal Company and its legal predecessor Sunnyside Reclamation and Salvage, Inc., bases its legal right to enter and begin underground coal mining activities in the permit area as follows:

(1) Deed dated 3/9/89 through which Kaiser Coal Corporation, a Nevada corporation, conveyed and warranted to Sunnyside Reclamation and Salvage, Inc., a Colorado corporation, title to tracts of land in Carbon County, Utah. It was recorded by the County Recorder of Carbon County, Utah in Book 287, pages 52-95 inclusive. Fee land included in the deed and within the permit area is described as follows:

T14S, R14E, SLB&M, Utah
Sect. 6: N1/2, S1/2 SW1/4, S1/2 SE1/4, NW1/4 SE1/4
Sect. 7: NW1/4, SW1/4 NE1/4, E1/2 SW1/4, S1/2 SE1/4, NW1/4 SE1/4
Sect. 17: NE1/4, SE1/4 NW1/4, SW1/4, S1/2 SE1/4
Sect. 18: E1/2, S1/2 SW1/4, NE1/4 SW1/4, NW1/4 SW1/4 SW1/4 NW1/4 less the following described area:
Beginning at the NW corner of SW1/4 NW1/4 of Section 18, T14S, R14E:

thence S 45° 05' E, 1,577.42 ft;
thence S 39° 25' W, 1,759.22 ft;
thence N 2,472.87 ft to point of beginning.

Sect. 19 and 20: All
Sect. 21: W1/2
Sect. 28 and 29: All
Sect. 30: NE1/4, NE1/4 NW1/4, NW1/4 SE1/4
Sect. 31: S1/2 NE1/4, NE1/2 NE1/4
Sect. 32 and 33: All
Sect. 34: W1/2

T15S, R14E, SLB&M, Utah
Sect. 3: W1/2
Sect. 4: All
Sect. 5: NE1/4, N1/2 SE1/4, SE1/4 SE1/4
Sect. 8: NE1/4 NE1/4
Sect. 9: All

CHAPTER II

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Sect. 10: W1/2, SE1/4
Sect. 15: W1/2, N1/2 NE1/4
Sect. 16: E1/2, NW1/4, E1/2 SW1/4
Sect. 17: E1/2 NE1/4

- (2) Federal Coal Leases numbers Salt Lake 062966-063383-Utah 010140, Utah 32083 and SL-068754. Areas within both the leases and the permit area are described as follows:

T14S, R13E, SLB&M, Utah

Sect. 1: SE1/4
Sect. 12: NE1/4, N1/2 NW1/4, SE1/4 NW1/4,
SE1/4 SE1/4, N1/2 SE1/4, SW1/4 NW1/4
NE1/4 SW1/4, SW1/4 SE1/4 less the
following described area:

Beginning at a point which bears South 1320 ft from the NW corner of Section 12:

thence South, 1320 ft;
thence S 89°55'30" E, 1327.01 ft;
thence South, 1320 ft;
thence S89°53'15"E, 1327.22 ft;
thence South, 1320 ft;
thence S89°51'E, 1327.43 ft;
thence N45°05'07"W, 5623.40 ft to the place of beginning.

Sect. 13: Portions of: NE1/4 NE1/4, E1/2 SE1/4,
SW1/4 SE1/4, SE1/4 SW1/4, NE1/4 SW1/4,
NW1/4 SW1/4, SW1/4, NW1/4 which are described
as follows:

Beginning at a point which bears 2850 ft S89°51'E from the SW corner of Section 13:

thence N42°30'W, 4215 ft;
thence North 610 ft;
thence S42°30'E, 3730 ft;
thence N47°30'E, 100 ft;
thence S42°30'E, 1450 ft;
thence N89°50'W, 710 ft to the point of beginning.

Beginning at the SE corner of Section 13:

thence North, 1487.13 ft;
thence S39°25'W, 1920.39 ft;
thence S89°50'E, 1219.36 ft to the point of beginning.

Less the following described area:

Beginning at a point which bears South 1320 ft from the NE corner of Section 13:

thence N89°51'W, 1327.76 ft;

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CHAPTER II

thence North 1320 ft;
thence S 45°05'33"E, 1874 ft to the point of beginning.

Sect. 24: S 1/2 SE1/4, Portions of: N1/2 NE1/4, SE1/4 NE1/4, N1/2 SE1/4 and NE1/4 SW1/4 which are described as follows:

Beginning at the NE corner of Section 24:

thence S0°07'W, 1814.87 ft;
thence S57°11'W, 430 ft;
thence N38°23'W, 1165 ft;
thence N42°25'W, 860.51 ft;
thence N39°05'E, 709.31 ft;
thence S89°50'E, 1219.36 ft;
thence South, 45.54 ft to the place of beginning.

Beginning at a point which bears N 0°02'E, 1,294.59 ft from the SE corner of said Section 24:

thence N0°02'E, 1294.59 ft;
thence N0°07'E, 830.41 ft;
thence S57°11'W, 3905.58 ft;
thence S89°E, 3280.00 ft to the place of beginning and containing 80 acres more or less.

Beginning at a point which bears N89°50'W 1720 ft from the NE corner of Section 24:

thence N89°50'W, 750 ft;
thence S42°30'E, 2900 ft;
thence N57°11'E, 100 ft;
thence N38°23'W, 1165 ft;
thence N42°26'W, 860.51 ft;
thence N39°25'E, 350 ft;
thence N42°30'W, 400 ft to the point of beginning.

Sect. 14: Portions of: NW1/4 which is described as follows:

Beginning at a point which bears 1915 ft N89°41'W from the NE corner of Section 14:

thence S42°30'E, 2090 ft;
thence South, 600 ft;
thence N42°30'W, 1400 ft;
thence S48°00'W, 1525 ft;
thence South, 175 ft;
thence N89°41'W, 315 ft;
thence North, 300 ft;
thence N48°00'E, 1775 ft;
thence N42°30'W, 1125 ft;
thence S89°41'E, 500 ft to the point of beginning.

Sect. 11: Portions SW1/4 SE1/4 which is described as follows:

CHAPTER II

Beginning at a point which bears 1915 ft N89°41'W from the SE corner of Section 11:
thence N40°30'W, 1150 ft;
thence S48°00'W, 380 ft;
thence S42°30'E, 780 ft;
thence S89°41'E, 520 ft to the point of beginning.

Sect. 25: NE1/2 NE1/4

T14S, R14E, SLB&M, Utah:

Sect. 6: NW1/2 SW1/4

Sect. 7: W1/2 SW1/4

Sect. 8: SW1/4, SW1/4 SE1/4

Sect. 17: W1/2 NW1/4, NE1/4 NW1/4, N1/2 SE1/4

Sect. 18: E1/2 NW1/4, NW1/4 NW1/4

Sect. 30: NW1/4 NW1/4, SE1/4 NW1/4, NE1/4 SW1/4
S1/2 SE1/4, NE1/4 SE1/4

Sect. 31: NW1/4 NE1/4

(3) Coal lease, dated November 8, 1989, granted by Carbon County of the State of Utah, the lessor, to Sunnyside Reclamation and Salvage, Inc., the lessee. The lease embraces the following described lands in Carbon County, Utah all of which are within the permit area:

Salt Lake Meridian, Utah

T14S, R14E

Sect. 21: SE 1/4, NE 1/4

Sect. 27: SW 1/4, SW 1/4 of NW 1/4

Sect. 34: E 1/2.

T15S, R14E

Sect. 3: E 1/2

Sect. 10: NE 1/4.

(4) Coal lease agreement, dated February 21, 1990, entered into with Geneva Steel granting a partial sublease of Utah Coal Lease M1-43715. The lease covers the following described lands:

Part of Section 16, T14S, R14E, SLBM described as:

Beginning at the Southwest section corner of said Section 16; running thence N0°03'W 3,281.79 Ft; thence S45°00'02"E 4,728.36 Ft; thence N88°56'35"W 3,341.19 Ft. to the point of beginning, containing 125.84 acres more or less.

(5) The specific land and surface rights for the Sunnyside permit area are included in the deed described in paragraph (1) of this section. Those lands are identified and described as follows:

CHAPTER II

T14S, R14E, SLB&M, Utah
Sect. 31: SE1/4
T15,S, R14E, SLB&M, Utah
Sect. 5: W1/2, SW1/4 SE1/4
Sect. 6: S1/2S E1/4, SE1/4 SW1/4,
portions of N1/2 SE1/4 and NE1/4 NW1/4 South of
the D&RGW railroad right-of-way.
Sect. 7: N1/2 NE1/4, N3/4 NW1/4
Sect. 8: N1/2 NW1/4, NW1/4 NE1/4

The foregoing documents have been duly assigned and transferred to applicant.

(b) The surface operations associated with underground coal mining activities at the Sunnyside Mines does not involve the surface mining of coal.

1.24 Relationship to Areas Designated Unsuitable for Mining

(a) The proposed permit area is not within an area designated unsuitable for surface effects of underground coal mining activities.

(b) Substantial legal and financial commitments were made at Sunnyside Mine before January 4, 1977 and the mine has engaged in underground coal mining in the proposed permit area for more than ninety years.

(c) There are no occupied dwellings within 300 feet of surface operations or facilities.

1.25 Permit Term

Underground coal mining in the permit area began in the late 1890's and has continued to some degree yearly since that time. The termination date is unknown at this time but is estimated to be more than five (5) years. It is conceivable that production will continue beyond that time if the property can remain economically competitive. This estimate is based on a yearly production

Chapter III

Reports of dam conditions including erosion, structural weakness or other hazardous conditions will be submitted to the Division within thirty (30) days of the inspection. Hazardous conditions will be reported directly to the Division immediately after the finding.

Sediments removed from the ponds will be disposed in the industrial waste dump (Plate III-1) or used as a borrow material. If the material is to be used as borrow, the operator will contact the Division to receive approval of the location and the amount of material to be used. The Division may require a chemical analysis of the sediments prior to disposal as borrow depending upon the area of disposal.

~~Coal slurry, a mixture of coal fines and water from the preparation plant is transported in an open ditch to three slurry settling ponds. Two of the settling ponds (SP1 and SP2) use a dike of coke breeze coarse refuse to filter the effluent before discharging into the third pond (Clear Water Pond). Final settling is completed before discharge through UPDES discharge point 004 into Iceland drainage or onto adjacent alfalfa fields. If both of the settling ponds are full, the old East Cell Slurry Pond (ESC) is used as an alternate evaporation location. Use of ESC is limited.~~

~~A control structure approved by the Division (see Appendix 111-3) is located at the bottom of the wash below the coarse refuse embankment. The rock gabion structure is used to drop out sediments. The Division has also approved addition of flocculent at this point to reduce the suspended iron content. Sampling points for discharge from the coarse refuse are the Coarse Refuse Source (CRS), that is located immediately below the gabion structure and Coarse Refuse Boundary (CRB) that is roughly 600 feet below CRS. Total iron values at the permit boundary (CRB) are in compliance with standards.~~

Coal refuse slurry, a mixture of fine coal refuse and water from the preparation plan is transported in an open ditch to Sunnyside Cogeneration Associates' permitted facility (formerly Sunnyside Coal Company's refuse disposal area. SCA's Mining and Reclamation Permit details the sedimentation controls.

The Division has also approved construction of a covered archway over a portion of the No. 2 Canyon Wash to prevent deposition of coal fines within the undisturbed drainage channel. The covered archway extends approximately 195 feet upstream from the concrete culvert inlet under the railroad and coarse refuse haul road (see Figure III-13, No. 2 Canyon/Whitmore Canyon Confluence). This encloses the drainage channel under the coal stockpile conveyor, and in the area of the coal stockpile and stockpile access roads.

Chapter III

The archway cover is surplus steel rockbolt plate welded to ground support steel arches spanning the No. 2 Canyon Wash. The

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Chapter III

3.2.10 Permit Term Disturbance Area

The Sunnyside permit contains ~~14,763~~ 14,533 acres. The permit boundary is delineated on Plate II-1. The permit area includes the original permit area, except for the Sunnyside Cogeneration Associates' permit area (formerly Sunnyside Coal Company's Refuse Disposal Area), plus all incidental boundary change which have been made and approved in the past.

A total of ~~313~~ 182 acres have been or will be disturbed. An additional 5.88 acres have been contemporaneously reclaimed in Slaughter Canyon. ~~23 acres of the disturbed area are excluded for permanent roads and right-of-ways. The remaining 290 acres are to be reclaimed (Table III-24).~~ The distribution of the disturbed areas are shown on Table III-24 and Table III-43.

3.2.11 Additional Areas for Surface Disturbance for Life of Mine

There are no new planned areas of disturbance during the permit term.

3.2.12 Detailed Construction Schedule

There is no new planned construction during the permit term.

3.3 Operating Plan

3.3.1 Mining Plans

The Sunnyside coal property has been mined continuously since the late 1890's. Over sixty million tons of coal have been extracted during this period. Kaiser Steel Corporation leased the No. 2 Mine from Utah Fuel Company in 1942 to provide coking coal to the newly constructed steel mill at Fontana, California. In 1950, Kaiser Steel purchased the entire property. Since 1950, the major production areas have been shifted from the No. 2 Mine near the southeast boundary to the No. 1 Mine area to the northwest (see Plate III-3).

At the present time, the Sunnyside workings extend along the strike from the Columbia Mine northwestward to the boundary of the B Canyon Federal Lease a distance of approximately 6-1/2 miles. Workings down-dip from the outcrop have reached a maximum of 2-1/2 miles. Future workings will be further extensions down-dip (see Plate III-4).

The Sunnyside complex encompasses three mines, each with its separate ventilation, access and haulage systems. At present, the

Chapter III

Up-Dip Subsidence Barrier

$$2000' \times \tan (20^\circ) = 727.94'$$

$$\frac{727.94 \times \sin (70^\circ)}{\sin (105.4^\circ)} = 709.52'$$

$$709.52 \times \cos (4.6) = \underline{707.23}'$$

Down-Dip Subsidence Barrier

$$2000' + \tan (4.6^\circ) \times 1400' = 2112.64'$$

$$\tan (20^\circ) \times 2112.64 = 768.94'$$

$$\frac{768.94 \times \sin (4.6^\circ)}{\sin (110^\circ)} = 65.63'$$

$$768.94 + 65.63 \times \sin (20^\circ) = \underline{791.39}'$$

The operator will notify each owner of property or resident within the area above underground workings and adjacent areas that could be affected by subsidence by mail six months prior to mining of the area. The notice will contain specific areas in which mining will take place, dates of the underground operations and measures taken to prevent or control adverse subsidence effects.

3.4.9 Waste Disposal Plans

~~During December 1987, the slurry and coarse refuse area was sold to Sunnyside Fuel Corporation. The company intends to use the low grade fine coal and coarse refuse as a fuel in a cogeneration power plant.~~

~~The slurry (refuse) ponds (D 1.1 and D 1.2) and coarse refuse disposal areas (D 2a and D 2b) are shown on Plate III-1 and in photographs in Section 3.7.1. Plate III-5 represents a more detailed plan and cross-section of the coarse refuse disposal facility.~~

In February 1993 the Division approved the Mining and Reclamation Permit Application submitted by Sunnyside Cogeneration Associates covering the Refuse Disposal Area of Sunnyside Coal Company. Sunnyside Coal Company's waste disposal plans require the continued use of that area. The right of entry to that area was retained when sold in December 1987. The Division's regulations require that coal mine waste, coal processing waste, etc. be properly disposed in a permitted area. Sunnyside Coal Company and Sunnyside Cogeneration Associates have agreements which

Chapter III

allow the continued use of the area for refuse disposal in accordance with the Divisions' regulations. The waste disposal plans are presented in subsequent paragraphs.

3.4.9.1 Projected Impacts of Disposal Areas on the Environment

(a) Coal slurry refuse

Coal refuse slurry, a mixture of fine coal ~~finer~~ refuse and water from the preparation plant is transported in an open ditch to ~~three-slurry~~ Sunnyside Cogeneration Associates' permitted facility (formerly Sunnyside Coal Company's refuse disposal area. SCA's Mining and Reclamation Permit details the Waste Disposal Plans.

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Chapter III

~~settling ponds. Two of the settling ponds (SP1 and SP2) use a dike of coke breeze/coarse refuse to filter the effluent before discharging into the third pond (Clear Water Pond). Final settling is completed before discharge through UPDES discharge point 004 into Iceland drainage or onto adjacent alfalfa fields. If both of the settling ponds are full, the old East Cell Slurry Pond (ESC) is used as an alternate evaporation location. Use of ESC is limited.~~

~~SP1 and SP2 are alternately filled and allowed to drain and dry. The dried coal fines are removed from SP1, SP2, and ESC by loader and trucks and stacked on the west side of the old West Cell Slurry Pond (WSC). A dozer spreads and compacts the coal fines.~~

~~WSC was the first slurry impoundment to be constructed. In the late 1950's, coarse refuse and borrow were used as fill material to block a wash at the mouth of Whitmore Canyon above Iceland drainage. As the level of slurry increased, additional coarse refuse was added to the top and sides of the impoundment. WSC was used until 1975 when ESC was constructed. SP1 and SP2 were constructed in 1978. The present slurry depth in WSC is over 200 feet above the bottom of the wash.~~

~~The East Slurry Cell was constructed by placing coarse refuse as dikes to contain the fine refuse. The dikes were compacted during placement and covered with borrow material. A geotechnical evaluation of the ESC embankment was completed (See Appendix III-7) which indicated a factor of safety of 0.5 for a saturated embankment. Subsequent field tests and installation of piezometers indicated that the embankment was not saturated.~~

~~Design and construction of the slurry ponds was pre-law and some of the design standards are deficient. A geotechnical evaluation and alternate construction methods to meet current standards was completed and results are found in Appendix III-7.~~

~~The Sunnyside Mines operator plans to reactivate WSC as soon as a second geotechnical evaluation is completed that evaluates the work that has been done to bring the impoundment into compliance with UMC 817.92-93. The operating plan and evaluation will be presented to DOGM and MSHA prior to reactivation.~~

~~All surface drainage above ESC, WSC, and the coarse refuse embankment is diverted away from embankments by stabilized diversion channels designed to pass a 100-year, 24-hour precipitation event (Plate III-27). Calculations are found in Appendix III-1.~~

~~Visual inspections are conducted weekly by a certified impoundment inspector, qualified registered professional engineer~~

Chapter III

~~or someone under his supervision to assess the stability of the impoundments and determine the amount of seepage if present. Piezometers installed in the East Slurry Cell embankment will be monitored weekly when water is present in the structure to assess the amount of embankment saturation. Records of the inspection findings and recommendations will be maintained at the mine site. If the inspection discloses that potential hazards exist, the Division will be informed promptly of the findings, the emergency procedures formulated for public protection, and remedial action measures that will be implemented.~~

~~Maintenance of the embankments will consist of filling and grading any erosion or other failure features discovered by weekly inspections.~~

~~Subsidence, mudflows, and landslides are not a problem because of the location of the embankments. Possibility of failure below the embankments is limited to thin layers of colluvial material on bedrock that would not threaten the embankments.~~

~~Reclamation of the slurry cells should pose little problem because the slurry material can be driven over after the material has dried for a short period of time.~~

(b) Coarse refuse

Coarse coal refuse from the preparation plant is hauled by truck via the Refuse Haul Road to Sunnyside Cogeneration Associates' permitted facility (formerly Sunnyside Coal Company's refuse disposal area. SCA's Mining and Reclamation Permit details the plans for handling this material in an approved manner. Sunnyside Coal Company will place this material in accordance with SCA's direction.

Temporary refuse storage is discussed in section (f) which follows.

~~The existing coarse refuse disposal area for Sunnyside Coal Company's permit ACT/007/007 is approaching design capacity. The coarse refuse disposal area is located on and is part of the west embankment of the West Slurry Cell. Current placement of the coarse refuse concludes the stabilization of the embankment and achieves the current reclamation contours for the area.~~

~~The West Slurry Cell was constructed in the late 1950's to impound coal slurry (a mixture of coal fines and water) from the preparation plant. Coarse refuse material (coal preparation plant reject material) was added to the top and sides of the impoundment as the slurry level increased. The West Slurry Cell ceased being used in 1975 when the East Slurry Cell was built. Since that time,~~

DRAFT

Chapter III

~~SCC has continued to use the west embankment of the West Slurry Cell as the coarse refuse disposal area to stabilize the embankment and ultimately allow future use of the West Slurry Cell.~~

~~SCC no longer intends to use the West Slurry Cell as an active slurry cell. The East Slurry Cell and Slurry Ponds Nos. 1 & 2 provide adequate slurry capacity for the projected production rates.~~

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Chapter III

~~Extension of the coarse refuse disposal area into the West Slurry Cell provides an additional 2 years of coarse refuse and fine coal disposal (dewatered fines from the remaining slurry cells) while achieving the decommissioning and reclamation of the West Slurry Cell.~~

~~Coarse refuse or reject material from the preparation plant will continue to be disposed as presented in the approved permit. Briefly, the refuse material is end dumped into piles that are spread by dozer in 24-inch to 48-inch lifts. Loaded haul trucks wheel compact the lifts as the material for the next lift is end dumped on the pile.~~

~~In addition to the coarse refuse material, dried coal fines from the slurry cells are also placed in the coarse refuse disposal area. The slurry cells are independently removed from service when reaching capacity and the stored coal fines allowed to dewater before removing the coal fines by front end loader and truck. The coal fines are placed and compacted with the coarse refuse material in the same manner as the coarse refuse material.~~

~~Coarse refuse disposal operations coincide with the preparation plant operation since there is extremely limited plant storage and temporary coarse refuse storage areas. The coal fines disposal operation is on an as needed basis.~~

~~Truck haulage remains on the same primary roads. No new roads are required; no existing roads will be decommissioned.~~

~~Coal mine waste (from underground development) containing coal, coal parting, or rock and coal together is conveyed to the preparation plant, and the resultant coal processing waste is disposed in the coarse refuse pile. Coal mine waste consisting of rock and non-coal material is transported from underground by rail to the rotary breaker and then hauled by truck to an industrial waste dump and is not disposed of in the coarse refuse pile.~~

~~Underground coal production is conveyed to the preparation plant and the resultant coarse refuse material is directly disposed of in the coarse refuse pile. The coal slurry is dewatered and later disposed of in the coarse refuse pile.~~

~~The existing coarse refuse pile was built in lifts by leveling end dumped piles of material. The coarse refuse pile maintains a maximum 27 degree (2 horizontal:1 vertical) outslope and is terraced on 50-foot vertical increments. The terrace is a minimum 20-foot wide and is gently sloped to control surface water runoff~~

Chapter III

~~and erosion.~~

~~Geotechnical investigations of the West Slurry Cell embankments were conducted in 1984 and again in 1986. The 1984 work (Appendix III-5 in Chapter III) indicated that the West Slurry Cell embankment above the active coarse refuse disposal area was not stable with a static safety factor of 1.03. The study concluded that a safety factor of 1.46 would be obtained by maintaining maximum slopes of 2 (h):1 (v) and maintaining a moist compacted material density of 100 pounds per cubic foot. Sunnyside continued stabilization of the west embankment by wheel compacting coarse refuse in lifts, maintaining 50-foot high benches at a maximum 2(h):1(v) slope, and establishing a minimum 20-foot terrace at every bench.~~

~~A 1986 report (Appendix III-13), developed for a proposed coarse refuse pile expansion to the north of the existing coarse refuse pile, concluded a 2(h):1(v) slope between 50-foot high benches and terraces of 30-feet in width, while maintaining a moist compacted material density of 100 pounds per cubic foot provides an adequate factor of safety (greater than 1.5) under static conditions.~~

~~Cross-sections C-C', D-D', and E-E' (Plate III-43), indicate the coarse refuse pile embankment maintains the slope and bench criteria established in the geotechnical investigations. Recent in place density testing (Appendix III-14) indicates moist compacted densities greater than 100 pounds per cubic foot as established in the geotechnical investigations.~~

~~With the conclusion of the stabilization of the west embankment of the West Slurry Cell, expansion of the coarse refuse area into the West Slurry Cell reclaims the existing West Cell to final reclamation contours. Approximately 172 acre-feet (315,000 tons) of material are required to fill the existing West Slurry Cell. Additional material may be temporarily stockpiled on the east side of the West Cell for closure of the East Cell at a future date.~~

~~SCC will construct the fill in the West Slurry Cell in a similar fashion to the construction of the coarse refuse embankment. The material will be end dumped by truck and spread by dozer in 24 to 48-inch lifts, maintaining a moist in-place compacted density of 100 pounds per cubic foot. Wheel compaction from the haul trucks is the primary compaction method. Reclamation will continue using the layering and compaction techniques until reaching the reclamation contours. Terracing, if any, will not be~~

Chapter III

~~steeper than 2(h):1(v). Cross-sections A-A' and B-B' (Plate III-43) present typical cross-sections of the West Cell area to be reclaimed with coarse refuse material.~~

~~The location of the West Slurry Cell at or above the surrounding topography precludes problems associated with mudflows, rock debris falls, or other landslides into the embankment. Possibility of failure downhill of the embankments is limited to a thin layer of colluvial material on bedrock. Failure of this material would not threaten the embankments.~~

~~Visual inspections by a qualified registered professional engineer or a qualified MSHA impoundment inspector will continue for the West Slurry Cell during reclamation. The inspections will continue to be conducted in accordance with 30 CFR 77.216-3 in assessing the stability of the impoundment and determining the amount of seepage, if any.~~

~~The coarse refuse pile inspections will now include the extension into the West Slurry Cell. The inspections will continue on a quarterly basis by a qualified, registered engineer or other qualified person. Slopes, seepage, and other visible factors which indicate potential failure will continue to be inspected.~~

~~Records of the inspection findings and recommendations will continue to be maintained at the mine site. If the inspection discloses that potential hazards exist, the Division will be informed promptly of the findings. Emergency procedures formulated for public protection, and remedial action measures will be implemented.~~

~~The refuse material may contain material unsuitable as a plant growth medium. The material may also exhibit characteristics of toxic or acid-forming material. Typical coarse refuse material analytical results are presented in Appendix III-15. There is no special segregation of unsuitable plant growth medium or toxic or acid-forming material during disposal operations. Reclamation activities will identify this material, and reclamation procedures will ensure proper covering of it.~~

~~The East and West Slurry Cells are impoundment embankments constructed of coarse refuse material. SCC does not intend to construct any additional impoundment embankments with coarse refuse material.~~

~~There are no plans for coal waste from outside the permit area to be disposed of in the coarse refuse disposal area.~~

Chapter III

(c) Return of coal processing waste to underground workings

No coal processing waste is to be returned to abandoned underground workings during the permit period.

In the late 1950's and early 1960's a backfill plant was constructed to crush a portion of the preparation plant reject and pump the reject underground to fill air courses that were no longer needed and to fill voids above yieldable arch installations. Approximately 700,000 tons of material were pumped underground. The backfill equipment (crushers, screens, rod mill, pumps, etc.) have been removed and the building is now used as a warehouse for preparation plant equipment and materials. The backfilling was done to stabilize main access and ventilation entries and to lessen the occurrence of bumps in such areas.

(d) Underground development waste

The bulk of underground development waste generated by the mining operation at Sunnyside Mines is disposed of in mined-out areas underground. If the rock waste shows unacceptable levels of acidity or toxicity, the rock waste will be mixed with acceptable waste to achieve overall acceptable levels of acidity or toxicity, or hydrologically isolated from the rest of the mine with solid block seals. The operator will submit a map to the Division showing where the material will be placed and the locations of the block seals.

Any underground development waste not disposed of underground will be placed in the coarse refuse pile with the coal processing waste. There is no separate disposal structure for the underground development waste on the surface.

Each geological stratum above and below the coal seam to be mined has been tested for SAR, pH, boron, and acid-base potential (see Section 6.6.3.2 and Table 6.2). Adverse levels for SAR, pH, boron and acid-base potential are defined as: SAR values greater than 10, pH less than 5 or greater than 9, boron greater than 5 PPM, and acid base potential less than -5 tons CaCO₃ equivalent per 1000 tons material.

(e) Industrial waste

Non-coal waste is disposed in ~~the East Carbon City landfill or the industrial waste dump, or~~ ECDC's landfill below East Carbon City or any available approved landfill.

Chapter III

~~The industrial waste dump has been approved by the State Board of Health (Figure III-2). It is located at the northeast end of the East and West Slurry Pond Cells of the refuse disposal area (Plate III-1). The dump was constructed and is used by excavating a trench, compacting the sides and bottom for a water barrier, filling the trench with non-coal waste and then covering the waste with a minimum of two feet borrow material. The industrial dump has not been used since before June 24, 1993 at the request of SCA.~~

~~The Authorization letter from East Carbon City (Figure III-7) allows the operator use of their landfill for disposal of non-industrial wastes.~~

ECDC's landfill or any other available approved landfill can accept our non-toxic and non-hazardous waste. Questionable material is tested prior to disposal.

The non-coal waste from the rotary breaker is disposed in the non-coal waste disposal area at the CRP area just south of the CRP.

The non-coal waste disposed in landfills is material from offices, warehouse, shop, prep plant (including rotary breaker), and underground. It consists of timbers and woodpieces, paper waste, scrap ventilation material, rock dust bags, and other such waste used to supply the operations.

Non-coal waste is temporarily stored in the Non-coal Waste Temporary Storage Area shown on Plate III-45. The area measures approximately 85' by 45' and provides for a maximum capacity of up to 35,000 cubic feet of non-coal waste. Every two months waste will be transported from the temporary storage area by highway trucks, which haul approximately 1500 cubic feet of waste, to either ~~the East Carbon City landfill or~~ the ECDC landfill or any other approved landfill. A maximum time of three months storage of waste without removal will be allowed. If the material is disposed in the industrial waste dump the 100 ton refuse truck will haul the material.

(f) Temporary Refuse Storage

Sunnyside Mine requires two areas of temporary storage of coarse refuse material. The area near the coarse refuse truck loadout is required during routine operations and the area by Sacco Flats is required for continuing operations in other than normal conditions.

Coarse Refuse Truck Loadout Storage Area

The coarse refuse truck loadout storage area (Plate III-5a) consists of three areas totaling 0.7 acres, all adjacent to each

DRAFT

Chapter III

other. The area immediately south of the truck loadout is 0.1 acres in size. The area immediately west of the 1st area is 0.2 acres and the area adjacent to the coal stockpile storage area is 0.4 acres. Total material stored may approach 10,000 tons (approximately 5 operating days of material).

All three areas are used to store spilled material from the loading operations. Spills may occur from truck overloads, conveyor spillage, discharging material without a truck under the chute, and other similar occurrences. These may occur at anytime the preparation plant is running, consequently movement of spilled material to these temporary storage areas is a routine operation.

Material stored at the truck loadout area is dumped in piles with a front end loader. The material is maintained in piles until reloaded and transported to the permanent coarse refuse disposal area.

All surface water runoff associated with the temporary storage areas near the coarse refuse truck loadout are collected and diverted to the SSSF pond (Plate D4-0159). No additional area is disturbed and no additional watershed is created. The material in the pile is +3/16-inch contributing little additional sediments or fines to the SSSF pond. All runoff is finally discharged through NPDES point 014. No flooding events are anticipated that would affect the storage pile and no stream flow alterations are attributed to or caused by the storage pile.

Sacco Flats Coarse Refuse Storage Area

The Sacco Flats area is 1.9 acres in size and is located immediately west of the haul road, just south of the SSSF pond (Plate III-5a). Total material stored may approach 25,000 tons.

This area stores material during an operational or weather related breakdown. On occasion the 100-ton rear dump haul trucks are replaced by 8-ton highway dump trucks. At full production the smaller trucks are unable to keep pace with the coarse refuse output and long haul cycle times to the permanent storage area, thus requiring the temporary storage areas with a short haul. Also, if haul road maintenance or weather problems prevent use of the haulroad to the permanent disposal area, the temporary storage area is used to keep the preparation plant on-line.

Material stored at the Sacco Flats storage area is end-dumped by trucks in piles. The material is maintained in piles until reloaded and transported to the permanent Coarse Refuse disposal area.

Chapter III

The west side of the Sacco Flats temporary storage area is bermed to control and direct surface water runoff from the refuse material. The runoff is diverted as shown on Plate III-5a and eventually channeled to one of three slurry cell ponds (Slurry Cell No. 1, Slurry Cell No. 2, or the East Slurry Cell) through the slurry ditch. No additional area is disturbed and no additional watershed is created. The material in the pile is +3/16-inch contributing insignificant fines or sediments to the slurry ditch and subsequent slurry cells. All runoff is eventually discharged through NPDES point 004. No flooding events are anticipated that would affect the storage pile and no stream flow alterations are attributed to or caused by the storage pile.

Sampling & Testing

Sunnyside recognizes the potential for refuse material to exhibit unacceptable levels of acidity or toxicity. Material in temporary storage longer than 30-days will be sampled and analyzed for acid-forming or toxic-forming materials. Within 36 hours of the final truck cycle the extent of the stored material will be marked with wire flags which will have the date marked to differentiate subsequently stored material. This also will provide the means to determine the appropriate time to sample the material if storage exceeds 30 days.

Upon 31st day of storage, a grab sample of every 10th pile will be collected and thoroughly mixed together for a representative sample of pounds to be sent to a laboratory for analysis. The analytical tests to be performed are:

pH, electrical conductivity, soluble Ca, Mg, & Na,
sodium adsorption ratio, selenium, nitrate, boron,
maximum acid potential, and neutralization potential.

3.4.9.2 Control Measures to Mitigate Impacts

Based on the characteristics, handling and disposal of various waste products discussed in Section 3.4.9.1 above, the impact of the environment is expected to be minimal.

The slurry refuse does not go into the hydrologic system, and is used by SCA in the power plant or disposed according to their approved permit.

~~The coarse refuse is covered with non-combustible waste material and compacted to eliminate ignition effect, if any, on the surface either used by SCA in the power plant or disposed according to their approved permit.~~

No additional waste facilities are planned, since ~~the existing~~

DRAFT

Chapter III

~~structures should have sufficient capacity to last throughout the proposed permit period~~ SCA' power plant will consume the waste or will be adequately handled within the terms of the approved permit of SCA.

3.5.1 Reclamation Plan

The reclamation and revegetation plans are designed to return the disturbed lands to productive uses once mining activities have ceased. These post-mine land uses will be the same as the current and pre-mine uses, i.e., fish and wildlife habitat, recreation, and livestock grazing.

The majority of the areas were disturbed prior to the Coal Mine Reclamation Act of 1977. The affected acreage of all disturbed areas is minimal. Because topsoil was not saved prior to the Act, many of these areas will be revegetated without topsoil.

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Chapter III

Although the plans utilize state-of-the-art reclamation methods, these plans will be revised as new materials and techniques become available.

Site stabilization and erosion control will be obtained through application of the reclamation and revegetation procedures described in Chapters III, VIII and IX. All of the techniques described are proven techniques, either through the operators' experience or from the literature.

3.5.1.1 Contemporaneous Reclamation

Contemporaneous reclamation has been ongoing at Sunnyside for many years. Although written records were not kept, we do know that plantings of crested wheatgrass began in the late 1950's. The streambanks have been reseeded along channelized sections of Grassy Trail Creek, areas adjacent to roads and vacant areas next to buildings.

Variations in the coal market constantly affect the rate and occurrence of mining activities, therefore it is not practical or possible to present a specific timetable for most reclamation activities. Very few contemporaneous reclamation activities are scheduled during this permit term. No final reclamation is planned at the end of the five year permit term. Timing of all reclamation activities will generally follow the sequential schedule presented in Table III-42. The revegetation process will be most successful by adhering to the revegetation schedule in Table III-26.

Areas adjacent to any future disturbances will be revegetated as part of contemporaneous reclamation. Contemporaneous reclamation includes:

(1) Slaughter Canyon Portal Area portal (P 19,) which provided access to the outside raise areas of the No. 1 Mine (Plate III-4) and the adjacent materials storage facility was not needed after early 1981. The portal was sealed in 1982 according to MSHA regulations. The portal and road area were both revegetated in 1983 according to the plan submitted to and approved by DOGM (Appendix III-4).

~~(2) Coarse Refuse Disposal Area (D2) (Plate III-5) is in a state of ongoing construction and reclamation. The pile is constructed in 50-foot vertical increments with 20-foot wide terraces constructed for water runoff and erosion control. Lifts are made in 3-foot increments of compacted refuse. Revegetation test plots of coarse refuse are being used to determine the amount and type of cover material necessary to support diverse and effective~~

DRAFT

Chapter III

~~vegetative growth. After the material and depth of cover are approved by DOGM, cover and revegetation will begin on the slopes and will be ongoing throughout the life of the mine.~~

~~Contemporaneous reclamation activities are concurrent with the coarse refuse disposal process. Backfilling the West Slurry Cell will commence at the southwest end and proceed northeast. The refuse material is dozed and compacted in lifts, building to the final reclamation contours while advancing northeast. Grading to final contours is the final disposal process prior to commencing reclamation stabilization.~~

~~With the conclusion of the stabilization of the west embankment of the West Slurry Cell, expansion of the coarse refuse area into the West Slurry Cell reclaims the existing West Cell to final reclamation contours. Approximately 172 acre-feet (315,000 tons) of material are required to fill the existing West Slurry Cell. Additional material may be temporarily stockpiled on the east side of the West Cell for closure of the East Cell at a future date.~~

~~SCC will construct the fill in the West Slurry Cell in a similar fashion to the construction of the coarse refuse embankment. The material will be end dumped by truck and spread by dozer in 24 to 48-inch lifts, maintaining a moist in-place compacted density of 100 pounds per cubic foot. Wheel compaction from the haul trucks is the primary compaction method. Reclamation will continue using the layering and compaction techniques until reaching the reclamation contours. Terracing, if any, will not be steeper than 2(h):1(v). Cross sections A-A' and B-B' (Plate III-43) present typical cross-sections of the West Cell area to be reclaimed with coarse refuse material.~~

~~Sunnyside Coal Company commits to reclaiming the Coarse Refuse Disposal Area on a contemporaneous basis starting one year from the date of Sunnyside Cogeneration Associates' permit application, if that permit application has not been approved by that date, which is August 20, 1993. SCA's permit application allows the use of the coal waste in the area as fuel feed to the cogeneration plant.~~

(3) Water Canyon Portals Area is being contemporaneously reclaimed.

(4) Fan Canyon Portals Area is being contemporaneously reclaimed.

(5) No. 2 Canyon Exhaust Fan Shaft Area is being contemporaneously reclaimed.

(6) Mine Site Areas. Beginning in 1993 a program was established to clean up, remove and reclaim on a contemporaneous

Chapter III

basis various unused disturbed sites, equipment and structures, which have been determined to no longer have a use in the mine operations. Areas which meet this determination are:

- (a) No. 2 Canyon Supply Yard
- (b) portions of the mine track leading to the above
- (c) the Rotary Dump for mine cars
- (d) portions of the Prep Plant known as the Backfill Plant, Stockingout Conveyor and Old Loadout Facility
- (e) portions of the Upper Bath House (Manshaft) Facility Area

Disturbances created prior to the ACT are delineated on Plates III-20 through III-23. Typically these pre-law disturbances were revegetated with crested wheatgrass. The maps make clear the level of reclamation required as currently required by the DOGM.

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Those disturbed areas which have been revegetated prior to the ACT were mapped in the fall of 1983 and are also shown on Plates III-20 through III-23. These maps delineate pre-law areas which remain to be revegetated and will enable determination of the level of reclamation required for any pre-law areas which may be redisturbed.

Upon completion of the Methane Drainage Borehole facility, as soon as weather conditions allow, the drill pad will be permanently reclaimed as outlined in section 3.5.5., except for the wellhead and shack. The access road shown on Plate III-1Di is temporary, to be used only during facility construction. The temporary access road will also be reclaimed upon completion of the facility, and will not be used except for emergencies after reclamation.

3.5.1.2 Soil Removal and Storage

Because the Sunnyside Mines have been active since the late 1800's, the permit area includes ~~136.645~~ acres areas of land which were disturbed prior to the 1977 Act that did not require topsoil removal before mining or surface facilities construction. The present status of this land includes active and inactive non-reclaimed areas as well as some reclaimed sites.

~~The 83 acres encompassed by the refuse and slurry piles will remain active until cessation of mining activities, although some reclamation of this area will occur contemporaneously.~~

Very little topsoil will be available for use in reclamation for any lands that were disturbed prior to the 1977 Act because topsoil material was not salvaged. In addition, estimation of the available in-place soil quality or quantity is difficult because many large areas have been disturbed, regraded, and spread with clinker and some of these areas have been revegetated. No records exist about disturbances, but we do know that part of the main facilities are located on a pre-existing townsite and that much of Grassy Trail Creek has been channelized, resulting in increased perturbation of the soils.

Large portions of the facilities are located over the HBC (Haverson fine sandy loam) mapping unit, which has an average depth of sixty inches (Plate VIII-1). Potentially, this material is available for revegetation. Although this soil becomes increasingly alkaline with depth, the texture remains suitable for plant growth. The extent of activities on this soil series is unknown, but no toxic materials were present in the test pits. In order to characterize and determine the extent of the in-place soils in

DRAFT

Chapter III

these areas, several test pits were dug around the facilities in the fall of 1983.

Within each soil pit, soil samples were taken at twelve inch increments. A visual examination of soil texture, color, and quality was also made. Details concerning the sampling methods, laboratory procedures, and results are contained in Chapter VIII.

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Chapter III

Prior to re-disturbance of some areas, seven ~~four~~ stockpiles of soil materials were saved from several sites. The histories of these soils are unknown. The location of each soil material stockpile is indicated on Plate VIII-1, and the quantity of material contained within each stockpile is indicated as follows:

QUANTITIES OF STOCKPILED TOPSOIL

<u>Stockpile Location</u>	<u>Quantity</u>
East Borrow Pit	36,600 cu ft
002B Pond	35,300 cu ft
No. 3 Hoisthouse Pond (@SCA Borrow Area)	4,200 cu ft
Slurry Pond Pile	127,900 cu ft
Haul Road Pile	102,200 cu ft
Reclamation Test Plot	67,500 cu ft
Twinshaft Pond	32,600 cu ft
Rail Cut Pile	15,800 cu ft
<u>Total</u>	<u>386,800 cu ft</u> 139,600

The soils contained in these stockpiles are currently committed for use in topsoiling the sites from where the soils were removed.

~~Several borrow areas have been identified for use in future reclamation (Plate III-1). The quantity of borrow material that will be required to cover the portals and other areas is identified by reclamation area in Table III-9. The quantity of borrow material that is available is identified by Borrow Area in the table shown below. The total amount of borrow material that will be required is about 427,700 cu yd; the amount of material available is 683,650 cu yd. It is anticipated that all of the borrow material will be taken from Borrow Areas 1 through 5. If more borrow material is required, Reclamation Area 1 can be expanded to the south for a considerable distance. Grassy Trail Dam Borrow Area will be used only if conditions at the end of mining warrant.~~

Chapter III

Available Industrial and Reclamation Borrow Material

<u>Borrow Area</u>	<u>Acres</u>	<u>Depth (ft.)</u>	<u>Cubic Yards</u>
			<u>Available</u>
(1) Industrial Area 1	3.42	8.5	46,899
(2) Industrial Area 2	3.25 ⁽¹⁾	0.0	0
(3) Industrial Area 3	3.36 ⁽²⁾	12.0	32,525
(4) Reclamation Area 1	30.14	12.0	550,726
(5) Grassy Trail Borrow ⁽³⁾			8,500
TOTAL			638,650

- ~~(1) Industrial Borrow Area 2 has been used for industrial purposes and is substantially gone.~~
- ~~(2) Approximately 10 ft. of this material has been used and 6 ft. remains in place.~~
- ~~(3) Grassy Trail Dam Borrow Area is a slide area and the acres and depth have not been determined. This area was approved by DOGM in a letter dated November 27, 1984 (Figure III-4).~~

The Reclamation Borrow Area and its extension has been identified as possibly 30 acres for soil substitute and fill material for future use. The existing approved area covers approximately 10 acres; the remaining 20 acres will need to be approved in a permit amendment prior to use. The total material available in the 30 acres using a 10 foot borrow depth is 484,000 cubic yards. The total amount of borrow material required is 77,009 cubic yards; Table III-45 allocates the material by area. Using a 10 acre borrow area, the required volume would then be removed from the borrow area at a depth of 5.3 feet. In order to cover the entire 282.55 182 acres of existing disturbance with 12" 18" of topsoil, 455,847 440,000 cu. yds. of material would be required.

Some of the borrow areas fall on the property currently owned by Sunnyside Fuel Corporation Cogeneration Associates. The Sunnyside Mine operator has rights to access the borrow areas to use topsoil and subsoil for reclamation on the Sunnyside Mines property during contemporaneous or final reclamation. Any use of these rights will be co-ordinated with the Division in accordance with the approved permits.

Permit Amendment 92F, "Coarse Refuse Borrow Area Extension" (approved 6/15/92), designates an additional 1.25 acres adjacent to Industrial Borrow Area #2 for capping fires in the coarse refuse pile and for contemporaneous reclamation.

Chapter III

~~—Test pits were dug to identify and evaluate the soil materials in these borrow areas. Information concerning the test methods, laboratory procedures, and results are discussed in Chapter VIII. It should be noted that the extent and quantity of these borrow materials is limited, and the material available will not adequately cover all areas that have been disturbed.—~~

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Chapter III

Because the practice of borrowing topsoil material requires the area be disturbed, this ultimately results in more acres being disturbed and reduces the total productivity. Therefore, borrow area materials use will be limited. These soils will only be used on areas where vegetation is not successful, or in other required circumstances such as covering the coal seams, refuse areas or portals.

Revegetation test plots have been approved by the DOGM and will evaluate revegetation success under several soil depths, amendments, and seeding regimes (Appendix VIII-3). The results of these tests should provide information concerning the most appropriate reclamation techniques and procedures to ensure revegetation success.

Any areas contaminated with oil or other petroleum products will be excavated and the material disposed in the refuse pile. These areas are ~~expected to be few and small in extent~~ **identified in Table III-42**, and will be covered with soil material and then revegetated.

Additional surface disturbances within the permit area are not currently anticipated. If any new areas are to be disturbed in the future, a permit amendment will be submitted to DOGM containing details of the site specific plans for topsoil removal, testing, stockpiling, and redistribution.

Handling of topsoil during mining operations involves removal of vegetation, topsoil stripping, stockpiling, and replacement of the topsoil onto the areas to be reclaimed. Trees and large shrubs will be removed prior to topsoil removal. Small shrubs, grasses, and forbs will be collected with the topsoil material since these materials increase both the available organic matter in the soil and the available seed stock. Topsoil will be removed to a depth determined by information contained in Appendix VIII-1 and confirmed in the field.

Stockpiles will be contoured, stabilized, and protected from wind and water erosion by seeding with rapidly establishing grass and forb species. Fertilizer will not be required for stockpiles. Stockpiles will be seeded with the sage/grass seed mix shown in Figure III-8 that was approved by DOGM on November 4, 1986. Because contractors are frequently used at the Mines for reclamation efforts, the precise equipment that will be used cannot be predicted. However, standard reclamation equipment and techniques will be employed in order to ensure stabilization and vegetation success.

Chapter III

~~No topsoil is currently stockpiled for the reclamation of the West Slurry Cell Area. Consequently, SCC intends to use substitute soil from the Topsoil Borrow Area (Plate III-1, 1 of 3, "Surface Facilities, Hydrology, and Pre-law Disturbance Vegetation"). The substitute soil material available from the Topsoil Borrow Area is virtually the same soil material adjacent to the Coarse Refuse Pile. The soil is the Strych soil type, and is discussed in Chapter VIII.~~

3.5.3 Final Abandonment

3.5.3.1 Sealing of Mine Openings

Shaft openings required to be sealed shall be effectively capped (Plate III-18 1 of 3). The cap will consist of a six-inch thick concrete and a steel plate cap with a 25-foot high, 2-inch steel vent pipe above the surface of the shaft.

Slope or drift openings will be sealed with an MSHA approved seal or be completely filled with noncombustible material for a distance of at least 25 feet into such openings.

There are 41 mine portals and shafts within the Sunnyside permit area that will be permanently sealed during abandonment. These portals are specifically located on Plate III-1.

At most mine openings, highwall reduction will place sufficient material over any concrete portal material to eliminate any additional work. In instances where the concrete portal material may be visible after regrading, the portal structure will be demolished and placed inside the portal against the permanent seal.

There are a limited number of portals that were broken to the surface from workings inside the mine. Many of these portals are located on top of sandstone cliffs and are inaccessible except by walking and pack horse. These portals will be blasted shut for at least 25 feet from the portal, if possible, to prevent access.

The plugging and management of drill holes will adhere to the procedures stipulated by the United States Geological Survey as detailed in Table III-4. See Table III-10 for drill hole sealing and casing costs.

The Methane Drainage Borehole will be reclaimed as shown on Table III-10 unless a Permit Change designating a post mining use is approved by the Division.

Refer to Section 3.5.7.1 for the cost estimate for sealing shafts and portals.

3.5.3.2 Removal of Surface Structures

(a) At the conclusion of mining, all surface structures, with the exception of those permanent structures marked on Plate III-1 and noted on Table III-1, will be dismantled, removed and the land graded to blend with the surrounding areas. The archway over the No. 2 Canyon Drainage is a temporary design and will be removed during final reclamation.

(b) Outlying surface facilities including portals, ventilation shafts, substations, upper bathhouse, equipment and material storage areas, preparation plant, power transmission lines, mine water lines, methane borehole pad and pipeline, and unit train loadout, will be dismantled and eliminated.

(c) Most roads will be left to provide access for grazing and recreational activities. Those roads not left for future use will be ripped, contoured and revegetated. The roads which will not be reclaimed are illustrated on Plate III-1.

(d) The area at the mouth of Pasture Canyon, containing the rodeo grounds and stables will be left intact.

(e) The water supply facilities will remain after completion of mining to supply culinary water to residents of the towns. Since new mines are being planned in nearby areas, it is believed the towns will remain occupied beyond the projected life of the existing mines.

~~(f) The preparation plant reject and industrial waste disposal facilities are in areas approved by MSHA and the Utah State Department of Health (see Plates III-1 and III-5). During the period the disposal sites are active, they will conform to applicable state regulations such as degree of slope, compaction, and coverage with inert material. Upon completion of mining activity, these areas will be scarified, covered with topsoil or material capable of supporting plant life, if necessary, and revegetated. Disposal and regrading are ongoing processes. Plans for final revegetation for the refuse are still being evaluated (Chapter VIII and 3.5), however, a conservative estimate of borrow cover and revegetation are included in the bond calculations.~~

Chapter III

3.5.3.3 Disposition of Dams, Ponds and Diversions

(a) Grassy Trail Dam and Reservoir

This facility, constructed in 1952, is jointly owned by Sunnyside Reclamation and Salvage, Inc., and BP Coal America Inc. who holds the majority interest. It provides culinary water to the towns of Sunnyside and East Carbon as well as mine facilities of the two companies.

The Sunnyside Mines operator will maintain ownership and liability of the reservoir after the permit if the ownership is not transferred to the towns.

~~If ownership of Grassy Trail Reservoir is transferred to another party, public or private, prior to bond release, Kaiser Coal Corporation will renovate the dam to design specifications previously approved by the Dam Safety Division of the State of Utah prior to transfer.~~

(b) Sediment ponds

All sediment control ponds no longer needed when reclamation of the disturbed area is completed, will be contoured and revegetated. See Table III-21 for pond reclamation requirements.

(c) Diversions

No diversion structures are currently planned, but if they are constructed, permits will be obtained prior to construction and reclamation will be in conjunction with adjacent disturbed areas.

~~(d) Slurry Ponds~~

~~The West Slurry Cell area will be contoured to the reclamation contours in the approved permit (reference Drawing E4-041).~~

~~Following grading and prior to topsoiling, the recontoured surface will be scarified by motorgrader at a minimum depth of 6-inches to ensure bonding between the fill and soil. The scarified surface will be sampled to a depth of 4-feet on 2-acre centers to determine material suitability for the vegetative root zone. The results of this sampling will determine the depth of soil on the recontoured surface. Soil will be placed from 1-foot to 4-foot in thickness based on the results of the material suitability test.~~

~~Soil placement will typically occur in late summer. This allows revegetation activities to occur in October and early Nov.~~

Chapter III

~~No topsoil is currently stockpiled for the reclamation of the West Slurry Cell area. Consequently SCC intends to use substitute soil from the Topsoil Borrow Area (Plate III-1, 1 of 3, Surface Facilities, Hydrology, and Prelaw Disturbance Vegetation) as presented in the approved permit. The substitute soil material available from the Topsoil Borrow Area is virtually the same soil material adjacent to the Coarse Refuse Pile. The soil is the Stryeh soil type and is discussed in Chapter VIII of the approved permit.~~

~~Following placement of the substitute soil, soil samples will be taken on a 2-acre spacing to determine soil nutrients. The sample will be tested for EC, conductivity, texture, pH, available phosphorus, and potassium. Based on the test results, a soil amendment plan will be established.~~

~~After the final grading and soil placement, the soil will be scarified, as needed, and the surface left with a rough texture to promote rainfall retention and plant growth. Typically the soil will be drill seeded on the rough surface. In areas of severe wheel compaction of the soil, the soil will be loosened by discing or harrowing prior to seeding.~~

~~Seedbed preparation, application of soil amendments, seeding, and mulching activities are typically performed by a reclamation contractor. Seed mixes are listed in the approved permit. Seed mixes will be drilled whenever possible or broadcast as a hydromulch at twice the drill rate on steep terrain. Hay mulching at 2-tons per acre and wood fiber at 105 lbs per acre will follow seeding.~~

~~Division approval will be obtained prior to commencing disposal of coal waste material from outside the permit area in the coarse refuse disposal area.~~

~~No coal processing waste is to be returned to abandoned underground workings. Coal waste was previously disposed of underground. These operations ceased and the backfilling facilities have been removed.~~

~~Maintenance of the coarse refuse disposal area consists of filling and grading erosion or other failure features on an as needed basis. Wheel compaction of the disposal area ensures mass stability and prevents mass movement in addition to preventing combustion of the refuse material.~~

~~Surface water drainage control is maintained on an as needed basis, ensuring proper drainage control of surface water runoff. In the event of a significant accumulation of water in the West Slurry Cell during reclamation, the water will be pumped from the West Slurry Cell and discharged to the surface~~

Chapter III

~~drainage control system after an appropriate settling time.~~

~~Road surfaces and berms/ditches are maintained with a motorgrader. Water or other dust control measures are applied as required during hauling periods to reduce dust. General road maintenance consists of erosion control, repair of structures and drainage systems, removal of debris from culverts and berms/ditches, and replacement of road surfacing material as needed.~~

~~Extension of the coarse refuse pile into the West Slurry Cell area does not alter final reclamation goals and plans. The extension hastens the completion of the reclamation of this area.~~

~~Backfilling the West Slurry Cell will commence at the southwest end and proceed northeast. The refuse material is dozed and compacted in lifts, building to the final reclamation contours while advancing northeast. Grading to final contours is the final disposal process prior to commencing reclamation stabilization.~~

3.5.4 Backfilling and Grading Plans

3.5.4.1 Recontouring

Recontouring and regrading will be done with bulldozers, scrapers, maintainers, backhoes or front-end loaders. The work will be done prior to replacement of any soil material and after removal of any facilities.

Each site to be disturbed will be contoured to blend with adjacent undisturbed areas. They may not be returned to original contours, as those are unknown in several instances. Small area cuts and fills will be restored using a front-end loader, bulldozer, or backhoe. Road bases, such as Fan Canyon, will be regraded to blend with rugged topography. Berms will be removed and the road bed ripped to blend with rugged topography.

The post-mine contours will remain approximately the same as the current contours. Final leveling and regrading changes will typically be so small, they will no appear on the map. The final contours will approximate those shown on Plate III-1.

~~The coarse refuse pile is contoured throughout is construction according to UMC 817.81-93 and the plan submitted in Section III. Any coal seam exposed because of a portal opening will be covered with four feet of non-toxic material.~~

Chapter III

The common depth of topsoil for the mapping units described from the disturbed sites is three inches. Most soil mapping units have only a thin A horizon situated directly over the C horizon. The HBC mapping unit has a 6-inch A horizon, 30-inch B horizon, and 24-inch C horizon. All of this mapping unit located within the permit area has been previously disturbed.

Any borrow material to be used will remain in place (Plate III-1) until the material is needed. For placement on large areas the material will be loaded, moved, and spread to an even depth of **18" or a greater depth as determined by revegetation studies.**

On all areas that are regraded without topsoil or covered with topsoil, material will be tested for fertility and potential toxicities at an average sampling rate of ~~three samples per acre~~ **2 acres per sample.** Soil samples will be taken from each site after the soil has been spread and prepared for seeding. Samples will be taken both from the surface (0-3" depth), and at a depth greater than six inches. Samples will be analyzed for fertility, texture, pH, conductivity, lime, organic matter, nitrogen, phosphorous, potassium, zinc, iron, manganese, and copper. Analyses for metal toxicities will also be run if the material has not yet been evaluated, or if field conditions warrant.

Native plants are typically adapted to soils of low fertility and certain texture and chemical characteristics. When reclaiming with the use of topsoil, addition of fertilizer is commonly not necessary. However, this may not be the case with soils still in place beneath buildings and other facilities. For instance, zinc, a necessary micronutrient for plant growth, was absent from one source of borrow material.

Any necessary soil nutrients will be spread prior to revegetation according to interpretation of test results and the species to be planted. If needed, phosphorous (P_2O_5) will be disked into the soil prior to planting. Nitrogen fertilizer (ammonium nitrate) will also be added if soil testing and interpretations indicate it is necessary.

Soil material will be worked on the contour whenever possible, unless there are steep slope limitations. Soil will be placed as evenly as possible. After facility removal on areas where no soil material will be replaced, the ground will be ripped with a bulldozer to a depth of eighteen to twenty inches to loosen the surface material and increase infiltration. The site will then be graded to its final contour and sampled for chemical analysis prior to planting as described above.

Chapter III

3.5.5 Revegetation Plan

The revegetation plan has been designed to re-establish several plant communities on the disturbed sites that are self-sustaining and capable of controlling erosion. Species have been selected which are important for supporting and complementing the planned post-mine land uses of fish and wildlife habitat, recreation and livestock grazing. Perennial forage species selected will minimize the amount of disclimax species such as Bromus tectorum.

~~Little variation in revegetation techniques are expected to be necessary at Sunnyside, with the exception of techniques required on the coarse refuse. The revegetation techniques on the coarse refuse are currently under study. The purposes of this study are presented in Appendix III-7. The refuse material may contain material unsuitable as a plant growth medium. The material may also exhibit characteristics of toxic or acid-forming material. Typical coarse refuse material analytical results are given in Appendix III-15. There is no special segregation of unsuitable plant growth medium, or toxic or acid-forming material during disposal operations. Reclamation activities will identify this material and reclamation procedures ensure proper covering of this material. Other supporting information is in Chapter VIII.~~

The primary differences between sites will be application of seed mixes appropriate to each habitat type. The amount of tackifier is doubled on steep slopes. Soil preparation equipment varies, e.g. bulldozer, tractor, disk, maintainer, front-end loader, etc. depending on site specific conditions and equipment availability. Seeding will be by a drill on level to gently sloping areas and hydroseeding on steeper or less accessible areas. When the hydroseeder is used the seed rate is increased (Tables III-15 through III-18).

3.5.5.1 Soil Preparation

Prior to seeding, soil will be disked or scarified if a crust has developed since final grading or disking of phosphorous. Otherwise, no special soil preparation will be necessary after final grading and addition of any necessary nutrients.

~~Special soil preparation, such as the addition of lime, may be necessary prior to revegetation of coarse coal refuse. This factor~~

CHAPTER III

~~is currently under study (Chapter VIII).~~

~~The coarse refuse disposal areas will require the placement of a substitute soil. Following the placement of the substitute soil, soil samples will be taken on a 2-acre spacing to determine soil nutrients. The samples will be tested for EC, conductivity, texture, pH, available phosphorus, and potassium. Based on the test results, a soil amendment plan will be established.~~

3.5.5.2 Seeding and Transplanting

The revegetation plan addresses each habitat type or vegetation type and not each disturbed site. As the disturbed areas are relatively small, each facility or area will be reclaimed to the appropriate habitat type in which it occurs. These are illustrated on Plate III-1.

~~The exception to the revegetation plan is the coarse refuse and slurry ponds. Until research is completed, it is uncertain what habitat type will be created. It is likely, however, that the area will be returned to a shrub/grass type rather than a woodland.~~

All disturbed areas will be seeded the first planting season after site preparation is complete. The Soil Conservation Service recommends autumn seeding (George Cook, personal communication). Many native shrub seeds have a stratification requirement and autumn planting will allow these seeds to overwinter (Monson and Christensen, 1975). Spring seeding of grasses and forbs can also be done. If any transplanting becomes necessary, it will be in early spring to allow the trees and shrubs to naturally break dormancy.

The seed mixes have been carefully prepared according to the habitat type to be reseeded, the post-mine land uses, erosion control capability and seed availability (Tables III-15 through III-18 and Figure III-8).

Experience has proven the addition of annual and exotic grasses, which have quick establishment rates, is detrimental to the establishment of nature species, both seeded and invaded (Oaks 1981, Wolfe 1982). Therefore these have been omitted. All species combined will provide erosion control. Table IX-39 describes documented forage values of the species to be used for deer and elk. The mixes may vary from year-to-year, depending on seed availability and cost.

CHAPTER III

areas delineated and identified in Table III-25. In addition to the total contract and reclamation costs, there are a number of add-on costs including supervision, overhead and monitoring costs. Equipment mobilization and demobilization cost includes the cost of transporting necessary reclamation equipment.

The cost of reclaiming the arches over No. 2 Canyon Wash is given in Table III-41.

The reclamation bond has been computed for post-law disturbances and pre-law disturbed areas which have been used since 1977.

No bond is calculated for areas disturbed and revegetated prior to 1977 and illustrated on Plates III-20-23.

There will be additional revegetation of unbonded pre-law areas in the future. These areas have been mapped (Plates III-20 through III-23) illustrating the current condition of the pre-law disturbances. In Appendix III-10 these areas are described and the acreages are listed in Table 2. About 50% of these pre-law disturbances were revegetated in the 1960's and about 33% remains in a completely disturbed condition.

The costs for equipment use and ownership have been taken at ~~current (1990) Blue Book values (Table III-31) from the 1993 Means Sitework and Landscape Cost Data book and compiled in Table III-31. For those pieces of equipment not in the Blue Book costs, depreciation, repair frequency and cost of operating similar size pieces of equipment were used to estimate ownership and operating costs.~~ The hours used for estimating equipment usage are based on the Caterpillar Handbook and field or supervisory experience in reclamation and revegetation or as cited.

3.5.7.2 Bond Estimate

Mine Portal Sealing

There are 33 portals (Table III-5) and 8 shafts (Table III-5) within the Sunnyside permit area that have not been reclaimed. Nine portals have been sealed but not covered and reclaimed. The portals and shafts are located on Plate III-1. The descriptive parameters are described in Plate III-18 (1 of 2) and Plate III-18 (2 of 2). Tables III-6 and III-8 give a summary and details of shaft sealing costs. Table III-5 gives detail and summary costs for portal sealing.

CHAPTER III

Portal Closure and Fill

Portal closure and fill costs (Table III-9) include the transport of enough fill material to cover portals to blend with topography where no highwall regrading was calculated. Costs are also included to blast shut portals on top of cliffs that cannot be accessed by equipment. There would be major surface disturbance to construct access roads to close the portals that the operator is proposing to blast shut.

Dismantling and Removing Facilities

A complete list of facilities is included in Table III-1 and shown on Plate III-1. ~~Several of the facilities are to remain after closure for use by the towns of Sunnyside and East Carbon.~~ The cost of facilities removal was derived from the Means Construction Handbook (1986) **Sitework and Landscape Cost Data book (1993)**. These costs include facility dismantling and removal from the site. Foundation breakage and burial sufficient for regrading and reclamation is included. Table III-1 gives the breakdown and cost estimate for facility removal. Unit costs for floor slab removal were converted from costs per square foot to costs per cubic foot for slabs and foundations to allow for ease of calculations when slab thickness varied. Footing removal unit costs were also converted from cost per linear foot to cubic foot. Some of the foundations are covered when the area is regraded and will not be removed.

Tables III-1A and III-1A(i) give calculations and costs associated with the removal of the mine water pipelines.

Power line removal costs were an average of previous removal cost estimates and bids.

Culvert Removal

A total of ~~26~~ 54 culverts (Table III-22) are to be removed inside the permit boundary during reclamation. Cost and source of information are shown on the table.

Drill Hole Plugging

Two drill holes are known to be open, based on presently available records. **A Degasification borehole has been proposed and approved.** Cementing costs are shown in Table III-10.

DRAFT

CHAPTER III

through 9 were based on cross-sections on Plate III-32. Volumes for the unit train loadout and preparation plant highwalls were based on regrade contour volumes shown on Plate III-42. Cost calculations are shown on Table III-20.

Regrade Outside Cut Slope Areas

General area regrading involves scarifying and recontouring general areas to achieve positive drainage and break up the ground surface for seeding. The Water Canyon refuse will require the placement of ~~6,018~~ **24,072** cu. yds. (\pm 4' depth) of borrow material for suitable cover prior to revegetation. ~~There are 47.04 acres of refuse (4-ft. of cover) and 71.49 acres of slurry (1-ft. of cover) that will require scarifying.~~ All unit costs are developed in backup cost calculations on Tables III-32 through III-36.

Pond Reclamation Costs

There are ~~eleven~~ **five** sediment ponds and ~~two~~ **three** mine water discharge ponds (Table III-21) on the Sunnyside permit that will require filling and leveling during abandonment. Yardage developed to fill and blend the pond with surrounding topography was assumed to be equal to the pond capacity to the top of the embankment. Material movement costs were from Table III-35 based on average push distances shown in Table III-21 with no ripping required.

For bonding purposes, it was assumed eight sediment ponds would have to be sampled only once each over the ten year period. Labor and lab costs are shown on Table III-30.

The monitoring costs are calculated and listed on Table III-35.

Soil Testing, Preparation, and Fertilizing

The soil testing will be done following the removal of facilities and after ripping and regrading. For bond purposes it was assumed that soil tests would be needed on all disturbed acreage. It was estimated that an average of three samples per acre would be needed to determine soil quality and fertility. Sample costs are from ~~Beekeliffs/ACZ Laboratory~~ **current labs**.

Nitrogen (ammonium nitrate) and Phosphorus (P_{205}) will be applied at the locations and rate that soil tests indicate. Assuming worst case, the soil tests indicate some soils could use 40 lb/acre of nitrogen and 30 lb/acre of phosphorus (recommendation - Colorado State University Soils Laboratory). Fertilizer would be applied with a tractor and spreader and ground will be disked to break surface crusting. Table III-12 details unit cost and Table III-25 summarizes cost by area.

CHAPTER III

Revegetation

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Revegetation costs were calculated for drilled (Table III-14) and hydroseeded (Table III-13) areas using four different vegetation seed mixtures. All areas will have hay mulch and/or tackifier applied. The cost of the seed mix for each vegetation type is presented in Tables III-15 through 18. The weighted average cost of revegetation at Sunnyside is found in Table III-11.

Responsibility Period Monitoring

Costs for responsibility period monitoring, described in Section 3.5.6.1, are shown on Table III-30.

Contractor Mobilization & Demobilization

A fixed cost of \$10,000 was included for costs of moving equipment and necessary portable facilities in and out of the job site for one or more contractors during the job period.

Revegetation Failure

Revegetation failure is high in the high desert environment of Utah where the rainfall is light and erratic during the summer months. A 40 percent failure rate was assumed for all disturbed acreage. Additional cost would include unit costs covered in soil testing, preparation, and fertilizing and revegetation costs described above.

Reclamation Management

A full time on-site manager during the reclamation phase of the project has been added for eight months at ~~\$4,000~~ \$5,000 per month.

Contingency

A contingency of 10 percent for the reclamation has been added to cover unforeseen costs.

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LIST OF EXHIBITS

FIGURES

- ~~III-1~~ — ~~Approval of MSHA Fire Extinguishing Plan~~
- ~~III-2~~ — ~~Approval of Industrial Waste Dump~~
- III-3 Grassy Trail Creek Water Rights
- III-4 Grassy Trail Creek Dam Borrow Area
- III-5 Subsidence Barrier Cross Section
- ~~III-6~~ — ~~Certification of the Slurry Cells and Coarse Refuse Pile~~
- ~~III-7~~ — ~~Landfill Use Approval Letter~~
- III-8 Approved Interim Seed Mixture
- III-9 Modification of UPDES Permit
- III-10 Rotary Dump Alternate Coals Storage
- III-11 Twin Tanks Alternate Coals Storage
- III-12 #2 Canyon Boiler Drainage Area
- III-13 #2 Canyon/Whitmore Canyon Confluence
- III-14 Typical Channel Section, #2 Cyn Arches
- III-15

TABLES

- III-1 Estimated Cost of Dismantling & Removing Facilities
- III-2 Roads Within the Permit Area
- III-3 Revised Road Specifications
- III-4 USGS Stipulations Covering Surface Drilling Programs

DRAFT

CHAPTER III

TABLES

III-29	Total Performance Bond Estimate
III-30	Ten Year Responsibility Period Monitoring
III-31	Equipment Operating Costs
III-32	Cat 225 Backhoe Production With 8'-0" Stick
III-33	Cat 988B Loader Production
III-34	Cat 633D Production & Operating Costs
III-35	Estimated Dozer and Ripper Production with D8L
III-36	Estimated Dozer Production — D8L
III-37	Preparation Plant Highwall Area - Cut-Fill Balance
III-38	Train Loadout - Cut-Fill Balance
III-39	#2 Cyn Channel X-section Peak Flow Calculations
III-40	#2 Cyn Channel X-section Dirt Volume Estimate
III-41	#2 Cyn Channel X-section Reclamation Cost Estimate
III-42	Contaminated Soil Removal Cost Estimate
III-43	Reclamation Areas by Type of Work
III-44	Earthwork Volumes
III-45	Soil/Fill Material Needed form Borrow Area
III-46	Soil/Fill Material Truck Haulage Costs
III-47	Culvert Removal Cost Calculations
III-42 48	48 thru 49 are not used and are available for future use.
III-50	Alternate Sediment Control Areas

APPENDIXES

Appendix III-1	Designs of sediment control structures
Appendix III-2	Division and State Board of Health

DRAFT

CHAPTER III

approvals for existing and proposed ponds

Appendix III-3 Approval of control measures given by the
Division

Appendix III-4 Slaughter Canyon Reclamation Plan and
approval

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DRAFT

CHAPTER III

APPENDIXES

- ~~Appendix III-5~~ ~~Geotechnical investigation of slurry impoundments~~
- ~~Appendix III-7~~ ~~Purpose and design of Sunnyside experimental revegetation plots on coarse refuse~~
- Appendix III-9 Agreement with Division on roads to remain for post-mine land use
- Appendix III-10 Breakdown and description of pre-law revegetation
- Appendix III-11 Hydrology information for #2 Cyn Trestle area to Lower #2 Cyn Sediment Pond
- Appendix III-12 Hydrology information for #2 Cyn Arches (Peak Flow)
- ~~Appendix III-13~~ ~~Geotechnical Report on Refuse Pile (February 1987)~~
- ~~Appendix III-14~~ ~~Coarse Refuse Pile Compaction Test Results~~
- ~~Appendix III-15~~ ~~Coarse Refuse Sample Analytical Results~~
- Appendix III-16 Fan Canyon BTCA Hydrology Information

PLATES

- Plate III-1 Surface facilities, hydrology to pre-law disturbance vegetation (1-3)
- Plate III-1A **Surface Facilities (North)/(South) (1-2)**
- Plate III-1B **Main Surface Facilities Middle**
- Plate III-1C **Whitmore Fan Area - Surface Facilities Detail**
- Plate III-1D **Manshaft Area - Surface Facilities Detail**
- Plate III-1E **Surface Facilities - Outcrop Fan Area**
- Plate III-1F **Main Surface Facilities North**
- Plate III-1G **Main Surface Facilities South**
- Plate III-2 Transportation facilities map

CHAPTER III

PLATES

Plate	III-3	Approximate timing and sequence of underground map
Plate	III-3A	Groundwater Monitoring Map
Plate	III-4	The Sunnyside underground geology and hydrology description map (revised)
Plate	III-5	Coarse refuse toe pond (revised) 1. Coarse refuse area 2. Coarse refuse toe sediment pond plan 3. Coarse refuse toe sediment pond as-built 4. Coarse refuse toe borrow area
Plate	III-6	Rail cut pond (1-4)
Plate	III-7	Pasture pond (1-3)
Plate	III-8	Refuse road I (1-3)
Plate	III-9	No. 3 Hoisthouse Pond and Drainage Plan (A-B)
Plate	III-10	Number Two Canyon Ponds and Drainage Plan (A-C)
Plate	III-11	Manshaft Sediment Pond, Access Crossing, and Drainage Plan (A-C)
Plate	III-12	Sunnyside Surface Facilities Sediment Pond and Drainage Plan (A-D)
Plate	III-13	Slurry pond
Plate	III-14	Twin shaft discharge pond Manshaft 001 Discharge)
Plate	III-15	Whitmore Fan Area Mine Water Discharge Pond 002A and Drainage Plan (A+D)
Plate	III-16	Road and utility right-of-way
Plate	III-17	Road cross sections
Plate	III-18	Shaft and mine opening seals (2 maps)
Plate	III-19	Topsoil stockpile cross sections

PLATES

CHAPTER III

Plate	III-20	Pre and post law disturbances map 1
Plate	III-21	Pre and post law disturbances map 2
Plate	III-22	Pre and post law disturbances map 3
Plate	III-23	Pre and post law disturbances map 4
Plate	III-24	Disposal area post mine contours
Plate	III-25	Refuse Haul Road (1-3)
Plate	III-26	Permit sign location map
Plate	III-27	Slurry ditch and surrounding areas drainage patterns as designed
Plate	III-28	Permanent bridges and culverts
Plate	III-29	Alluvial valley floor
Plate	III-30	Typical stream channel section
Plate	III-31	Cross sections alluvial valley floor (1-4)
Plate	III-32	Highwall reductions alluvial valley floor (1-2)
Plate	III-33	Small area exemptions (BTCA Areas)
Plate	III-34	Silt fence installation (typical)
Plate	III-35	Culvert and ditch protection measures
Plate	III-36	Subsurface water contours
Plate	III-39	Facilities Area Post Mine Contours
Plate	III-40	Facilities Area Post Mine Contour X-sections
Plate	III-40	Typical Coarse Refuse Pile Terrace Drain & Discharge Apron
Plate	III-40	Refuse Area Drainage Plans
Plate	III-42	#2 Cyn Arches Plan

PLATES

Plate	III-42	Whitmore Mine Water 002B Discharge Pond
-------	--------	---

CHAPTER III

Plate	III-43	Coarse Refuse Extension West Cell
Plate	III-44	Material, Equipment and Snow Removal Storage Areas
Plate	III-45	#2 Canyon Equipment, Material, Snow Removal, Non-coal Waste and Bulk Fluid Storage Areas
Plate	III-46	Sacco Flats Storage Areas
Plate	III-47	*Reserved for pending amendment*
Plate	III-48	*Reserved for future use*
Plate	III-49A	Mine Facilities Area (North) - Disturbed Area Drainage
Plate	III-49B	Mine Facilities Area (South) - Disturbed Area Drainage
Pictures		Aerial infrared
Pictures		Aerial color

TABLE III-1
 ESTIMATED COST OF DISMANTLING AND REMOVING FACILITIES

AREA	ITEM	APPROX YEAR OF COMPLETION	CONSTRUCTION & NOTES	STRUCTURE							FOUNDATION							TOTAL COST		
				LENGTH	WIDTH	EAVE HEIGHT	VOLUME	COST /UNIT	UNITS	COST	LENGTH	WIDTH	THICK	AREA/ VOLUME	COST /UNIT	UNITS	COST			
ALL	Power Lines	pre-1950	Costs on a per pole cost.	88.0				\$100	POLE	\$8,800							\$0	\$8,800		
ALL	Minewater Pipelines	1993	Costs per foot of pipe basis.	7,700				\$1.87	L.F.	\$14,400							\$0	\$14,400		
1	Parking Lot						11,400	\$3.47	S.Y.	\$4,395							\$0	\$4,395		
1	Materials Track	pre-1950	Cost per foot of track basis	5,400				\$14.17	L.F.	\$76,518							\$0	\$76,518		
1	Main Office	1974	Foundation covered by regrade	51.0	50.0	14.2	36,210	\$0.19	C.F.	\$6,880							\$0	\$6,880		
1	Warehouse	1953	Foundation covered by regrade	199.0	72.0	23.0	329,544	\$0.17	C.F.	\$56,022							\$0	\$56,022		
1	Main Changehouse	1953	Foundation covered by regrade	175.0	71.0	23.0	285,775	\$0.18	C.F.	\$51,440							\$0	\$51,440		
1	Training Building		Foundation covered by regrade	120.0	37.0	17.0	60,000	\$0.18	C.F.	\$10,800							\$0	\$10,800		
1	Shop	1953	Foundation covered by regrade	202.0	102.0	37.0	762,348	\$0.17	C.F.	\$129,599							\$0	\$129,599		
1	Warehouse Annex	1980's	Foundation covered by regrade	204.0	30.0	13.5	82,820	\$0.17	C.F.	\$14,045							\$0	\$14,045		
1	Engineering Office	1975-76	Foundation covered by regrade	54.0	39.0	13.5	28,431		1 LS	\$2,500							\$0	\$2,500		
1	Backfill Building		Metal Building	81.0	49.0	54.0	214,328	\$0.17	C.F.	\$38,435	81.0	49.0	1.5	3,989	\$4.14	S.F.	\$16,432	\$52,867		
1	Preparation Plant	pre-1950		120.0	80.0	50.0	708,000	\$0.17	C.F.	\$120,020	120.0	80.0	3.0	9,600	\$4.14	S.F.	\$39,744	\$159,764		
1	Crusher	pre-1950	Foundation covered by regrade	60.0	30.0	39.0	70,200	\$0.17	C.F.	\$11,934							\$0	\$11,934		
1	Blending Bins	pre-1950	Foundation covered by regrade	140.0	35.0	69.0	250,000	\$0.26	C.F.	\$65,000							\$0	\$65,000		
1	Clean Coal Stockpile Belt																			
1	Concrete Pier	1968-69					0			\$0	16.0	3.8	3.0	182	\$3.00	C.F.	\$547	\$547		
1	Concrete Pier	1968-69					0			\$0	10.5	6.4	3.0	202	\$3.00	C.F.	\$605	\$605		
1	Concrete Pier - 2	1968-69					0			\$0	18.0	4.0	3.0	384	\$3.00	C.F.	\$1,152	\$1,152		
1	Concrete Pier @ Tower	1968-69	Foundation covered by regrade				0			\$0							\$0	\$0		
1	Concrete Pier - 14	1968-69					0			\$0	3.0	6.0	3.0	54	\$3.00	C.F.	\$162	\$162		
1	Loadout Conveyor	1968-69		1,230			0	\$5.50	L.F.	\$6,765							\$0	\$6,765		
1	Rotary Car Dump	pre-1950	Foundation covered by regrade	10.0	10.0	7.2	720	\$0.17	C.F.	\$122							\$0	\$122		
1	Prep Plant Office	pre-1950	Block Walls	20.0	16.0	8.9	2,848	\$0.19	C.F.	\$541	20.0	16.0	0.5	320	\$4.14	S.F.	\$1,325	\$1,866		
1	Prep Plant Belt MCC Bldg	pre-1950	Block Walls	18.8	20.7	9.4	3,658	\$0.19	C.F.	\$695	18.8	20.7	0.5	389	\$4.14	S.F.	\$1,611	\$2,306		
4	Material Foreman's Office	pre-1950	Block Walls	16.0	20.0	8.1	2,592	\$0.19	C.F.	\$492	16.0	20.0	0.5	320	\$4.14	S.F.	\$1,325	\$1,817		
1	No. 2 Canyon Wash Arches	1992-93	Steel Arches (see Table III-41)															\$3,968		
1	Hoist House, No. 3 Mine			64.0	33.0	18.0	38,018	\$0.17	C.F.	\$6,463	64.0	33.0	1.5	2,112	\$4.14	S.F.	\$8,744	\$15,206		
1	No. 3 Slope Rarrp Walls		2 Concrete Walls (dirt fill - rail)								175.0	6.0	0.7	1,407	\$3.00	C.F.	\$4,221	\$4,221		
9	Manshaft Bathhouse	1973	Metal Frame	100.0	40.0	15.2	60,800	\$0.17	C.F.	\$10,336	100.0	40.0	0.5	4,000	\$4.14	S.F.	\$16,560	\$26,896		
9	Hoist House, Manshaft	1973	Block Walls. Fndtn cvrd by regrade	24.0	27.0	11.4	7,387	\$0.19	C.F.	\$1,404							\$0	\$1,404		
9	Headframe, Manshaft	1973		15.0	12.0	40.0	7,200	\$0.17	C.F.	\$1,224	15.0	12.0	1.0	180	\$4.14	S.F.	\$745	\$1,969		
1	Bulk Rock Dust Tank	1977		8.0		30.0	1,508	\$0.17	C.F.	\$256							\$0	\$256		
1	No. 3 Mine Milk Building		Block Walls	21.3	18.7	8.7	3,457	\$0.19	C.F.	\$657	21.3	18.7	0.5	397	\$4.14	S.F.	\$1,645	\$2,302		
1	Garage @ Mouth No. 2 Cyn	pre-1950	Block Walls	24.0	28.0	9.0	6,048	\$0.19	C.F.	\$1,149	24.0	28.0	0.5	672	\$4.14	S.F.	\$2,782	\$3,931		
1	No. 2 Canyon Trestle Bldg	pre-1950	Concrete	25.3	16.0	11.0	4,453	\$0.22	C.F.	\$980	25.3	16.0	0.5	202	\$7.40	C.F.	\$1,498	\$2,477		
4	Lunch Shed		Removed 1993	9.0	12.0	7.6	821	\$0.17	C.F.	\$0							\$0	\$0		
4	No. 2 Canyon Storage Bldg		Removed 1993	11.0	12.0	7.3	964	\$0.17	C.F.	\$0							\$0	\$0		
4	No. 2 Canyon Repair Shop		Wood Frame & Floor w/Corrgtd Walls	12.0	16.5	8.9	1,762	\$0.17	C.F.	\$300							\$0	\$300		
4	No. 2 Canyon Material Shed		Wood Frame w/Corrugated Walls	130.0	19.4	9.0	22,898	\$0.17	C.F.	\$3,859	130.0	19.4	0.5	2,522	\$4.14	S.F.	\$10,441	\$14,300		
9	Manshaft Milk Building		Block Walls. Fndtn cvrd by regrade	18.0	14.0	9.5	2,394	\$0.17	C.F.	\$407							\$0	\$407		
2	Substation, Fan Canyon	pre-1950	Removed 1993				0			\$0							\$0	\$0		
8	Substation, Outcrop	pre-1950		50.0	50.0	20.0	50,000	\$0.17	C.F.	\$8,500							\$0	\$8,500		
1	Substation, Hillside	pre-1950		50.0	50.0	20.0	50,000	\$0.17	C.F.	\$8,500							\$0	\$8,500		
1	Substation, Roadside	1979		50.0	50.0	20.0	50,000	\$0.17	C.F.	\$8,500							\$0	\$8,500		
3	Substation, Whitmore Fan	late-1950's		50.0	50.0	20.0	50,000	\$0.17	C.F.	\$8,500							\$0	\$8,500		
6	Substation, Manshaft	early 1980's		50.0	50.0	20.0	50,000	\$0.17	C.F.	\$8,500							\$0	\$8,500		
2	Fan, No. 2 Mine Fan Cyn	early 1950's	Removed 1993				0			\$0							\$0	\$0		
1	Fan, Shop Fan	early 1950's		60.0	25.0	12.0	18,000	\$0.17	C.F.	\$3,060	60.0	25.0	0.5	1,500	\$4.14	S.F.	\$6,210	\$9,270		
4	Fan, No. 2 Cyn Air Shaft	1977	Removed 1993				0			\$0							\$0	\$0		
8	Fan, Outcrop	early 1950's		60.0	25.0	12.0	18,000	\$0.17	C.F.	\$3,060	60.0	25.0	0.5	1,500	\$4.14	S.F.	\$6,210	\$9,270		
3	Fan, Whitmore Cyn	late-1950's		60.0	25.0	12.0	18,000	\$0.17	C.F.	\$3,060	60.0	25.0	0.5	1,500	\$4.14	S.F.	\$6,210	\$9,270		
9	Fan, Twin Shafts	1975	Foundation covered by regrade	60.0	25.0	12.0	18,000	\$0.17	C.F.	\$3,060							\$0	\$3,060		
1	Powder Magazine		Concrete Cvrd by cut slope regrade				0			\$0							\$0	\$0		
4	Detonator Caps Magazine		Concrete	10.0	12.0	8.0	960	\$0.22	C.F.	\$211	10.0	12.0	1.0	120	\$4.14	S.F.	\$497	\$708		
1	Mine Water Tank (015)	1955	Foundation covered by regrade	70.0		18.0	69,272	\$0.17	C.F.	\$11,776							\$0	\$11,776		
1	Mine Water Tank (015)	1955	Foundation covered by regrade	70.0		18.0	69,272	\$0.17	C.F.	\$11,776							\$0	\$11,776		
9	CH4 Vent Shack (Planned)	1994	Skld mounted, Steel	9.0	12.0	7.6	821	\$0.17	C.F.	\$140							\$0	\$140		
TOTALS																		-\$723,082	\$128,665	\$855,715

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SUNNYSIDE COAL COMPANY
 SUNNYSIDE MINE
 RECLAMATION COST ESTIMATE -- REVISED 2/7/94

TABLE III-5
 MINE PORTAL SEALS

AREA	I.D. NUMBER	DESCRIPTION	MINE	COMMENT	SEAL STATUS	LENGTH FEET	HEIGHT FEET	AREA SQ. FT.	NUMBER of BLOCKS	BLOCKS \$1.05 EACH	MORTAR MIX \$3.85 /2 CF BAG	SEALANT @ \$5.20 /20 SF BCKT	LABOR 5 MD \$29.25 /HOUR	TOTAL SEAL COST
1	P 18	Rock Tunnel	No. 1 Mine		Open	20	10	200	450	\$472.50	\$69.30	\$104.00	\$1,170.00	\$1,816
8	P 20	Outcrop (Lower Sunnyside Seam)	No. 1 Mine	Stopping	Sealed	14	12	0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
8	P 21	Outcrop (Lower Sunnyside Seam)	No. 1 Mine	Regulator	Open	14	12	168	396	\$415.80	\$61.60	\$88.40	\$1,170.00	\$1,736
8	P 22	Outcrop (Lower Sunnyside Seam)	No. 1 Mine	Stopping	Sealed	14	12	0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
8	P 23	Outcrop (Lower Sunnyside Seam)	No. 1 Mine	Stopping	Sealed	14	12	0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
8	P 24	Outcrop (Lower Sunnyside Seam)	No. 1 Mine	Fan	Open	14	12	168	396	\$415.80	\$61.60	\$88.40	\$1,170.00	\$1,736
8	P 25	Outcrop (Lower Sunnyside Seam)	No. 1 Mine	Regulator	Open	14	12	168	396	\$415.80	\$61.60	\$88.40	\$1,170.00	\$1,736
8	P 26	Outcrop (Lower Sunnyside Seam)	No. 1 Mine	Backfilled	Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
8	P 27	Inside Raise at Outcrop - Upper Seam	No. 1 Mine		Open	14	12	168	396	\$415.80	\$61.60	\$88.40	\$1,170.00	\$1,736
8	P 28	Inside Raise at Outcrop - Lower Seam	No. 1 Mine		Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
8	P 31	Inside Raise at Outcrop	No. 1 Mine	Not on map	Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
9	P 29	B Canyon Portal	No. 1 Mine		Sealed	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
7	P 1	Columbia Bleeder No. 1	No. 2 Mine		Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
7	P 2	Columbia Bleeder No. 2	No. 2 Mine		Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
7	P 3	Columbia Bleeder No. 3	No. 2 Mine		Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
2	P 4	Fan Canyon Portal 1	No. 2 Mine		Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
2	P 5	Fan Canyon Portal 2	No. 2 Mine		Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
2	P 6	Fan Canyon Portal 3	No. 2 Mine		Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
5	P 7	Upper Seam (Not on map)	No. 2 Mine	Part Backfilled	Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
6	P 8	Motor Road to No. 2 Mine	No. 2 Mine		Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
5	P 9.0	Upper Seam Portal 2	No. 2 Mine		Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
5	P 9.1	Upper Seam Portal 1	No. 2 Mine	Part Backfilled	Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
5	P 9.2	Upper Seam	No. 2 Mine		Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
5	P 10	Water Canyon	No. 2 Mine		Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
5	P 11	Fowler	No. 2 Mine		Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
5	P 12	Water Canyon Motor Road	No. 2 Mine		Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
4	P 13	No. 2 Canyon Motor Road	No. 2 Mine		Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
1	P 14	Intake	No. 3 Mine		Open	11	9	99	224	\$235.20	\$34.65	\$52.00	\$1,170.00	\$1,492
1	P 14.1	No. 3 Mine Beltway	No. 3 Mine		Open	14	9	126	308	\$323.40	\$50.05	\$67.60	\$1,170.00	\$1,611
1	P 15	Manway (old)	No. 3 Mine		Open	16	9	144	336	\$352.80	\$53.90	\$72.80	\$1,170.00	\$1,650
1	P 16	By Old Manway	No. 3 Mine		Open	6	9	54	140	\$147.00	\$23.10	\$26.00	\$1,170.00	\$1,366
4	P 30	Fowler Outcrop (Lower Sunnyside Seam)	No. 2 Mine	Not on map	Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
4	P 13.1	No. 2 Canyon Portal 2	No. 2 Mine	NOM Stopping	Sealed			0	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0
TOTAL SEAL COST														\$14,878

Block, mortar, and sealant costs were from 1993 vendor quotes.
 Labor cost is based on 1993 UMWA wages, including fringes and burdens.

SUNNYSIDE COAL COMPANY
 SUNNYSIDE MINE
 RECLAMATION COST ESTIMATE --- REVISED 2/7/94

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TABLE III-6
 SHAFT SEALING COST

AREA	I.D. NUMBER	DESCRIPTION	MINE	DIAMETER FEET	STATUS	COST /SEAL
1	S 1	Shop Fan Shaft Exhaust	No. 3 Mine	16	Open	\$2,400
4	S 2	No. 2 Canyon Exhaust Shaft	No. 2 Mine	8	Sealed	\$0
3	S 3	Whitmore Intake Fan Shaft	No. 1 Mine	16	Open	\$2,400
3	S 4	Whitmore Return	No. 1 Mine	16	Open	\$2,400
9	S 5	Pole Canyon Shaft	No. 1 Mine	7	Capped	\$1,000
9	S 6	Manshaft (Intake & Hoist Shaft)	No. 1 Mine	8	Open	\$1,000
9	S 7	Twinshaft No. 1	No. 1 Mine	7	Open	\$1,000
9	S 8	Twinshaft No. 2	No. 1 Mine	7	Open	\$1,000
8	S 9	Outcrop Exhaust Shaft	No. 1 Mine	7	Capped	\$1,000
TOTAL SHAFT SEAL COST						\$12,200

Material costs are from 1993 vendor quotes. Labor cost is 1993 UMWA wage.
 See "Shaft Seal Cost Estimate" sheet for cost details.

TABLE III-8
SHAFT SEAL COST ESTIMATE

There are basically two sizes of shafts, 8' diameter and 16' diameter. The Shafts will be covered with a 1/4" reinforced plate cover that extends at least 2' past the shaft edge on all sides. A 2" vent pipe, will extend through the plate at least 25' above the seal to allow gas escape through the seal. A 6" slab of concrete will be poured over the plate for a distance of 1' beyond the plate on all sides.

8' Diameter Shaft

1/4" plate 12' x 12' x 10.21 lb/SF = 1470 lb.
1470 lb. * \$.26/lb. = \$382

3" x 3" x 1/4" angle reinforcing x 2 sections 12' long = 24'
4.9 lb./ft. x 24' x \$.20/lb. = \$24

25' of 2" black iron schedule 40 pipe @ \$1.53/ft. = \$38

Concrete - (13' x 13' x .5')/27cf/cy = 3.2 CY concrete
3.2 CY x \$62/CY = \$198

Welding Labor 24'/120 LF/day = 1.6 hrs. x \$29.25 = \$47
Laborers - 2 to set steel over shaft in 1 hr. x \$29.25 = \$59
Laborers for concrete - 2 x 3 hrs. x \$29.25 = \$176

TOTAL COST = \$924 Use \$1,000

16' Diameter Shaft

1/4" plate 20' x 20' x 10.21 lb/SF = 4,084 lb.
4,084 lb. * \$.26/lb. = \$1,062

3" x 3" x 1/4" angle reinforcing x 3 sections 20' long = 60'
4.9 lb./ft. x 60' x \$.20/lb. = \$59

25' of 2" black iron schedule 40 pipe @ \$1.53/ft. = \$38

Concrete - (22' x 22' x .5')/27cf/cy = 9.0 CY concrete
9.0 CY x \$62/CY = \$558

Welding Labor 60'/120 LF/day = 4.0 hrs. x \$29.25 = \$117
Laborers - 3 to set steel over shaft in 2 hr. x \$29.25 = \$176
Laborers for concrete - 3 x 3 hrs. x \$29.25 = \$264

TOTAL COST = \$2,374 Use \$2,400

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TABLE III-9
PORTAL CLOSURE AND FILL

AREA	DESCRIPTION	NO. OF PORTALS	CY @ 230 /PORTAL	CAT 769C TRUCK					CAT 988B LOADER			TOTAL COST	
				TRUCK C.Y.	ONE WAY HAUL (MI)	CYCLE TIME	RATE CY/HR	COST /CY	TRUCK COST	LOADER C.Y.	RATE /C.Y.		LOADER COST
1	Portal - No. 3 Slope (SSSF Area) 4 Portals in highwall reduction CY Haul material from Borrow Area	1	230	230	1.5	21	200	\$1,330	\$306	230	\$0.867	\$199	\$505
2	Fan Canyon Portals (Reclaimed)												
3	None (Whitmore Cyn Fan Area)												
4	No. 2 Canyon Mine Portals included in cut slope reduction. No road access to open portal (Fowler) above cliff. Note (1)	1											\$2,100
5	Water Canyon Portals (Reclaimed)												
6	None (Manshaft Area)												
7	Portals - Columbia Bleeders No road access. Note (1)	3											\$6,300
8	Outcrop Fan Portals (7) Included in Cut Slope Reduction Portal w/no road access. Note (1)	1											\$2,100
9	None (Manshaft Area)												
SUB-TOTAL				230					\$306	230		\$199	
TOTAL				230									\$11,005

NOTES:

- Shoot portals using 2 men 3 days per portal = \$1,272.38
Add pack horse rental, portable drill, and powder & primers-use \$750.00
\$2,022.38 use \$2,100/portal
- See equipment operating cost sheets for hourly and unit cost backup.

TABLE III-10
DRILL HOLE CEMENTING ESTIMATE

Two holes are presently known to be open. The holes are DH 86-1 and the Manshaft Power Borehole. The proposed CH4 Vent Borehole is also included.

DH 86-1 (Water Monitoring Well)
8" diameter to 680' depth
Volume = 237.4 cu. ft. = 8.79 Cubic Yards

Manshaft Power Borehole
8" diameter to 1,220' depth
Volume = 425.9 cu. ft. = 15.8 Cubic Yards

Proposed CH4 Vent Borehole
8" diameter to 1,120' depth
Volume = 391.0 cu. ft. = 14.5 Cubic Yards

Total Cost:
Concrete: 39.1 Cubic Yards x \$62/CY = \$2,424
Labor: 1 man x 2 days x 8 hrs. x \$29.25/hr. = \$468

TOTAL DRILL HOLE CEMENTING COST = \$2,892

Concrete is from a 1993 vendor quote with extra truck time
Labor cost based on 1993 UMWA rates including burden.

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SUNNYSIDE COAL COMPANY
 SUNNYSIDE MINE
 RECLAMATION COST ESTIMATE -- REVISED 2/7/94

TABLE III-11
 REVEGETATION COST SUMMARY

AREA NUMBER	AREA DESCRIPTION	VEGETATION TYPE	TOTAL ACRES	% STEEP SLOPES	HYDROSEEDING			DRILLING		REVEGETATION COST	
					ACRES	COST /ACRE	COST	ACRES	COST /ACRE		DRILLED COST
1	Main complex, including offices, shop, warehouse, parking lot, unit train, preparation plant, No. 3 Mine fan, industrial water tanks, mine portals, sed ponds & substations.	Sagebrush grass	53.8	20%	10.76	\$670	\$7,211	43.04	\$412	\$17,738	\$24,949
2	Fan Cyn fan, substations, portals, & road.	Sagebrush grass	3.3	33%	1.09	\$670	\$730	2.21	\$412	\$911	\$1,641
3	Whitmore Ventilation shafts, road, & 002A pond.	Sagebrush grass	3.4	20%	0.68	\$670	\$456	2.72	\$412	\$1,121	\$1,577
4	No. 2 Canyon Yard, Portal, sed pond, No.2 Cyn Fan pad & access road.	Sagebrush grass	7.9	58%	4.58	\$670	\$3,071	3.32	\$412	\$1,367	\$4,438
5	Water Canyon portals & road.	Sagebrush grass	11.3	36%	4.07	\$670	\$2,726	7.23	\$412	\$2,981	\$5,707
6	Manshaft Substation area, manshaft pond road, and Twinshafts mine water pond & water discharge.	Sagebrush grass	3.1	20%	0.62	\$670	\$416	2.48	\$454	\$1,126	\$1,541
7	Sacco Flats, RR Loop, & Refuse Haul Road Proposed Borrow Area No revegetation at Columbia bleeders.	Pinyon-juniper & grass	12.8	20%	2.56	\$739	\$1,891	10.24	\$454	\$4,648	\$6,539
			10.0	20%	2.00	\$739	\$1,477	8.00	\$454	\$3,631	\$5,108
8	Outcrop Fan Area, fan, substations, Outside Raise portals & roads.	Pinyon-juniper	8.8	36%	3.17	\$739	\$2,340	5.63	\$526	\$2,965	\$5,305
9	Manshaft-Twinshafts Area, fan, shafts, hoisthouse, bathhouse, sediment pond, Pole Cyn shaft, and 002B pond.	Mountain brush	13.8	100%	13.80	\$803	\$11,077	0.00	\$0	\$0	\$11,077
TOTAL REVEGETATION			128.2		43.33		\$31,394	84.87		\$36,488	\$67,881

See equipment operating cost sheets for hourly and unit cost backup.

Average Revegetation Cost/Acre

\$529

TABLE III-12
 SOIL TESTING, FERTILIZING, & SEED BED PREPARATION

EQUIPMENT & LABOR COSTS	UNIT JOB TIME Hrs./Acre	HOURLY LABOR RATE	UNIT LABOR COST	HOURLY EQPMT COST	UNIT EQPMT COST	EQUIPMENT & LABOR COST /ACRE
TRACTOR & FERTILIZER SPREADER	1.0	\$22.00	\$22.00	\$20.00	\$20.00	\$42.00
TRACTOR & DISC	1.0	\$22.00	\$22.00	\$20.00	\$20.00	\$42.00
TOTAL EQUIPMENT & LABOR COST/ACRE						\$84.00

DRILLING MATERIAL COSTS

MATERIAL COSTS	UNITS	UNIT COST	UNITS /ACRE	COST /ACRE
SOIL TESTING	Sample	\$45.000	3	\$135.00
PHOSPHORUS	Lbs	\$0.118	30	\$3.54
AMMONIUM NITRATE	Lbs	\$0.097	40	\$3.86
				\$142.40

SUMMARY OF SOIL TESTING, FERTILIZING, & SEED BED PREPARATION COSTS

	EQUIPMENT & LABOR COSTS	MATERIAL COSTS	TOTAL COST /ACRE
TOTAL COST/ACRE	\$84.00	\$142.40	\$226.40

Labor, equipment, & material rates are from 1993 suppliers.

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SUNNYSIDE COAL COMPANY
 SUNNYSIDE MINE
 RECLAMATION COST ESTIMATE -- REVISED 2/7/94

TABLE III-13
 HYDROSEEDING REVEGETATION COSTS

EQUIPMENT & LABOR COSTS	UNIT JOB TIME Hrs./Acre	HOURLY LABOR RATE	UNIT LABOR COST	HOURLY EQPT COST	UNIT EQPT COST	UNIT EQPT & LABOR COST
HYDROSEEDER (seed)	0.5	\$22.00	\$11.00	\$41.20	\$20.60	
	0.5	\$15.00	\$7.50			
HAY BLOWER			\$18.50		\$20.60	\$39.10
	0.5	\$22.00	\$11.00	\$19.50	\$9.75	
	0.5	\$15.00	\$7.50			
			\$18.50		\$9.75	\$28.25
HYDROSEEDER (muck & tackifier)	0.5	\$22.00	\$11.00	\$41.20	\$20.60	
	0.5	\$15.00	\$7.50			
			\$18.50		\$20.60	\$39.10
TOTAL EQUIPMENT & LABOR COST/ACRE						\$106.45

HYDROSEEDING MATERIAL COSTS

MATERIAL COSTS	UNITS	UNIT COST	UNITS /ACRE	COST /ACRE
HAY	Tons	\$75.00	2	\$150.00
TACKIFIER	Lbs.	\$0.90	120	\$108.00
WOOD FIBER	Tons	\$220.00	0.15	\$33.00
				\$291.00

SUMMARY OF HYDROSEEDING COSTS BY VEGETATION TYPE

VEGETATION TYPE	EQUIPMENT & LABOR COSTS	MATERIAL COSTS	SEED COSTS	HYDRO-SEEDING COST /ACRE
Pinyon-Juniper	\$106.45	\$291.00	\$341.15	\$738.60
Mountain Brush	\$106.45	\$291.00	\$405.20	\$802.65
Pinyon-Juniper/Grass	\$106.45	\$291.00	\$336.65	\$734.10
Sagebrush/Grass	\$106.45	\$291.00	\$272.73	\$670.18

Labor, equipment, & material rates are from 1993 suppliers.

TABLE III-14
 DRILLING REVEGETATION COSTS

EQUIPMENT & LABOR COSTS	UNIT JOB TIME Hrs./Acre	HOURLY LABOR RATE	UNIT LABOR COST	HOURLY EQPMT COST	UNIT EQPMT COST	EQUIPMENT & LABOR COST /ACRE
SEED DRILL	0.5	\$22.00	\$11.00	\$20.00	\$10.00	\$21.00
HAY BLOWER	0.5	\$22.00	\$11.00	\$19.50	\$9.75	
	0.5	\$15.00	\$7.50			
			\$18.50		\$9.75	\$28.25
HAY CRIMPER	0.5	\$22.00	\$11.00	\$21.50	\$10.75	\$21.75
TOTAL EQUIPMENT & LABOR COST/ACRE						\$71.00

DRILLING MATERIAL COSTS

MATERIAL COSTS	UNITS	UNIT COST	UNITS /ACRE	COST /ACRE
HAY	Tons	\$75.00	2	\$150.00
				\$150.00

SUMMARY OF DRILLING COSTS BY VEGETATION TYPE

VEGETATION TYPE	EQUIPMENT & LABOR COSTS	MATERIAL COSTS	SEED COSTS	TOTAL DRILLING COST /ACRE
Pinyon-Juniper	\$71.00	\$150.00	\$233.65	\$454.65
Mountain Brush	\$71.00	\$150.00	\$305.40	\$526.40
Pinyon-Juniper/Grass	\$71.00	\$150.00	\$232.90	\$453.90
Sagebrush/Grass	\$71.00	\$150.00	\$191.13	\$412.13

Labor, equipment, & material rates are from 1993 suppliers.

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SUNNYSIDE COAL COMPANY
 SUNNYSIDE MINE
 RECLAMATION COST ESTIMATE -- REVISED 2/7/94

TABLE III-15
 SEED COSTS FOR MOUNTAIN BRUSH VEGETATION TYPE

SEED	COST/LB. PLS	DRILLING		BROADCAST	
		RATE	COST/ ACRE	RATE	COST/ ACRE
GRASSES					
Agropyron smithii	\$4.00	1.9	\$7.60	2.8	\$11.20
Bouteloua gracilis	\$21.00	0.6	\$12.60	0.2	\$4.20
Elymus salina	\$16.00	2.6	\$41.60	3.9	\$62.40
Koeleria cristata	\$40.00	0.8	\$32.00	1.2	\$48.00
Oryzopsis hymenoides	\$6.50	0.4	\$2.60	0.6	\$3.90
Poa pratensis	\$2.00	0.1	\$0.20	0.2	\$0.40
FORBS AND SHRUBS					
Amelanchier alnifolia	\$45.00	1.3	\$58.50	2.0	\$90.00
Achillea millefolloom	\$13.00	0.1	\$1.30	0.1	\$1.30
Artemesia ludoviciana	\$40.00	0.1	\$4.00	0.1	\$4.00
Balsamorhiza sagittata	\$18.00	0.2	\$3.60	0.2	\$3.60
Castilleja chromosa	\$150.00	0.1	\$15.00	0.1	\$15.00
Cercocarpus ledifolius	\$20.00	0.2	\$4.00	0.2	\$4.00
Cercocarpus montanus	\$28.00	1.1	\$30.80	1.7	\$47.60
Gaillardia aristata	\$41.00	0.1	\$4.10	0.1	\$4.10
Gilia aggregata	\$95.00	0.1	\$9.50	0.1	\$9.50
Hedysarum boreale	\$60.00	0.7	\$42.00	1.0	\$60.00
Penstemon strictus	\$20.00	0.1	\$2.00	0.1	\$2.00
Petalostemon purpureum	\$40.00	0.1	\$4.00	0.1	\$4.00
Potentilla fruticosa	\$45.00	0.1	\$4.50	0.1	\$4.50
Rhus trilobata	\$18.00	0.5	\$9.00	0.5	\$9.00
Rosa woodsii	\$12.00	0.5	\$6.00	0.5	\$6.00
Solidago canadensis	\$25.00	0.1	\$2.50	0.1	\$2.50
Symphoricarpos oreophilis	\$40.00	0.2	\$8.00	0.2	\$8.00
TOTAL			\$305.40		\$405.20

Seed costs from 1993 vendor quotes.

SUNNYSIDE COAL COMPANY
 SUNNYSIDE MINE
 RECLAMATION COST ESTIMATE -- REVISED 2/7/94

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TABLE III-16
 SEED COSTS FOR PINYON-JUNIPER VEGETATION TYPE

SEED	COST/LB. PLS	DRILLING		BROADCAST	
		RATE	COST/ ACRE	RATE	COST/ ACRE
GRASSES					
Agropyron smithii	\$6.50	5.9	\$38.35	8.9	\$57.85
Bouteloua gracilis	\$16.00	0.3	\$4.80	0.5	\$8.00
Elymus salina	\$16.00	0.3	\$4.80	0.4	\$6.40
Hilaria jamesii	\$21.00	0.7	\$14.70	1.0	\$21.00
Oryzopsis hymenoides	\$6.00	2.3	\$13.80	3.5	\$21.00
Sitanion hystrix	\$18.00	0.6	\$10.80	0.9	\$16.20
FORBS AND SHRUBS					
Artemisia nova	\$28.00	0.1	\$2.80	0.1	\$2.80
Cercocarpus ledifolius	\$20.00	0.4	\$8.00	0.6	\$12.00
Cercocarpus montanus	\$22.00	1.8	\$39.60	2.8	\$61.60
Cowania mexicana	\$14.00	1.0	\$14.00	1.5	\$21.00
Ephedra viridis	\$12.00	0.4	\$4.80	0.7	\$8.40
Gilia aggregata	\$95.00	0.1	\$9.50	0.1	\$9.50
Hedysarum boreale	\$40.00	1.3	\$52.00	1.9	\$76.00
Oenothera pallida	\$50.00	0.1	\$5.00	0.1	\$5.00
Penstemon bridgesii	\$18.00	0.1	\$1.80	0.1	\$1.80
Penstemon palmeria	\$14.00	0.1	\$1.40	0.1	\$1.40
Petalostemon purpureum	\$37.00	0.1	\$3.70	0.2	\$7.40
Sphaeralcea coccinea	\$38.00	0.1	\$3.80	0.1	\$3.80
TOTAL			\$233.65		\$341.15

Seed costs from 1993 vendor quotes.

SUNNYSIDE COAL COMPANY
 SUNNYSIDE MINE
 RECLAMATION COST ESTIMATE -- REVISED 2/7/94

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TABLE III-17
 SEED COSTS FOR PINYON-JUNIPER/GRASS VEGETATION 1

SEED	COST/LB. PLS	DRILLING		BROADCAST	
		RATE	COST/ ACRE	RATE	COST/ ACRE
GRASSES					
Agropyron smithii	\$6.50	5.9	\$38.35	8.9	\$57.85
Bouteloua gracilis	\$16.00	0.3	\$4.80	0.5	\$8.00
Elymus salina	\$16.00	0.3	\$4.80	0.4	\$6.40
Hilaria jamesii	\$16.00	0.7	\$11.20	1.0	\$16.00
Oryzopsis hymenoides	\$6.00	2.3	\$13.80	3.5	\$21.00
Sitanion hystrix	\$21.00	0.6	\$12.60	0.9	\$18.90
FORBS AND SHRUBS					
Artemesia ludoviciana	\$45.00	0.1	\$4.50	0.1	\$4.50
Artemisia nova	\$25.00	0.1	\$2.50	0.1	\$2.50
Cercocarpus ledifolius	\$20.00	0.4	\$8.00	0.6	\$12.00
Cercocarpus montanus	\$22.00	1.8	\$39.60	2.8	\$61.60
Cowania mexicana	\$12.50	1.0	\$12.50	1.5	\$18.75
Ephedra viridis	\$4.00	0.4	\$1.60	0.7	\$2.80
Gilia aggregata	\$95.00	0.1	\$9.50	0.1	\$9.50
Hedysarum boreale	\$40.00	1.3	\$52.00	1.9	\$76.00
Oenothera pallida	\$52.50	0.1	\$5.25	0.1	\$5.25
Penstemon bridgesii	\$25.00	0.1	\$2.50	0.1	\$2.50
Penstemon palmeria	\$22.00	0.1	\$2.20	0.1	\$2.20
Petalostemon purpureum	\$37.00	0.1	\$3.70	0.2	\$7.40
Sphaeralcea coccinea	\$35.00	0.1	\$3.50	0.1	\$3.50
TOTAL			\$232.90		\$336.65

Seed costs from 1993 vendor quotes.

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 SUNNYSIDE MINE
 RECLAMATION COST ESTIMATE -- REVISED 2/7/94

TABLE III-18
 SEED COSTS FOR SAGEBRUSH-GRASS TYPE

SEED	COST/LB. PLS	DRILLING		BROADCAST	
		RATE	COST/ ACRE	RATE	COST/ ACRE
GRASSES					
Agropyron smithii	\$6.50	3.0	\$19.50	5.9	\$38.35
Agropyron spicatum	\$4.50	1.5	\$6.75	2.2	\$9.90
Bouteloua gracilis	\$16.00	0.2	\$3.20	0.2	\$3.20
Oryzopsis hymenoides	\$6.00	3.2	\$19.20	4.9	\$29.40
Sitanion hystrix	\$21.00	0.2	\$4.20	0.3	\$6.30
Sporobolis cryptandrus	\$1.80	0.1	\$0.18	0.1	\$0.18
Stipa comata	\$35.00	1.9	\$66.50	2.8	\$98.00
FORBS AND SHRUBS					
Amelanchier alnifolia	\$45.00	0.1	\$4.50	0.1	\$4.50
Artemesia ludoviciana	\$45.00	0.1	\$4.50	0.1	\$4.50
Artemisia tridentata	\$20.00	0.1	\$2.00	0.1	\$2.00
Balsamorhiza sagittata	\$20.00	0.2	\$4.00	0.3	\$6.00
Chrysothamnus nauseosus	\$24.00	0.1	\$2.40	0.1	\$2.40
Eurotia lanata	\$18.00	0.3	\$5.40	0.4	\$7.20
Hedysarum boreale	\$40.00	0.7	\$28.00	1.0	\$40.00
Penstemon palmeria	\$22.00	0.1	\$2.20	0.1	\$2.20
Petalostemon purpureum	\$37.00	0.1	\$3.70	0.1	\$3.70
Solidago canadensis	\$24.00	0.1	\$2.40	0.1	\$2.40
Sphaeralcea coccinea	\$35.00	0.1	\$3.50	0.1	\$3.50
Symphoricarpos oreophilis	\$45.00	0.2	\$9.00	0.2	\$9.00
TOTAL			\$191.13		\$272.73

Seed costs from 1993 vendor quotes.

TABLE III-19
REGRADE AREAS OUTSIDE CUT SLOPES

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AREA	DESCRIPTION		ACRES	CY @ 18" DEPTH	CAT D8L WITH S BLADE				CAT D8L TRIPLE SHANK RIPPER				CAT 789C TRUCK			CAT 988B LOADER			TOTAL COST	
					C.Y.	PUSH DIST	RATE /C.Y.	DOZING COST	C.Y.	RIP DIST	RATE /C.Y.	RIPPING COST	C.Y.	HAUL MILES	RATE /C.Y.	TRUCK COST	C.Y.	RATE /C.Y.		LOADER COST
1	SSSF Area	Place Dirt	9.5	22,990	22,990	150	\$0.297	\$6,828					26,553	1.5	\$1.330	\$35,315	26,553	\$0.867	\$23,021	\$87,373
		Grade	23.0	55,660	55,660	150	\$0.297	\$16,531	111,320	400	\$0.051	\$5,877								
2	Fan Cyn Area	Place Dirt	0.2	484									484	2.2	\$1.650	\$799	484	\$0.740	\$358	\$2,294
		Grade	2.0	4,840	4,840	50	\$0.137	\$663	9,680	100	\$0.049	\$474								
3	Whitmore Fan Area	Place Dirt	0.5	1,210	1,210	50	\$0.137	\$166					1,210	3.5	\$2.880	\$3,485	1,210	\$0.794	\$961	\$5,363
		Grade	1.7	3,146	3,146	50	\$0.137	\$431	6,292	400	\$0.051	\$321								
4	No.2 Cyn Yard	Place Dirt	1.8	4,356	4,356	150	\$0.297	\$1,294					13,027	1.8	\$1.520	\$19,801	13,027	\$0.993	\$12,936	\$35,187
		Grade	1.4	3,388	3,388	50	\$0.137	\$464	6,776	400	\$0.051	\$346								
		Grade	0.6	1,452	1,452	50	\$0.137	\$199	2,904	400	\$0.051	\$148								
5	Water Canyon Area	Portal Area Place Dirt	0.1	242	242	50	\$0.137	\$33					242	2.2	\$1.710	\$414	242	\$0.740	\$179	\$65,520
		Refuse Area Place Dirt	3.7	23,877	23,877	50	\$0.137	\$3,271					23,877	2.2	\$1.710	\$40,830	23,877	\$0.740	\$17,669	
		Access Road Grade	5.4	13,068	13,068	50	\$0.137	\$1,790	26,136	400	\$0.051	\$1,333								
6	Manshaft Sub, 001 Area	Place Dirt	0.5	1,210	1,210	50	\$0.137	\$166					1,210	4.5	\$3.200	\$3,872	1,210	\$0.794	\$961	\$5,369
		Grade	0.6	1,452	1,452	50	\$0.137	\$199	2,904	100	\$0.059	\$171								
7	Railroad Loop Area	Place Dirt	3.0	7,260	7,260	50	\$0.137	\$995					7,260	0.8	\$0.900	\$6,534	7,260	\$0.814	\$4,458	\$18,735
		Grade	7.4	17,908	17,908	50	\$0.137	\$2,453	35,816	400	\$0.051	\$1,827								
		Proposed Borrow Area -- Rip	10.0	24,200					48,400	400	\$0.051	\$2,468								
8	Outcrop Fan Area Access Road		6.4	15,488	15,488	50	\$0.137	\$2,122	30,976	100	\$0.059	\$1,828							\$3,949	
9	Mnshft-Twshft Area, 002B	Manshaft Place Dirt	1.3	3,146	3,146	50	\$0.137	\$431					3,146	5.0	\$3.520	\$11,074	3,146	\$0.794	\$2,498	\$17,594
		Manshaft Grade	2.9	7,018	7,018	150	\$0.297	\$2,084	14,036	100	\$0.059	\$828								
		Twinshaft Grade	0.6	1,452	1,452	50	\$0.137	\$199	2,904	100	\$0.059	\$171								
		Pole Cyn Grade	0.5	1,210	1,210	50	\$0.137	\$166	2,420	100	\$0.059	\$143								
SUB-TOTAL			82.7		190,373			\$40,485	300,564			\$15,735	77,009		\$122,124	77,009		\$63,041		
TOTAL				215,057															\$241,385	

See equipment operating cost sheets for hourly and unit cost backup.

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SUNNYSIDE COAL COMPANY
 SUNNYSIDE MINE
 RECLAMATION COST ESTIMATE --- REVISED 2/7/94

TABLE III-20
 CUT SLOPE REGRADING

AREA	DESCRIPTION	LENGTH FT	AVERAGE		CAT D&L WITH S BLADE				CAT D&L TRIPLE SHANK RIPPER				CAT 633D SCRAPER			CAT 225 BACKHOE/8' STICK			TOTAL COST	
			X/C AREA C.Y./FT	TOTAL C.Y.	C.Y.	PUSH DIST	RATE /C.Y.	DOZING COST	C.Y.	RIP DIST	RATE /C.Y.	RIPPING COST	C.Y.	HAUL DIST	RATE /C.Y.	SCRAPER COST	C.Y.	RATE /C.Y.		BACKHOE COST
1	Unit Train Loadout Area Preparation Plant Area		See Cut & Fill Tables	71,519	45,444	250	\$0.482	\$21,904	22,722	300	\$0.052	\$1,182	26,075	300	\$0.463	\$12,073				\$35,158
				68,037 0	25,833	400	\$0.674	\$17,411	12,917	400	\$0.051	\$659	42,204	900	\$0.763	\$32,202				\$50,272
2	Fan Canyon, #2 Mine		Finish Amount	484 0	484	150	\$0.297	\$144								484	\$0.785	\$380	\$524	
3	Whitmore Canyon Fan	130	7.11	924 0	924	100	\$0.218	\$201	462	150	\$0.056	\$26				139	\$0.785	\$109	\$336	
4	No. 2 Canyon Mine Fan No. 2 Mine Portals Area	360	9.68	3,485	3,485	150	\$0.297	\$1,035	1,742	300	\$0.052	\$91				523	\$0.785	\$410	\$1,536	
		1300	6.67	8,671 0	8,671	150	\$0.297	\$2,575	4,336	400	\$0.051	\$221				1,301	\$0.785	\$1,021	\$3,817	
5	Water Canyon Portals Area		Finish Amount	242 0	242	150	\$0.297	\$72								242	\$0.785	\$190	\$262	
6	None -- Manshaft in Valley at Mouth Water Cyn			0 0															\$0	
7	None -- Rail Loop Area			0 0															\$0	
8	Outcrop Fan Area	570	30.70	17,500 0	17,500	150	\$0.297	\$5,197	8,750	300	\$0.052	\$455				2,625	\$0.785	\$2,061	\$7,713	
9	Twinshaft Pad	220	55.56	12,223	12,223	150	\$0.297	\$3,630	6,112	200	\$0.054	\$330				1,833	\$0.785	\$1,439	\$5,400	
	Manshaft Area	900	36.14	32,526	32,526	150	\$0.297	\$9,660	16,263	400	\$0.051	\$829				4,879	\$0.785	\$3,830	\$14,320	
	Pole Canyon Shaft Pad	330	28.24	9,319 0	9,319	150	\$0.297	\$2,768	4,660	300	\$0.052	\$242				1,398	\$0.785	\$1,097	\$4,107	
SUB-TOTAL					156,651			\$64,599	77,963			\$4,035	68,279		\$44,274	13,423		\$10,537		
TOTAL					224,930														\$123,445	

See equipment operating cost sheets for hourly and unit cost backup.
 Assumes on 60% of volume will need to be ripped.

SUNNYSIDE COAL COMPANY
 SUNNYSIDE MINE
 RECLAMATION COST ESTIMATE -- REVISED 2/7/94

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TABLE III-21
 POND REMOVAL COST

AREA	POND DESCRIPTION	CY CAPACITY	DOZER PUSH DISTANCE	COST /C.Y.	TOTAL COST
1	No. 3 Hoist House Sediment Pond (Removed during Prep Plant cut slope regrade)				\$0
1	Lower No. 2 Canyon Sediment Pond	2,010	50	\$0.207	\$416
1	Sunnyside Surface Facilities Sediment Pond	9,350	300	\$0.584	\$5,460
4	Upper No. 2 Canyon Sediment Pond	630	50	\$0.207	\$130
9	Manshaft Sediment Pond	2,480	50	\$0.207	\$513
9	Twin Shaft Mine Water Discharge 001 Pond	10,100	100	\$0.277	\$2,798
3	Whitmore Mine Water Discharge 002A Pond	5,030	50	\$0.207	\$1,041
3	Whitmore Mine Water Discharge 002B Pond	11,180	100	\$0.277	\$3,097
TOTAL SEDIMENT POND REMOVAL COST					\$13,456

1) See "Estimated Dozer Production - D8L", 50' Push distance for Cost/CY plus Ripping Costs.

2) Volume of Redistributed Material = Pond Capacity to top of embankment

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TABLE III-22
 CULVERT REMOVAL COST ESTIMATE

CULVERT	MAP I.D.	TYPE	DIAMETER INCHES	SLOPE %	LENGTH FEET	COST /LF	REMOVAL COST
SSSF Ditch/Refuse Road	RC1-1	CMP	36	3.00%	120.0	\$1.02	\$122
Refuse Road	RC1-2	CMP	16	10.00%	120.0	Permanent	
Refuse Road-Sacco Flats	RC1-3	CMP	36	5.53%	85.0	Permanent	
Does not Exist	RC1-4						
Does not Exist	RC1-5						
Railroad	RC1-6	CMP	30	7.50%	32.0	\$1.02	\$33
SSSF Pond Access Rd	RC1-7	CMP	12	8.33%	60	\$0.64	\$39
Water Cyn Rd	RC2-1	CMP	24	3.25%	40	\$0.64	\$26
Old Coarse Refuse Drainage	RC2-2	CMP	24	4.38%	48.0	\$0.64	\$31
Water Cyn Rd	RC2-3	CMP	18	3.00%	40.0	\$0.64	\$26
Water Cyn Rd	RC2-4	CMP	36	8.80%	25.0	\$1.02	\$25
Water Cyn Rd	RC2-5	CMP	24	2.27%	44.0	\$0.64	\$28
No.2 Cyn Rd-Top of Supply Yd	RC3-1	CMP	36	2.54%	29.5	Permanent	
No.2 Cyn Rd-6th up from Top	RC3-2	CMP	36	5.33%	30.0	Permanent	
No.2 Cyn Rd-5th up from Top	RC3-3	CMP	36	2.67%	30.0	Permanent	
No.2 Cyn Rd-4th up from Top	RC3-4	CMP	36	2.76%	29.0	Permanent	
No.2 Cyn Rd-2nd up from Top	RC3-5	CMP	48	5.50%	32.0	Permanent	
No.2 Cyn Rd-Switchback	RC3-6	CMP	36	5.25%	40.0	Permanent	
No.2 Cyn Rd-Bottom	RC3-7	CMP	12	1.52%	93.0	\$0.64	\$60
No.2 Cyn Rd-3rd up from Top	RC3-8	CMP	18	3.33%	21.0	Permanent	
No.2 Cyn Supply Yd-1st b/w Top	RC-C1	CMP	18	0.32%	119.0	\$0.64	\$77
No.2 Cyn Supply Yd-2nd b/w Top	RC-C2	CMP	12	2.13%	155.0	\$0.64	\$100
No.2 Cyn Supply Yd-3rd b/w Top	RC-C3	CMP	24	1.83%	126.0	\$0.64	\$81
No.2 Cyn Supply Yd-4th b/w Top	RC-C4	CMP	18	0.73%	172.0	\$0.64	\$111
Does not Exist	RC-C5						
Btm Supply Yd to Lwr No.2 Pond	RC-C6	CMP	12	3.91%	51.2	\$0.64	\$33
North side to Lwr No.2 Pond	RC-C7						
Triangle Undisturbed North No.2 Cyn	RC-C8	CMP	12	2.41%	33.2	\$0.64	\$21
Part of RC-C8	RC-C9	CMP	12	6.00%	50.0	\$0.64	\$32
South Yard Triangle to LWR #2 Pond	RC-C10	CMP	12	7.18%	74.5	\$0.64	\$48
Trestle to LWR #2 Pond	RC-C11	CMP	6	4.00%	51.6	\$0.64	\$33
Grassy Trail CRK/Manshaft RD	RC7-1	CMP	84	5.00%	60	\$3.20	\$192
South of Bathhouse #2	RC7-2	CMP	8	15.75%	9	\$0.64	\$6
Manshaft/Twinshaft Rd Intersection	RC7-3	CMP	8	57.74%	20	\$0.64	\$13
Twinshaft Pad Drain Ditch	RC7-4	CMP	18	2.91%	55	\$0.64	\$35
Manshaft Rd Corner	RC7-5	CMP	12	23.27%	15	\$0.64	\$10
Manshaft Sub Drain/County Rd	RC7-6	CMP	18	1.43%	42	County	
South of Bathhouse #1	RC7-7	CMP	8	33.66%	21	\$0.64	\$14
Grassy Trail CRK/West Ridge RD	RC7-8	CMP	96	5.00%	20	\$4.31	\$86
Whitmore Sub Drain/County RD	RC7-9	CMP	15	2.00%	40	County	
Engineer Office Rd/Undisturbed Ditch	RC10-1	CMP	36	5.18%	56	\$1.02	\$57
South of Shop	RC10-2	CMP	18	5.00%	20	\$0.64	\$13
SSSF Ditch/Access Rd @ Plant Office	RC10-3	CMP	28	1.30%	124	\$1.02	\$126
No.2 Cyn Wash	RC10-4	CMP	144	10.00%	150	Permanent	
Bath House Sump	RC10-5	CMP	12	1.82%	110	\$0.64	\$71
#3 Milkhouse	RC10-6	CMP	24	5.45%	110	\$0.64	\$71
Yard X-sing North of RR	RC10-7	CMP	12	1.36%	103	\$0.64	\$66
North Ramp coal pipe	RC10-8	CMP	36	2.67%	300	\$1.02	\$305
Water Loadout/North Access Stckpl	RC10-9	CMP	12	3.94%	164	\$0.64	\$106
No. 3 Slope Conveyor-Prep Plant	RC10-10	CMP	18	12.61%	43	\$0.64	\$28
Hillside Sub Undisturbed to Pond	RC10-11	CMP	30	9.00%	320	\$1.02	\$325
Hillside Sub Ramp X-sing	RC10-12	CMP	24	2.08%	24	\$0.64	\$15
Hoisthouse Pond inlet	RC10-13	CMP	18	4.02%	51	\$0.64	\$33
No.2 Cyn Bridge above Arches	RC10-14	Box Culvert	89x102	15.00%	60	\$8.62	\$517
Clean Coal Belt/No.2 Cyn Wash Arches	RC10-15	Arches	192			Table III-1	
SSSF Ditch/Rd to Fuel Station	RC10-16	CMP	24	1.43%	35	\$0.64	\$23
RR Tracks/No.2 Cyn Wash	RC10-17	CMP	42x28	3.57%	43.4	\$1.02	\$44
North End Loadout Tunnel	RC10-18	CMP	24	4.54%	205.0	\$0.64	\$132
Stckpl Pad Drain Downspout	RC10-19	CMP	8	45.50%	73.0	\$0.64	\$47
Between Stckpl & RR Tracks-SSSF Ditch	RC10-20	Alum Pipe	6	1.36%	22	\$0.64	\$14
Sump Outlet under RR Tracks	RC10-21a	Iron Pipe	12	3.81%	21.0	\$0.64	\$14
Sump Outlet under RR Tracks	RC10-21b	Iron Pipe	12	2.38%	21.0	\$0.64	\$14
Mine Track Sump	RC10-22	Iron Pipe	16	9.76%	20.5	\$0.64	\$13
No.2 Cyn/North Rd near #2 Cyn Pond	RC10-23	Box Culvert	127x60	3.00%	25.7	\$8.62	\$221
Refuse Rd West Ditch/Coal Haul Rd	C-11a	CMP	12	5.83%	60.0	\$0.64	\$39
Slurry Ditch/RR @ Bermuda Tri	C-13	CMP	36	2.55%	235.0	\$1.02	\$239
Undisturbed Drains @ Bermuda Tri	C-14-1	Perf CMP	6	2.25%	40.0	\$0.64	\$26
Undisturbed Drains @ Bermuda Tri	C-14-2a	G. Iron Pipe	6	0.50%	20.0	\$0.64	\$13
Undisturbed Drains @ Bermuda Tri	C-14-2b	G. Iron Pipe	6	3.00%	20.0	\$0.64	\$13
Disturbed twins @ Bermuda Tri	C-15	G. Iron Pipe	6	3.50%	20.0	\$0.64	\$13
Main Entrance Bridge	M-BR	BRIDGE	240x1200	-	20.0	Permanent	
Lower Entrance Culvert	M-CV	CMP	90	14.50%	40.0	Permanent	
Slurry Pipe		CMP	24		1,200.0	\$0.64	\$773
Total Number of Culverts					54		\$4,651

See Table III-47 for Cost Basis

Table III-24

Disturbed Acreage of the Sunnyside Permit Area w/o SCA Area

	<u>Description</u>	<u>Total Acreage</u>
AREA 1	Surface Facilities Area	65.0
	Railroad Right-of-Way (Permanent)	4.5
	Permanent Road to No. 2 Cyn	<u>2.8</u>
		72.3
AREA 2	Fan Canyon - No.2 Mine Fan Pad	1.3
	Fan Canyon Road	<u>2.0</u>
		3.3
AREA 3	Whitmore Fan Shaft Area	6.3
	Whitmore Return Shaft Area	<u>0.9</u>
		7.2
AREA 4	No. 2 Canyon Yard	6.4
	Permanent No. 2 Canyon Road	6.2
	No. 2 Cyn Fan Pad & Access Road	<u>1.5</u>
		14.1
AREA 5	Water Canyon Portals - No. 2 Mine	2.2
	Water Canyon Refuse Area	3.7
	Water Canyon Road	<u>5.4</u>
		11.3
AREA 6	Manshaft Substation Area	5.7
	Twinshaft Mine-Water Pond	3.5
	Permanent West Ridge Road	1.3
	Whitmore Canyon County Road	1.1
	Reclamation Test Plot	<u>0.1</u>
		11.7
AREA 7	Rail Loop Area-Plate III-22	12.6
	Plate III-23	12.6
	Railroad Right-of-Way (Permanent)	<u>1.1</u>
		26.3
AREA 8	Outcrop Fan Road	6.4
	Outcrop Power Line Corridor	8.4
	Outcrop Fan Pad - No. 1 Mine	<u>2.0</u>
		16.8
AREA 9	Pole Cyn Shaft Pad & Access Road	1.3
	Permanent Pole Canyon Road	1.8
	002B Mine-Water Pond	2.6
	Manshaft - Twinshaft	<u>12.9</u>
		18.6
TOTAL		181.6

Revised 2/7/94

TABLE III-25
 RECLAMATION & REVEGETATION COST SUMMARY

AREA NUMBER	AREA DESCRIPTION	TOTAL ACRES	MINE SEALING	REGRADE DISTURBED AREAS	REGRADE CUTBANK AREAS	PORTAL CLOSURE & FILL	SOIL TEST FERTILIZE & PREPARE	REVEGE-TATE	POND RECLAIM	TOTALS
1	Main complex, including offices, shop, warehouse, parking lot, unit train, preparation plant, No. 3 Mine fan, industrial water tanks, mine portals, sed ponds & substations.	53.8	\$10,334	\$87,373	\$85,430	\$505	\$12,180	\$24,949	\$5,876	\$226,649
2	Fan Cyn fan, substations, portals, & road.	3.3	\$0	\$2,294	\$524	\$0	\$747	\$1,641		\$5,206
3	Whitmore Ventilation shafts, road, & 002A pond.	3.4	\$4,800	\$5,363	\$336	0	\$770	\$1,577	\$4,138	\$16,984
4	No. 2 Canyon Yard, Portal, sed pond, No.2 Cyn Fan pad & access road.	7.9	\$0	\$0	\$5,353	\$2,100	\$1,789	\$4,438	\$130	\$13,811
5	Water Canyon portals & road.	11.3	\$0	\$65,520	\$262	0	\$2,558	\$5,707		\$74,047
6	Manshaft Substation area, manshaft pond road, and Twinshafts mine water pond.	3.1	\$0	\$5,369	\$0	0	\$702	\$1,541		\$7,612
7	Sacco Flats, RR Loop, & Refuse Haul Road Proposed Borrow Area	12.8 10.0	\$0 \$0	\$18,735	\$0	\$6,300	\$2,898 \$2,264	\$6,539 \$5,108		\$41,844
8	Outcrop Fan Area, fan, substations, Outside Raise portals & roads.	8.8	\$6,943	\$3,949	\$7,713	\$2,100	\$1,992	\$5,305		\$28,002
9	Manshaft-Twinshafts Area, fan, shafts, hoisthouse, bathhouse, sediment pond, Pole Cyn shaft, and 002B pond.	13.8	\$5,000	\$17,594	\$23,827	\$0	\$3,124	\$11,077	\$3,311	\$63,933
TOTAL		128.2	\$27,078	\$206,198	\$123,445	\$11,005	\$29,024	\$67,881	\$13,456	\$478,087

Note: Soil Test, Fertilize, & Prepare cost based on acres x \$226.40/acre

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TABLE III-29
 TOTAL PERFORMANCE BOND ESTIMATE

ITEM	TOTAL	Table
Mine Sealing	\$27,078	III-5&6
Regrading Disturbed Areas (1)	\$241,385	III-19
Regrading Cut Slope Areas (1)	\$123,445	III-20
Remove Contaminated Soil	\$79,916	III-42
Portal Closure & Fill	\$11,005	III-9
Soil Testing, Preparation & Fertilizing	\$29,024	III-25
Revegetation	\$67,881	III-11
Pond Reclamation	\$13,456	III-21
Dismantling & Removing Facilities	\$855,715	III-1
Culvert Removal	\$4,651	III-22
Plug Drill Holes	\$2,892	III-10
Monitoring During 10 Year Responsibility	\$146,620	III-30
Revegetation @ 40% Failure Rate (2)	\$38,762	
On-Site Manager - (8 mo. x \$5,000/mo.)	\$40,000	
	\$1,681,831	

YEAR	ESCALATED FACTOR	TOTAL BOND
1993		\$1,681,831
1994	1.84%	\$1,712,776
1995	1.84%	\$1,744,292

Contingency @ 10%	\$168,183
Contractor Mobilization & Demobilization	\$10,000
Cost to Collateralize Bond @ 6%	\$115,348

TOTAL PERFORMANCE BOND ESTIMATE **\$2,037,823**

Notes:

- (1) Estimated dirt volumes based on 18 to 48 inches of soil material.
- (2) Calculations for Revegetation Failure Rate Cost:

Soil Testing, Prep., & Fertilizing	\$29,024
Revegetation	\$67,881
Total Revegetation & Soil Testing	\$96,906
 Disturbed Acres	 167
 Cost/Disturbed Acre	 \$580
Cost at 40% Failure Rate	\$38,762

TABLE III-30
TEN YEAR RESPONSIBILITY PERIOD MONITORING

A. EROSIONAL

2 mandays/month at \$30.00/hr x 12 months x 10 years x 8 hrs./day = \$57,600

B. HYDROLOGIC

- 1) Sample each discharge pond on a 10 year – 24 hour storm frequency basis. Assume each pond will require sampling one time during the ten year responsibility period.

8 ponds x 2 hours each x \$30.00/hr = \$480

- 2) Sample 2 streams 4 times/year x 2 hrs/sample x 10 years x \$30/hr = \$4,800

- 3) Laboratory costs @ \$190/sample x 88 samples in 10 years = \$16,720

Total Hydrologic = \$22,000

C. VEGETATION

- 1) Biannual sampling of vegetation reference areas and revegetated areas during responsibility period. Assume 5 years of sampling 8 days/year.

40 days x 2 men x \$30/hr. x 8 hrs. = \$19,200

- 2) Final vegetation survey for reclamation bond release

16 days x 3 men x 8 hrs./day x \$30/hr. = \$11,520

- 3) Biannual Report assembling and writing

3 days x 2 men x 8 hrs./day x \$30/hr. x 5 reports = \$7,200

- 4) Final vegetation report assembling and writing

8 days x 2 men x 8 hrs/day x \$30/hr x 5 reports = \$19,200

Total Vegetation = \$57,120

D. SUBSIDENCE SURVEY

- 1) Subsidence survey annually for 3 years after closure.

3 days x 3 men x 8 hrs/day x \$25/hr x 3 yrs = \$5,400

- 2) Annual subsidence report

5 days x 1.5 men x 8 hrs/day x \$25/hr x 3 yrs = \$4,500

Total Subsidence Monitoring = \$9,900

TOTAL MONITORING COST = \$146,620

* Lab sample costs are from 1993 lab costs.
Labor costs are from recent contractor quotes.

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SUNNYSIDE COAL COMPANY
 SUNNYSIDE MINE
 RECLAMATION COST ESTIMATE
 REVISED 2/7/94

Table III-31

EQUIPMENT OPERATING COSTS

EQUIPMENT	MONTHLY RENTAL COST	COST WITH SLC/UT CITY COST INDEX	HOURLY OPERATING COST*	----- OPERATING COST	MONTHLY LABOR COST	----- TOTAL COST	HOURLY COST @ 132.9 HRS/MONTH
Cat D8L, 300 hp	\$9,675	\$8,930	\$29.78	\$4,000	\$5,100	\$18,030	\$136.00
Cat D8L/Single Shank Ripper	\$11,690	\$10,790	\$32.91	\$4,400	\$5,100	\$20,290	\$153.00
Cat D8L/Triple Shank Ripper	\$11,015	\$10,170	\$32.57	\$4,300	\$5,100	\$19,570	\$147.00
Cat 225 Backhoe with 8'Stick	\$6,225	\$5,750	\$16.92	\$2,200	\$5,100	\$13,050	\$98.00
Cat 633D Self-Loading Scraper	\$18,400	\$16,980	\$55.33	\$7,400	\$5,100	\$29,480	\$222.00
Cat 988B Front End Loader	\$12,200	\$11,260	\$45.01	\$6,000	\$5,100	\$22,360	\$168.00
Cat 769C Haul Truck	\$10,200	\$9,410	\$24.11	\$3,200	\$5,100	\$17,710	\$133.00
12 CY Haul Truck	\$3,675	\$3,390	\$15.10	\$2,000	\$5,100	\$10,490	\$79.00
Case 580, Rubber-tire Backhoe	\$2,850	\$2,630	\$9.77	\$1,300	\$5,100	\$9,030	\$68.00
3 Ton, Flat Bed Truck	\$1,125	\$1,040	\$8.54	\$1,100	\$5,100	\$7,240	\$54.00

Equipment Operating Hrs./Day	(A)	7.25	
Labor Paid Hrs./Day	(B)	8.00	
Days/Month Operated	(C)	22	
Equipment Maint. Availability	(D)	83.33%	
Equipment Hrs./Month A*C*D		132.9	
Operator Hrs./Month B*C		176.0	
Hourly Labor Cost Including Burden		\$29.25	1993 Wage Agreement

Monthly Equipment Rental and Hourly Operating Costs from 1993 Means Sitework and Landscape Cost Data, Section 016-400 pages 13-21

Salt Lake City, UT Cost Index * 0.923 Installation, page 479 Means Sitework and Landscape
 0.846 Material, page 479 Means Sitework and Landscape

SUNNYSIDE COAL COMPANY
 SUNNYSIDE MINE
 RECLAMATION COST ESTIMATE
 REVISED 2/7/94

Table III-32

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CAT 225 BACKHOE PRODUCTION WITH 8'-0" STICK

Use G.P. bucket with 48" width - Heaped = 1.37 CY

Material between rock - well blasted & bottom end of sand & gravel for fill factor ---- use

85% Fill Factor
 1.165 Actual CY per Bucket

CYCLE TIME	TIME
Average operator @ 120 deg. swing	8.0 Seconds
Load Bucket	6.0
Dump Bucket	2.0
Swing Empty	6.0

TOTAL CYCLE TIME	22.0 Seconds or 0.367 Minutes

Assume : 0% Swell on Reworked Material
 2 minutes reset time every 20 swings.
 50 minute hour operating time

Adjusted cycle time = (min./cycle * cycles before reset + reset time)/cycles before reset = 0.467 min./cycle

PRODUCTION
 Bucket capacity * fill factor * 50 min hr / 0.467 min/cycle = 124.8 CY/50 min hr

OPERATING COST
 \$98.00 /Hr divided by 124.8 CY/Hr = \$0.785 /LCY

CASE 580 Rubber Tire BACKHOE

Use G.P. bucket with 30" width - Heaped = 1.00 CY

Material between rock - well blasted & bottom end of sand & gravel for fill factor ---- use

85% Fill Factor
 0.85 Actual CY per Bucket

CYCLE TIME	TIME
Average operator @ 120 deg. swing	7.0 Seconds
Load Bucket	5.0
Dump Bucket	2.0
Swing Empty	5.0

TOTAL CYCLE TIME	19.0 Seconds or 0.317 Minutes

Assume : 0% Swell on Reworked Material
 2 minutes reset time every 15 swings.
 50 minute hour operating time

Adjusted cycle time = (min./cycle * cycles before reset + reset time)/cycles before reset = 0.450 min./cycle

PRODUCTION
 Bucket capacity * fill factor * 50 min. hr./minutes/cycle = 94.4 CY/50 min. hr.

OPERATING COST
 \$68.00 /Hr divided by 124.8 CY/Hr = \$0.720 /LCY

Equipment Hourly Costs From "Equipment Operating Costs" Table

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 SUNNYSIDE MINE
 RECLAMATION COST ESTIMATE
 REVISED 2/7/94

Table III-33

Cat 988B Loader Production

CYCLE TIME

Basic Cycle Time	0.57 min.
Material - Mixed	0.02 min.
Misc. - Assume:	0.00 min.

	0.59 min.

Use 7 CY heaped rock bucket with fill factor of 95%
 7 CY * 95% = 6.65 CY/Bucket 35 Ton/2600lb./ton = 26.92 CY/Truck
 26.92 CY truck/6.65 CY/Bucket = 4.05 Buckets/Truck
 Use 4 Buckets /Truck * 6.65 CY/Bucket = 26.6 CY/Truck
 4 Buckets * 0.59 min./bucket = 2.36 min. Truck Load Time

12 CY truck/6.65 CY/Bucket = 1.80 Buckets/Truck
 Use 2 Buckets/Truck * 6.65 CY/Bucket = 13.3 CY/Truck
 2 Buckets * 0.59 min./bucket = 1.18 min. Truck Load Time

Truck Size	Load Time	Spot Time	Wait Time	Total Time	Loads /50 min hr	CY /hr.	Loading Cost @ \$168.00 /hr.
35 Ton	2.36	0.5	0.0	2.86	17.48	465.03	\$0.361
	2.36	0.5	0.5	3.36	14.88	395.83	\$0.424
	2.36	0.5	1.0	3.86	12.95	344.56	\$0.488
	2.36	0.5	2.0	4.86	10.29	273.66	\$0.614
	2.36	0.5	3.0	5.86	8.53	226.96	\$0.740
	2.36	0.5	4.0	6.86	7.29	193.88	\$0.867
	2.36	0.5	5.0	7.86	6.36	169.21	\$0.993
12 CY Truck Hourly Cost =							\$79.00 /hr.
12 CY	1.18	0.5	0.0	1.68	29.76	395.83	\$0.200
	1.18	0.5	0.5	2.18	22.94	305.05	\$0.259
	1.18	0.5	1.0	2.68	18.66	248.13	\$0.318
	1.18	0.5	2.0	3.68	13.59	180.71	\$0.437
	1.18	0.5	3.0	4.68	10.68	142.09	\$0.556
	1.18	0.5	4.0	5.68	8.80	117.08	\$0.675
	1.18	0.5	5.0	6.68	7.49	99.55	\$0.794

Equipment Hourly Costs From " Equipment Operating Costs" Table

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 SUNNYSIDE MINE
 RECLAMATION COST ESTIMATE
 REVISED 2/7/94

Table III- 34

CAT 633D PRODUCTION & OPERATING COSTS

HAUL DISTANCE	LOADED HAUL TIME MIN.	EMPTY HAUL MIN.	SPREAD TIME MIN.	LOAD TIME MIN.	CYCLE TIME MIN.	LOADS /50 MIN. HOUR	C.Y./HR. @ 28.8 C.Y./LOAD	COST/C.Y. @ \$222 /HOUR
50	0.25	0.20	0.70	0.90	2.05	24.39	702	\$0.316
100	0.40	0.30	0.70	0.90	2.30	21.74	626	\$0.355
150	0.52	0.35	0.70	0.90	2.47	20.24	583	\$0.381
200	0.63	0.45	0.70	0.90	2.68	18.66	537	\$0.413
250	0.75	0.50	0.70	0.90	2.85	17.54	505	\$0.439
300	0.85	0.55	0.70	0.90	3.00	16.67	480	\$0.463
350	0.95	0.60	0.70	0.90	3.15	15.87	457	\$0.486
400	1.05	0.65	0.70	0.90	3.30	15.15	436	\$0.509
450	1.15	0.70	0.70	0.90	3.45	14.49	417	\$0.532
500	1.25	0.75	0.70	0.90	3.60	13.89	400	\$0.555
550	1.35	0.82	0.70	0.90	3.77	13.26	382	\$0.581
600	1.45	0.90	0.70	0.90	3.95	12.66	365	\$0.609
650	1.55	0.95	0.70	0.90	4.10	12.20	351	\$0.632
700	1.65	1.00	0.70	0.90	4.25	11.76	339	\$0.655
750	1.75	1.05	0.70	0.90	4.40	11.36	327	\$0.678
800	1.87	1.10	0.70	0.90	4.57	10.94	315	\$0.705
850	2.00	1.15	0.70	0.90	4.75	10.53	303	\$0.732
900	2.15	1.20	0.70	0.90	4.95	10.10	291	\$0.763

PAYLOAD = 75,000 LB./2,600 LB./C.Y. = 28.8 L.C.Y./LOAD
 CYCLE TIMES FROM CAT HANDBOOK
 EQUIPMENT HOURLY COSTS FROM "EQUIPMENT OPERATING COSTS" TABLE

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 SUNNYSIDE MINE
 RECLAMATION COST ESTIMATE
 REVISED 2/7/94

Table III-35

ESTIMATED DOZER PRODUCTION - D8L

PUSH DISTANCE	D8L	JOB	COST/C.Y.
	UNCORRECTED DOZER PRODUCTION	CORRECTED C.Y. @ 0% GRADE	@ \$136 /HOUR
50	1480	995	\$0.137
100	930	625	\$0.218
150	680	457	\$0.297
200	530	356	\$0.382
250	420	282	\$0.482
300	380	255	\$0.532
350	320	215	\$0.632
400	300	202	\$0.674

JOB CORRECTION FACTORS

A. Operator - Average	0.75
B. Material - Previously Excavated	0.90
C. Slot Dozing	1.20
D. Job Efficiency - 50 Min. Hr.	0.83
E. Wt. Correction 2600lb./yd / 2600 lb./yd.	1.00
Correction Factor - A * B * C * D * E =	0.67

- Assume average LCY weight of 2,600 lb/cy for 25% rock, 75% earth
- Production data from Caterpillar Production Handbook - Dozing
- Equipment Hourly Costs From " Equipment Operating Costs" Table

ESTIMATED RIPPER PRODUCTION D8L WITH SINGLE SHANK RIPPER

RIP DISTANCE	TIME ONE WAY MIN.	ADD TURN TIME .25 MIN	PASSES /50 MIN. HOUR	HOURLY PASSES @ 85% JOB *	** PRODUCTION		COST/L.C.Y. @ \$153 /HR.	
					1' DEEP	2'DEEP	1' DEEP	2'DEEP
50	0.568	0.818	61.1	51.9	288.6	577.2	\$0.530	\$0.265
100	1.136	1.386	36.1	30.7	340.6	681.2	\$0.449	\$0.225
150	1.705	1.955	25.6	21.7	362.4	724.8	\$0.422	\$0.211
200	2.273	2.523	19.8	16.8	374.4	748.7	\$0.409	\$0.204
250	2.841	3.091	16.2	13.8	381.9	763.9	\$0.401	\$0.200
300	3.409	3.659	13.7	11.6	387.2	774.3	\$0.395	\$0.198
350	3.977	4.227	11.8	10.1	391.0	782.0	\$0.391	\$0.196
400	4.545	4.795	10.4	8.9	393.9	787.8	\$0.388	\$0.194

- * Actual Production 10% to 20% lower than calculated method. See Caterpillar Performance Handbook - Calculating Ripper Production.
- ** Rip Distance * 3' between passes * Depth * Hourly Passes/27 cu. ft.per C.Y.
- Equipment Hourly Costs From " Equipment Operating Costs" Table

ESTIMATED RIPPER PRODUCTION D8L WITH TRIPLE SHANK RIPPER

RIP DISTANCE	TIME ONE WAY MIN.	ADD TURN TIME .25 MIN	PASSES /50 MIN. HOUR	HOURLY PASSES @ 85% JOB *	** PRODUCTION		COST/L.C.Y. @ \$147.00 /HR.	
					1' DEEP	2'DEEP	1' DEEP	2'DEEP
50	0.568	0.818	61.1	51.9	1089.9	2179.7	\$0.140	\$0.070
100	1.136	1.386	36.1	30.7	1286.4	2572.8	\$0.119	\$0.059
150	1.705	1.955	25.6	21.7	1368.7	2737.4	\$0.112	\$0.056
200	2.273	2.523	19.8	16.8	1413.9	2827.8	\$0.108	\$0.054
250	2.841	3.091	16.2	13.8	1442.5	2885.0	\$0.106	\$0.053
300	3.409	3.659	13.7	11.6	1462.2	2924.4	\$0.105	\$0.052
350	3.977	4.227	11.8	10.1	1476.6	2953.2	\$0.104	\$0.052
400	4.545	4.795	10.4	8.9	1487.6	2975.2	\$0.103	\$0.051

- * Actual Production 10% to 20% lower than calculated method. See Caterpillar Performance Handbook - Calculating Ripper Production.
- ** Rip Distance * 11.33' between passes * Depth * Hourly Passes/27 cu. ft.per C.Y.
- Equipment Hourly Costs From " Equipment Operating Costs" Table

Table III-42
 Contaminated Soil Removal Costs

Area	Length	Width	Area	Depth	Cu Yds
Shop Building	120	50	3000	3	330
Preparation Plant	50	50	2500	3	280
Backfill Plant	50	50	2500	3	280
Fueling Station	25	25	625	2	50
Coarse Refuse Bin	25	25	625	3	70
Stockpile Pad	75	50	3750	2	280
North End Loadout	25	25	625	3	70
#3 Hoisthouse	15	15	225	2	20
Rotary Dump	15	15	225	2	20
Sacco Flats	100	25	2500	2	190
#3 Emulsion House	15	15	225	2	20
Mnshft Emulsion Hs	15	15	225	2	20
Rotary Brkr Bldg	15	15	225	2	20
Totals			0.40 acre		1,650
Loading Cost :	988b @ \$0.794/cy *				\$1,310
Haulage Cost :	12 CY Truck @ \$4.74/cy **				\$7,821
Landfill Cost:	ECDC @ \$33/ton & 2600 lb/CY				\$70,785
			Total Cost		\$79,916

* Table III-33

** Table III-31 and following calculations:

1650 CY/12 CY per trip =	138 trips
Cycle Times:	
15 mile roundtrip =	36 minutes
Load & dump =	7 minutes

	43 minutes
Operating hours =	99 hours
Operating Cost:	
@ \$79/hr * hours =	\$7,821
	\$4.74 /Cubic Yard

Landfill Cost based on ECDC's quoted rate for 1993-94.

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TABLE III-43

RECLAMATION AREAS BY TYPE OF WORK
(ACRES)

AREA	LOCATION	GRADE & RIP ONLY	PLACE 18" COVER	RE-SLOPE CUTBANKS	POND REMOVAL	RE- VEGETATE	CONTEMP- ORANEOUS RECLAIMED	PERMANENT AREAS	TOTAL DISTURBED
1	SSSF AREA	23.0	9.5	16.7	4.6	53.8	10.0	4.5	72.3
2	FAN CYN PORTALS	2.0	3.2	0.0	0.0	3.3	0.0	0.0	3.3
3	WHITMORE FAN AREA	1.3	0.5	0.8	0.8	3.4	0.4	0.0	7.2
4	NO.2 CYN PAD	0.6	0.0	0.9	0.0	1.5	0.0	0.0	1.5
	YARD	1.4	1.8	3.0	0.2	6.4	0.0	6.2	12.6
									14.1
5	WATER CYN PORTALS	5.4	0.1	0.0	0.0	7.6	0.0	0.0	7.6
	REFUSE PILE	0.0	3.7 *	0.0	0.0	3.7	0.0	0.0	3.7
									11.3
6	MANSHAFT (VALLEY)	0.6	0.5	0.0	2.0	3.1	3.3	2.4	11.7
7	RAIL LOOP BORROW AREA	7.4	3.0	0.0	0.0	12.8	0.0	3.5	16.3
		10.0	0.0	0.0	0.0	10.0	0.0	0.0	10.0
									26.3
8	OUTCROP PORTALS	6.4	0.0	2.4	0.0	8.8	0.0	0.0	16.8
9	MANSHAFT	2.9	1.3	2.5	1.6	8.3	3.0	0.0	11.3
	TWINSHAFT	0.6	0.0	1.0	0.0	1.6	0.0	0.0	1.6
	POLE CYN	0.5	0.0	0.8	2.6	3.9	0.0	1.8	5.7
	TOTAL 9								18.6
TOTALS		62.1	20.6	28.1	11.8	128.2	16.7	18.4	181.6

* -- WATER CYN REFUSE PILE COVERED WITH 4 FOOT OF SOIL SUBSTITUTE

NOTES: WATER CYN AND FAN CYN PORTALS (3.2 ACRES) HAVE BEEN ROUGH GRADED;
REVEGETATION STILL NEEDS TO BE DONE. POWERLINE CORRIDORS
ACCOUNT FOR 22.1 ACRES OF THE DISTURBED AREA.

TABLE III-44

EARTHWORK VOLUMES
(CU YDS)

AREA	LOCATION	GRADE & RIP ONLY	PLACE 18" COVER	RE-SLOPE CUTBANKS	POND REMOVAL	HAULED MATERIAL	TOTAL MATERIAL
1	PREP PLANT	0	0	68,037	0	3,111	68,037
	LOADOUT	0	0	71,519	0	222	71,519
	OTHER	55,660	22,990	0	11,360	23,220	90,010
2	FAN CYN						
	PORTALS	4,840	484	0	0	484	5,324
3	WHITMORE						
	FAN AREA	3,146	1,210	924	5,030	1,210	10,310
4	NO.2 CYN						
	FAN PAD	1,452	0	3,485	0	0	4,937
	SUPPLY YARD	3,388	4,356	8,671	630	13,027	17,045
5	WATER CYN						
	PORTALS	13,068	242	0	0	242	13,310
	REFUSE PILE	0	23,877 *	0	0	23,877	23,877
6	MANSHAFT						
	(VALLEY)	1,452	1,210	0	10,100	1,210	12,762
7	RAIL LOOP	17,908	7,260	0	0	7,260	25,168
	BORROW AREA	48,400 #	0	0	0	0	48,400
8	OUTCROP						
	PORTALS	15,488	0	17,500	0	0	32,988
9	MANSHAFT	7,018	3,146	32,526	2,480	3,146	45,170
	TWINSHAFT	1,452	0	12,223	0	0	13,675
	POLE CYN	1,210	0	9,319	11,180	0	21,709
TOTALS		174,482	64,775	224,204	40,780	77,009	504,241

* -- WATER CYN REFUSE PILE COVERED WITH 4 FOOT OF SOIL SUBSTITUTE.
-- BORROW AREA IS RIPPED 3 FT DEEP ONLY.

TABLE III-45

SOIL/FILL MATERIAL NEEDED FROM BORROW AREA
(CU YDS)

AREA	LOCATION	AREA (ACRES)	DEPTH (INCHES)	VOLUME (CU YDS)	DISTANCE FROM BORROW AREA (MILES)
1	PREP PLANT			3,111	1.5
	LOADOUT			222	1.5
	OTHER	9.5	18	22,990	1.5
	PORTAL FILL			230	1.5
2	FAN CYN PORTALS	0.2	18	484	2.2
3	WHITMORE FAN AREA	0.5	18	1,210	3.5
4	NO.2 CYN				
	NO.2 PORTALS SUPPLY YARD	1.8	18	8,671 4,356	1.8 1.8
5	WATER CYN				
	PORTALS REFUSE PILE	0.1 3.7	18 48	242 23,877	2.2 2.2
6	MANSHAFT (VALLEY)	0.5	18	1,210	4.5
7	RAIL LOOP BORROW AREA	3.0	18	7,260	0.8
8	OUTCROP PORTALS				
9	MANSHAFT TWINSHAFT POLE CYN	1.3	18	3,146	5.0
TOTALS		20.6		77,009	
				10% CONTINGENCY	7,701
GRAND TOTAL BORROW MATERIAL (CU YDS)				84,710	
MATERIAL DEPTH OVER 10 ACRES (FT)				5.3	

AT LEAST 30 ACRES OF BORROW AREA AVAILABLE

CHAPTER III

SUNNYSIDE COAL COMPANY
 SUNNYSIDE MINE
 RECLAMATION COST ESTIMATE
 REVISED 2/7/94

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TABLE III-46

FILL MATERIAL TRUCK HAULAGE COSTS

AREA	ONE-WAY DISTANCE (miles)	VOLUME HAULED (cu yds)	TRUCK SIZE (cu yds)	NUMBER OF TRIPS	---CYCLE TIME (min)---			OPERATE HOURS	HOURLY RATE	TOTAL COST	COST/ CU YD	--988B LOADER--		----- TRUCKS -----		TOTAL CY/HR
					TRAVEL	LD/DUMP	TOTAL					COST/ CU YD	CY/HR	INDIVDL NUMBERCY/HR		
1	1.5	26,553	35	760	12	9	21	266	\$133	\$35,380	\$1.33	\$0.867	194	2	99.8	200
2	2.2	484	35	14	18	9	27	6	\$133	\$800	\$1.65	\$0.740	227	3	80.7	242
3	3.5	1,210	12	101	17	9	26	44	\$79	\$3,480	\$2.88	\$0.794	100	4	27.5	110
4	1.8	13,027	35	372	14	10	24	149	\$133	\$19,820	\$1.52	\$0.993	169	2	87.4	175
5	2.2	24,119	35	690	18	9	27	311	\$133	\$41,360	\$1.71	\$0.740	227	3	77.6	233
6	4.5	1,210	12	101	22	7	29	49	\$79	\$3,870	\$3.20	\$0.794	100	4	25.0	100
7	0.8	7,260	35	210	6	8	14	49	\$133	\$6,520	\$0.90	\$0.614	274	2	148.2	296
8	0	0	0	0	0	0	0	0	\$0	\$0	\$0.00	\$0.000	0	0	0.0	0
9	5.0	3,146	12	262	24	8	32	140	\$79	\$11,060	\$3.52	\$0.794	100	5	22.0	110
TOTALS		77,009						1,014		\$122,290	\$1.59					

NOTES: TRAVEL TIME BASED ON AVERAGE 16 MPH FOR 35 CY TRUCK AND 25 MPH FOR 12 CY TRUCK. LOAD/DUMP TIME BASED ON TABLE III-33 LOADER TIME PLUS 2 TO 3 MINUTES FOR DUMPING. TRUCK HOURLY RATE BASED ON TABLE III-31. LOADER RATE BASED ON TRUCK CAPACITY MATCHING LOADER CAPACITY. OPERATING HOURS BASED ON 50 MINUTE HOURS IN 7.25 HOURS PER 8-HOUR DAY.

Table III-47
 CULVERT REMOVAL --- COST CALCULATIONS

EXCAVATION COSTS

Diameter (inches)	Trench wide/deep (feet)	Excavate (CY/ln ft)	Type Backhoe Machine	Cost/CY	Cost/Ln Ft	Excavation Rates		Excavate 20 ft (min)
						CY/Hr	Feet/Min	
0 to 24	3 x 2	0.22	Case 580	\$0.72	\$0.160	95	7.13	2.8
25 to 42	4 x 3	0.44	Cat 225	\$0.785	\$0.349	125	4.69	4.3
43 to 54	5 x 4	0.74	Cat 225	\$0.785	\$0.581	125	2.81	7.1
55 to 66	6 x 5	1.11	Cat 225	\$0.785	\$0.872	125	1.88	10.7
67 to 78	7 x 6	1.56	Cat 225	\$0.785	\$1.221	125	1.34	14.9
79 to 90	8 x 7	2.07	Cat 225	\$0.785	\$1.628	125	1.00	19.9
+91	12 x 8	3.11	Cat 225	\$0.785	\$2.442	125	0.67	29.9

CULVERT REMOVAL & TRANSPORTATION COSTS --- Based on 20 foot Sections

Diameter (inches)	Time to Pull Out (min)	Backhoe Removal Cost/Ln Ft	Flatbed Truck Cost/Day	Sections Ft/Trip	Truck Cycle Times			Total (min)	Trips /Day	Feet /Day	Transp Cost /Foot
					Load (min)	Other (min)					
0 to 24	5	\$0.285	\$158.20	200	78	25	103	4.0	796	\$0.199	
25 to 42	5	\$0.409	\$158.20	120	56	25	81	5.1	610	\$0.259	
43 to 54	6	\$0.491	\$158.20	80	52	25	77	5.3	424	\$0.374	
55 to 66	6	\$0.491	\$158.20	60	50	25	75	5.5	328	\$0.482	
67 to 78	7	\$0.572	\$158.20	40	44	25	69	6.0	238	\$0.664	
79 to 90	7	\$0.572	\$158.20	20	27	25	52	7.9	158	\$1.002	
+91	8	\$0.654	\$158.20	20	38	25	63	6.5	130	\$1.213	

CULVERT REMOVAL --- TOTAL COSTS PER LINEAL FOOT

Diameter (inches)	EXCAVATION	REMOVAL	TRANSPORTATION	GRAND TOTAL
0 to 24	\$0.160	\$0.285	\$0.199	\$0.644
25 to 42	\$0.349	\$0.409	\$0.259	\$1.017
43 to 54	\$0.581	\$0.491	\$0.374	\$1.446
55 to 66	\$0.872	\$0.491	\$0.482	\$1.845
67 to 78	\$1.221	\$0.572	\$0.664	\$2.458
79 to 90	\$1.628	\$0.572	\$1.002	\$3.202
+91	\$2.442	\$0.654	\$1.213	\$4.309

For Equipment Costs see Tables III-31 and III-32