

0054

Document Information Form

Mine Number: C/007/035

File Name: Incoming

To: DOGM

From:

Person N/A

Company N/A

Date Sent: N/A

Explanation:

TABLE OF CONTENTS
chapter nine
Mining Plan

cc:

File in: C/007, 035, Incoming

Refer to:

- Confidential
- Shelf
- Expandable

Date _____ For additional information

TABLE OF CONTENTS
CHAPTER NINE
MINING PLAN

9.1	Mining Plans	900-1
9.2	Description of Present Disturbance	900-2
9.3	Reclamation Accomplished to Date	900-2
9.4	General Reclamation Objectives	900-2
9.5	Areas to Be Reclaimed and Planned Reclamation	900-2
9.6	Excavation of Coal Mine Waste	900-3
	9.6.1 Coarse Refuse	900-4
	9.6.2 Fine Refuse	900-6
	9.6.3 Temporary Storage Areas	900-6
9.7	Backfilling and Grading	900-8
9.8	Topsoil and Borrow Material Handling	900-10
	9.8.1 Areas to Receive Topsoil or Borrow Material	900-10
	9.8.2 Borrow Material Removal	900-10
	9.8.3 Topsoil Storage	900-11
	9.8.4 Topsoil and Borrow Material Redistribution	900-11
	9.8.5 Amendments	900-11
9.9	Revegetation	900-11
	9.9.1 General Revegetation Procedures	900-11
	9.9.2 Interim Revegetation	900-12
	9.9.3 Seeding and Planting	900-13
	9.9.4 Mulching and Soil Stabilization	900-14
	9.9.5 Vegetation Success Determination	900-14
	9.9.6 Sampling Procedures	900-15
	9.9.7 Irrigation	900-16
9.10	Water Treatment	900-16
	9.10.1 Diversions	900-16
	9.10.2 Sediment Control	900-16
9.11	Monitoring and Maintenance	900-16
	9.11.1 Water	900-16
	9.11.2 Vegetation	900-17
	9.11.3 Erosion	900-17
	9.11.4 Temporary Storage Areas	900-17
	9.11.5 Reporting and Emergency Procedures	900-17
9.12	Schedule	

FIGURES

Figure 9-1, Interim Reclamation Seed Mixture

File in:
 Confidential
 Shelf
 Expandable
Refer to Record No 0054 Date _____
In C/ 007, 035, Internal
For additional information

APPENDICES

- Appendix 9-1, Draft Coarse Refuse Pile Fuel Study and Mining Plan, John T. Boyd
- Appendix 9-2, Noncombustible Material Disposal Design
- Appendix 9-3, Sunnyside Coal Refuse Drilling Programs and Evaluation of the Quantity and Quality of Fuel Material in the Sunnyside Coal Refuse Pile
- Appendix 9-4, Storage Area One Soil Sample Testing Results

TABLE OF CONTENTS
CHAPTER NINE
MINING PLAN

9.1	Mining Plans	900-1
9.2	Description of Present Disturbance	900-2
9.3	Reclamation Accomplished to Date	900-2
9.4	General Reclamation Objectives	900-2
9.5	Areas to Be Reclaimed and Planned Reclamation	900-2
9.6	Excavation of Coal Mine Waste	900-3
	9.6.1 Coarse Refuse	900-4
	9.6.2 Fine Refuse	900-6
	9.6.3 Temporary Storage Areas	900-6
9.7	Backfilling and Grading	900-8
9.8	Topsoil and Borrow Material Handling	900-10
	9.8.1 Areas to Receive Topsoil or Borrow Material	900-10
	9.8.2 Borrow Material Removal	900-10
	9.8.3 Topsoil Storage	900-11
	9.8.4 Topsoil and Borrow Material Redistribution	900-11
	9.8.5 Amendments	900-11
9.9	Revegetation	900-11
	9.9.1 General Revegetation Procedures	900-11
	9.9.2 Interim Revegetation	900-12
	9.9.3 Seeding and Planting	900-13
	9.9.4 Mulching and Soil Stabilization	900-14
	9.9.5 Vegetation Success Determination	900-14
	9.9.6 Sampling Procedures	900-15
	9.9.7 Irrigation	900-16
9.10	Water Treatment	900-16
	9.10.1 Diversions	900-16
	9.10.2 Sediment Control	900-16
9.11	Monitoring and Maintenance	900-16
	9.11.1 Water	900-16
	9.11.2 Vegetation	900-17
	9.11.3 Erosion	900-17
	9.11.4 Temporary Storage Areas	900-17
	9.11.5 Reporting and Emergency Procedures	900-17
9.12	Schedule	900-18

FIGURES

Figure 9-1, Interim Reclamation Seed Mixture

APPENDICES

- Appendix 9-1, Draft Coarse Refuse Pile Fuel Study and Mining Plan, John T. Boyd
- Appendix 9-2, Noncombustible Material Disposal Design
- Appendix 9-3, Sunnyside Coal Refuse Drilling Programs and Evaluation of the Quantity and Quality of Fuel Material in the Sunnyside Coal Refuse Pile
- Appendix 9-4, Storage Area One Soil Sample Testing Results

PLATES

Plate 9-1a, Noncombustible Waste Pile Design
Plate 9-1b, Reclamation Sequencing
Plate 9-2, Storage Area Map

CHAPTER NINE

9.1 MINING PLANS

Sunnyside Coal Company's (SCC) refuse disposal area has been acquired by Sunnyside Cogeneration Associates (SCA) to serve as a long-term supply of waste fuel for its coal mine waste-to-energy facility, located adjacent to the SCA Permit Area. SCA has contracted with SCC to provide alternative disposal for coal mine waste generated by SCC, both past and future. SCA's alternative energy project has been approved by the Federal Energy Regulatory Commission as a Qualifying Facility, based on the usage of coal mine waste as fuel in its fluidized-bed combustion boiler. SCA will use both "active waste", from the processing plant, and "accumulated waste", from the refuse pile, as sources of waste fuel for the facility.

Based on SCA's contract for the sale of electricity to Utah Power and Light, handling coal mine waste to serve as an alternative energy fuel will be a consistent and continuous process. Coal mine waste that continues to be generated by SCC's preparation plant will also be factored into SCA's fueling strategy, which can allow direct acceptance of coal mine waste at the facility, or temporary placement within the refuse disposal area prior to utilization.

SCA will excavate coal mine waste from the refuse disposal area based on detailed sampling and analyses and a materials handling plan which will be continuously updated by SCA. Excavation of the coal mine waste will be considerate of material quality, pile and embankment stability, and mine operation. Over the life of SCA's facility, nearly all of the coal mine waste will be burned to generate electricity, resulting in significantly less material that will need final reclamation. Final reclamation of the refuse pile will be accomplished after all of the coal mine waste is either burned as a fuel, or repositioned within the refuse disposal area for final disposal, if determined to be non-combustible (i.e., ashes, rock).

SCC will continue to dispose of the coal mine waste and slurry within the SCA Permit Area. The East Slurry Cell, and Slurry Ponds One and Two will continue to accept slurry from the SCC's coal processing facility.

Appendix 9-1 presents the mine plan for SCA. Data, including boring logs, to substantiate the conclusions of the Mine Plan are included in Appendix 9-3. The mine plan includes:

Cross sections of the refuse pile.

A detailed mine plan for year one. A moderately detailed plan for years two through ten. A general plan for years 11 through 20. The critical issues of the mine plan address:

1. Optimization of blending to provide consistent quality fuel over the life of the project.
2. Utilization of fines
3. Minimization of material handling
4. Characterization and handling of nonfuel zones in the refuse pile
5. Compliance with reclamation and regulatory requirements

Recommended equipment types, methods of mining and locations of mining.

9.2 DESCRIPTION OF PRESENT DISTURBANCE

Presently approximately 57% of the SCA Permit Area is disturbed. The disturbances have been caused from 1) coal mine waste disposal, 2) roads, and 3) sedimentation ponds and ditches. The majority of the impacted land was disturbed prior to the present resource protection laws. The future activities of the SCA cogeneration facilities are expected to cause little or no new disturbances to vegetated areas as the permit activities will be located mainly in areas that have been disturbed in the past.

All facilities are shown on Plate 5-1. Plate 3 - 1 outlines the areas of pre- and post-law disturbances.

9.3 RECLAMATION ACCOMPLISHED TO DATE

Interim reclamation was conducted in the fall of 1992 on the faces of lifts one through four of the coarse refuse pile. Approximately two feet of borrow material was placed on these areas to control fires that had been burning within the coarse refuse pile. This project was conducted by SCC in cooperation with DOGM.

9.4 GENERAL RECLAMATION OBJECTIVES

The reclamation activities proposed in this chapter are intended to meet the following specific objectives:

Regrading of the areas within the coarse refuse pile, slurry cells and other disturbances to achieve a stable, post-mining contour which will be compatible with the surrounding area, similar to the original pre-mining contour, free-draining, and conducive to revegetation.

Restoration of the natural drainage pattern through the disturbed area to the extent practicable while maintaining appropriate sediment controls at the periphery of the disturbed areas.

Covering areas that have been cleaned of refuse or slurry with topsoil or borrow material to allow revegetation of these surfaces.

Reseeding the regraded surfaces with a species mix designed to re-establish the surrounding native vegetation on the reclaimed areas and provide for wildlife habitat.

Monitor and maintain the reclaimed property until the reclamation success standards are achieved and the bond is released.

9.5 AREAS TO BE RECLAIMED AND PLANNED RECLAMATION

There are approximately 202 acres of disturbance within the SCA Permit Area of which all areas will eventually be reclaimed. The area of reclamation and reclamation sequencing is shown in Plate 9-1b.

During the remaining plan phase of the project the coarse refuse pile and East and West Slurry Cells will be excavated and the site will be covered with borrow material, recontoured and revegetated. The existing sediment ponds will be kept in-place until the final reclamation phase to control runoff from the area.

9.6 EXCAVATION OF COAL MINE WASTE

SCA's activities will include excavation and handling of noncoal mine waste, coal mine waste, and redisposal of non-combustible materials within the SCA Permit Area. Temporary storage of noncoal mine waste will be in the area just west of the Pasture Pond, between the Pasture Pond and Industrial Borrow Area 1. The site is approximately 1.1 acres and will be used as a temporary storage facility for material not suitable (noncoal mine waste) for the noncombustible waste site produced from within the SCA Permit Area. It should be noted that accommodations have NOT been made for the disposal of noncoal mine waste that is produced from the Sunnyside mines. It is Sunnyside Coal Company's (SCC) responsibility to dispose of all noncoal mine waste produced from their facility outside of the SCA Permit Boundary. SCC has NOT been authorized to store or dispose of noncoal mine waste within the SCA Permit Boundary.

Final disposal of noncoal mine waste will be in the Carbon County landfill. All noncoal mine waste will be disposed of in a timely manner as it is accumulated. It is not foreseen that there will be a significant amount of noncoal mine waste that will require disposal.

A detailed mining plan was completed by John T. Boyd Company in November of 1992 and is included in Appendix 9-1. Exhibits 3 through 29 in Appendix 9-1 demonstrate the conceptual mine sequence. Some of the findings of this report are summarized below.

The existing refuse pile consists of recoverable coarse and fine coal refuse and noncombustible material in the following proportions:

<u>Type of Material</u>	<u>Tons (000)</u>	<u>Percent</u>
Coarse Refuse	6,816*	73.5
Fine Refuse	1,998	21.5
Noncombustible	<u>460</u>	<u>5.0</u>
Total	9,274	100.0

* Includes 70,000 tons expected to be added between July 31, 1992 and January 1, 1993.

Based on current SCC mine production, approximately 264,000 tons per year of waste material (198,000 tons of coarse material and 66,000 tons of fines) will be added to the pile during the remaining life of the mine.

Mine plan delivery parameters are as outlined in Table 9-1.

**TABLE 9-1
MINE PLAN DELIVERY PARAMETERS**

	TONS		
	<u>Coarse</u>	<u>Fines</u>	<u>Total</u>
Mine Plan Deliveries			
Average annual fuel requirement	310,102	99,898	410,000
Average daily basis (240 days)	1,292	416	1,708
Average hourly basis (1,920 hours)	161.5	52	213.5
Number of trips per day (56.5 tons)	23	7	30
Trips per operating hour	3	1	4

The equipment used for loading and hauling services are one Caterpillar 980C type front-end loader with a modified 7.0 cubic yard bucket and one hauler with dual trailer rated at 60 tons capacity. Based on one 10-hour shift and a 5-day work week, this equipment allocation is more than adequate to consistently deliver the amount of waste coal fuel required by the cogeneration facility.

Tables 3.2 and 3.3 of Appendix 9-1 show summary and detailed schedules of the 20-year mine plan.

9.6.1 COARSE REFUSE

The initial excavation area was determined by the readily available coarse refuse material. The only area within the SCA Permit Area where this occurs is in the currently active SCC dumping zone west of the West Slurry Cell. All of the coarse refuse in other areas is covered either by 15 to 30 feet of fine refuse or by two to three feet of noncombustible clay, sand and rock used by SCC for reclamation. Exhibits 6, 7 and 8 of Appendix 9-1 show the initial development area in the coarse refuse.

The coarse refuse west of the West Slurry Cell will be mined by cuts oriented in a north-south direction. The base elevation selected for the initial lift is 6500 feet. This lift will vary from 10 to 30 feet in height in order to excavate the top or road portion of the noncombustible material of the West Slurry Cell dike in the first year. Noncombustible material excavated and disposed of during the first year is estimated at 50,000 cubic yards; of which 94% is dike material.

Each successive coarse refuse lift below 6,500 feet is ten feet. The 6,500 feet level is mined in a southerly direction. In all levels below 6,500 feet, mining commences in the middle of the level and progresses both north and south in order to present as many operating faces as possible. This mining sequence gives flexibility to the operator in selecting areas of varying quality for blending in order to deliver as consistent a fuel as possible.

The area of coarse refuse covered by fine material in the West slurry Cell is mined in an easterly direction. As proposed by the conceptual mine plan, mining commences in this area in the third quarter of the fourth year of operation. At this time period the elevation difference between the two operating levels mining coarse refuse is 40 feet (elevation 6,430 vs 6,470 feet).

There are three locations that will be utilized specifically for the temporary storage of coarse refuse. These areas are shown on Plate 5-1 and a detailed design is shown on Plate 9-2. The section below outlines John T. Boyd's analyses of the temporary storage areas. The remainder of Chapter 9, specifically section 9.6.3, includes further discussion concerning the practicality of utilizing the three temporary storage areas.

John T. Boyd has provided analyses of these areas and the disposal/utilization concepts are outlined below. Basic parameters used for the analyses are:

1. Currently, SCC produces 198,000 tons of coarse refuse annually (average - 16,500 tons per month).
2. Bulk density of the drained refuse is 80 lbs per cubic foot.
3. Each levelled lift (formed from truck dump windows) measures four feet high.
4. The loading/transportation equipment is the same (i.e. one Caterpillar 980C type front-end loader with a modified 7.0 cubic yard bucket and one hauler with dual trailers rated at 60-ton capacity).

The following is a summary of the available area in each storage area and the storage capacity of each 4' lift.

Storage Area 1

Storage Area One measures 2.9 acres or 126,324 square feet. The storage capacity of each lift is about 20,200 tons as follows:

$$\frac{126,324\text{ft}^2 \times 4\text{ft} \times 80\text{lbs/ft}^3}{2000\text{lbs/ton}} = 20,212 \text{ tons}$$

The surface of Storage Area One slopes towards the southwest at about 3% grade. The drainage direction is southwest. There is a ditch that runs parallel to the southern boundary of Storage Area One that drains to the existing 18" culvert at the south end of the New Access Road then to the Pasture Sediment Pond. The location of the drainages are shown on Plate 9-2.

Approximately 1.95 acres of Storage Area One is undisturbed and has been reclassified as "post-law disturbed" (see Plate 3-1) due to the storage of coarse refuse material in this area.

Topsoil removal will be consistent with approved methods outlined in Section 9.8. Topsoil from Storage Area One will be placed adjacent to the northeastern boundary of the SCA Permit Boundary as shown on Plate 5-1.

Storage Area 2

Storage Area Two measures approximately 3.1 acres or 135,036 square feet. An active industrial waste dump occurs in this area as a depression measuring 25,000 square feet and averaging 8 feet deep. To prepare Storage Area Two, the floor of the Industrial Waste Dump will be leveled. Utah Department of Environmental Quality (UDEQ) regulations will be followed to ensure proper closure of the dump site. The following section outlines procedures that will be followed to ensure compliance.

According to R315-303-2(3) of the UDEQ's regulations, "Any landfill that received waste after October 9, 1991 but stopped receiving waste before October 9, 1993 is exempt from all requirements of this section except for final cover." The Industrial Waste Dump located on SCA's property falls under this requirement. The closure of the site will entail complying with the requirements listed below:

- 1) At least 18" of compacted soil with a permeability of 1×10^{-5} cm/sec or less or equivalent will be placed upon the final lifts. Artificial liners may replace compacted soil covers provided that a minimum of either 20 mils reinforced or 40 mils non-reinforced thickness is used and is covered with eighteen inches of natural subsoils present in the unit.
- 2) The grade of the surface slopes will not be less than 2%, nor the grade of side slopes more than 33%.

In addition to the above requirements, SCA will exterminate all rats or other vermin from the site, extinguish all fires, cover all solid wastes with consolidated, compacted material at least 18 inches deep, ensure grading to provide proper drainage (see discussion below), and reclaim the site upon final reclamation of the entire SCA Permit Area. These requirements are outlined under R315-304-8 of the UDEQ Division of Solid and Hazardous Waste regulations.

The natural drainage of the site is toward the east at approximately 2%. Storage Area Two will be graded to allow drainage toward the northeast at approximately 2% grade (see Plate 9-2). A 12 inch culvert is proposed for the northeast corner of the site which will allow drainage into the Pasture Sediment Pond. Hydrologic calculations are included in Appendix 7-3. In addition, a 12" high berm will be constructed

around the southern perimeter of Storage Area Two to prevent runoff from the West Slurry Cell from entering the storage area.

Storage Area 3

Storage Area Three will be used primarily when additional storage is required if Areas One and Two cannot handle the amount of coarse refuse and fine refuse being generated. Fine refuse removed from the active slurry ponds numbers One and Two are currently stored within this area. The fine refuse (approximately 15,000 tons) occupies 25,000 square feet of surface (of the total 275,000 square feet available for coarse refuse storage) in two separate areas.. The coarse refuse storage capacity of each lift is approximately 44,000 tons.

The surface slopes toward the west at about 6% grade. Drainage direction is west-southwest to the ditch which transports slurry to the East Slurry Cell (when in use). Additional grading is not necessary for this area.

9.6.2 FINE REFUSE

The initial development area for fine refuse excavation was determined primarily by moisture content (13.0%) during the first two operating months and by the critical requirement to uncover coarse refuse material thereafter. This uncovering process must begin about two months after start-up in order to avoid mining and temporary storage of fines for subsequent rehandle. One of the prime objectives of the mine plan is to minimize material handling.

Exhibit 5 of Appendix 9-1 (mine bench elevation 6,540 to 6,530 feet) illustrates the decanted fines excavation area for the initial two-month period north of the West Slurry Cell. Fines excavation is then shifted to the western portion of the cell in order to remove the decanted fines dumped there from Slurry Ponds One and Two. These fines have a moisture content estimated at 13% and will be mined out by Month 7 as shown in Exhibit 6 and 7 of Appendix 9-1. Fines excavation then begins in the higher moisture (17.5%) material of the West Slurry Cell from Month 8 of Year 1 to Year 10 of the mining sequence. During this period all of the coarse material covered by these fines will be exposed (see Exhibits 8, 9, 10, 11 and 12 of Appendix 9-1) These fines will be mined in an easterly direction in a sequence of advancing benches, each upper bench remaining about 40 feet ahead of each succeeding lower bench.

The sequencing as described exposes coarse refuse ahead of requirement and does not create excessive highwall height between one operating area and another.

9.6.3 TEMPORARY STORAGE AREAS

In order to accommodate accessibility conflicts between SCC and Savage Construction on the SCA Permit Site, three additional storage areas will be constructed for the temporary storage of coarse refuse and fine refuse from the Sunnyside Mine. The reasons for these additional storage areas are: to provide a physical barrier between the non-union (Savage Construction) and the union laborers (Sunnyside Coal), provide Sunnyside Coal Company a place to temporarily store coarse refuse and fine refuse being brought to the SCA Permit Area, and to create a smoother, more efficient operating procedure by concentrating SCC's operations to the northeast area of the Permit Area.

The main reason for these storage areas is due to the conflict in union and non-union laborers. To separate the two parties, a fence will be constructed on the south side of Storage Area One. Sunnyside Mine stockpiles coarse refuse on the west side of the west slurry cell. The movement of the SCC vehicles conflicts with the excavation procedures that are being accomplished by Savage construction. The excavation of the coarse refuse by Savage and the stockpiling of the coarse refuse and fine refuse by SCC

creates accessibility problems to both operations. There are two access roads and they are being used by both parties. The three storage areas will be constructed so that both operations will be confined to separate areas of the SCA Permit Site. The storage areas have been designed to allow access from both ends so that when Savage is excavating from one end, SCC may be stockpiling from the other and vice versa. This arrangement will provide an environment suitable to SCC, SCA and Savage Construction. It will provide temporary storage of coarse refuse and fine refuse that is closer to both the power plant site and Sunnyside mine.

As stated above, the three temporary storage sites shall be used for the temporary placement of coarse refuse and fine refuse from the Sunnyside mine. Storage Areas One and Two will be used on a rotating basis. Storage Area Three would be used mainly as a contingency back-up area.

The primary plan is to have SCC deposit their waste in Storage Area One. Once Storage Area One was filled, SCC will begin to use Storage Area Two for coarse refuse and fine refuse storage to allow Storage Area One to dry. After Storage Area One was dry, SCA will excavate the coarse refuse and fine refuse in Storage Area One to allow Storage Area Two to dry.

These two areas will be used on a rotating basis with approximately two month cycles. The two storage areas are designed to allow SCC to enter both Storage Areas from the east. SCA will enter Storage Area One from the west and Storage Area Two from the east. The two storage areas will be separated by a chain link fence (to be installed) and the existing Lower and Upper Haul Roads.

The storage areas have been designed with proper drainage. Storage Area One is approximately 2.9 acres and drains to the southwest end of the site. Storage Area Two is approximately 3.1 acres and drains northeasterly. A 12 inch berm will be constructed around the southern perimeter of Storage Area Two to prevent additional runoff from the West Slurry Cell from entering the storage area. Storage Area Three is approximately 7.5 acres and will drain into the existing drainage to the south.

The 18 inch culvert previously installed as per the approved design of the New Access Road (shown on the original Plate 5-3) will not be altered. The drainage from Storage Area One will be diverted to this culvert which discharges into the Pasture Sediment Pond. A new culvert will be installed at the northeast end of Storage Area Two which will also divert runoff across the Upper Haul Road and into the Pasture Sediment Pond. The new culvert will be 12" inches in diameter. The location of the proposed culvert is shown on Plate 9-2. Updated hydrology calculations are also included to demonstrate that the Pasture Pond has adequate capacity to handle the additional runoff.

There are minor alterations proposed for both the Lower and Upper Haul Roads to provide access into and out of Storage Areas One and Two. Both of these roads have been designated "Primary Roads". The east end of the Lower and Upper Haul Roads will be slightly altered to allow easy access into and out of Storage Areas One and Two. The west intersection of Storage Area Two and the Upper Haul Road will also be changed to allow access into Storage Area Two from the west side. The proposed changes to the two roads are minor.

Topsoil will be handled according to DOGM guidelines and will be consistent with the plans outlined in the approved SCA Permit Document. Vegetation will be removed and topsoil will be stripped and stockpiled. Topsoil piles will be labeled with visible signs and measures will be taken to protect the topsoil from further disturbance. Topsoil will be used during final reclamation and therefore, will not be respread over the roadway embankment.

Trees and large shrubs will be removed prior to topsoil removal. Small shrubs, grasses and forbs will be collected with the topsoil material. Coal mine waste will be separated from this material and a Soil Tabulation Chart will be completed for the topsoil which is removed. Topsoil will be stockpiled near the northeast boundary of Storage Area One as shown on Plates 5-1. The topsoil storage pile will be

contoured to minimize soil loss and seeded with the interim seed mixture. Fertilizer will not be used on the stockpiles. A small berm will be constructed at the base of the new topsoil pile to prevent erosion until vegetation becomes established.

Three grab samples have been taken in Storage Area One (sample locations are shown on Plate 5-1) and testing has been completed. The samples were tested according to Table 1 of the DOGM's *Guidelines for Management of Topsoil and Overburden*. Based on DOGM's overburden evaluation for vegetative root zone, the material in Storage Area One is rated 'Good'. The test results are included in Appendix 9-4.

Disposal/Utilization Concepts

SCC produces 198,000 tons of coal refuse annually or an average of 16,500 tons of coarse refuse produced monthly. The capacity of the storage areas is adequate to meet the demands of production and have been designed to allow sufficient time for proper drainage of the refuse.

The concept of utilizing currently generated coarse refuse as feed fuel to the cogeneration plant boiler will not interfere with the conceptual mine plan presented by John T. Boyd. The mining plan is enhanced since the use of coarse refuse currently produced by the preparation plant makes the requirement to uncover coarse refuse material covered by the West Slurry Cell fine refuse less critical.

Maintenance

Maintenance of the three proposed storage areas will consist of providing general maintenance and inspections of the surrounding structures, drainages, culverts, and roads.

Water or other dust control measures will be applied as necessary to reduce dust. General road maintenance procedures will be practiced and inspections will be done as necessary. Inspections will consist of: erosion control, repair of structures and drainage systems, removal of debris in culverts and replacement of road surfacing material as needed.

Reclamation Plans

Reclamation plans will not deviate from those outlined in chapters 9 and 10. Approximately two acres of Storage Area One, which have had minimal disturbance in the past, will be disturbed as a result of the initiation of the temporary storage areas. Reclamation activities for this area will follow procedures outlined in section 9.9.1 GENERAL REVEGETATION PROCEDURES.

9.7 BACKFILLING AND GRADING

This section discusses the backfilling and regrading that will be done during the remaining plan period. Backfilling and regrading will involve redistribution of noncombustible material and regrading exposed surface areas that will be reclaimed. The objective of these activities is to restore the site to topographic configurations and geomorphic conditions similar to premining conditions. Final grading of all areas will include blending materials into the surrounding areas and reclaiming as detailed in Plate 10-1.

Noncombustible material in the refuse pile has been classified as follows:

Nontoxic reclamation cover placed in four areas as identified in Exhibit 1 of Appendix 9-1.

Nontoxic West Slurry Cell dike (now buried) as shown in Exhibit 2 of Appendix 9-1.

Buried clay and sand layers probably used as fire control materials when sections of the pile were burning.

Other waste such as the hardpan material that exists at the refuse and native soil interface.

These noncombustibles and burned sections are estimated to compose five percent of the total pile or 460,000 tons (Appendix 9-1 and Appendix 9-3). The cover and cell dike materials were investigated and estimates were made totaling 336,000 tons. The remaining 124,000 tons have been allocated to the fire control materials added to the pile, burned sections and unknown concentrations of inert materials (such as the hardpan material mentioned above).

Table 9-2 below summarizes the reclamation cover and cell dike material to be removed and disposed of annually from Year One through Year Ten and two five-year increments during the 20-year mine plan. Appendix 9-2 contains detailed designs for the disposal of the noncombustible material including a site plan with cross-sections and appropriate engineering calculations.

**TABLE 9-2
NONCOMBUSTIBLE MATERIAL REMOVAL SCHEDULE**

Removal Year	Reclamation Cover (Cubic Yards)	West Slurry Cell Dike (Cubic Yards)	Total (Cubic Yards)	Tons*
1	3,140	46,870	50,010	84,160
2	1,960	7,670	9,630	16,250
3	-	7,630	7,630	12,880
4	-	6,950	6,950	11,730
5	-	-	-	-
6	6,290	-	6,290	10,610
7	-	-	-	-
8	3,970	-	3,970	6,700
9	-	-	-	-
10	-	-	-	-
11-15	30,710	-	30,710	51,820
16-20	84,240	-	84,240	141,850
Total	130,310	69,120	199,430	336,000

As discussed under section 9.6.1, the Industrial Waste Dump will be closed prior to grading the site for temporary storage of coarse and fine refuse. Additional grading will be necessary to establish the storage areas. Grading will be required for Storage Areas One and Two, whereas Storage Area Three does not require additional grading. Grading requirements for each storage area are specified under section 9.6.1 and 9.6.3.

9.8 TOPSOIL AND BORROW MATERIAL HANDLING

Mining operations began at the Sunnyside Mines prior to implementation of topsoil salvage requirements. Therefore, borrowed soil materials will be required in most locations in order to achieve successful reclamation on areas affected by the remining operations. A complete discussion of the materials used for topsoil and borrow material is included in Chapter Two, R645-301-200, Soils.

9.8.1 AREAS TO RECEIVE TOPSOIL OR BORROW MATERIAL

Areas within the SCA Permit Area that will receive an application of topsoil will be all reclaimed areas. Areas of contemporaneous reclamation are outlined in Plate 9-1b. Depths of topsoil are shown in Plate 10-1. Application of the topsoil or borrow material are outlined below.

The noncombustible material pile will be covered with four feet of material during the final reclamation phase.

The coarse refuse remaining below elevation 6210 will be covered with four feet of material. This coarse refuse may not be mineable because of questionable access (i.e., the excessive depth of the narrow valley).

Any other areas located at the time of final reclamation that are occupied by unsuitable plant growth medium such as refuse, will be covered with four feet of borrow material.

All other disturbed areas within the SCA Permit Area will be covered with 18-inches of borrow material.

9.8.2 BORROW MATERIAL REMOVAL

Because very little topsoil has been saved during the SCC mining activities, borrow material will need to be substituted for topsoil in order to establish vegetative growth on reclaimed areas. Detailed descriptions of topsoil handling on any newly disturbed sites is discussed in R645-301-232, Topsoil and Subsoil Removal. The following discussion pertains to the borrow area removal that will be necessary for reclamation.

Approximately 460,000 cubic yards of borrow material will be needed for all reclamation activities to cover the area delineated in Plate 9-1b. This borrow material will be obtained from the borrow areas outlined in Chapter Two, R645-301-224, Substitute Topsoil. The borrow material that will be utilized is the best available within the SCA Permit Area which lies close to the existing disturbed areas. Borrow material will be removed from these sites and contoured such that each acts as a catchment basins. This will be done to control run-off from each borrow area and provide water for wildlife species.

A sufficient amount of material will be left in the bottom of each borrow area for reclamation, and each borrow area will be permanently revegetated according to the procedures discussed in section 9.9.

The borrow material stripping depths will be confirmed by qualified personnel in the field prior to actual disturbance. Salvageable topsoil will be removed from the borrow areas as described in Chapter Two, R645-301-232, Topsoil and Subsoil Removal.

9.8.3 TOPSOIL STORAGE

Detailed descriptions of topsoil handling on any newly disturbed sites is discussed in R645-301-232,

9.8.4 TOPSOIL AND BORROW MATERIAL REDISTRIBUTION

The recontoured surfaces of disturbed areas that will receive borrow material or topsoil will be cleaned of waste material including the hardpan material that has formed between the refuse and soil layers. The subgrade will be prepared by ripping to a minimum depth of 18-inches. Ripping will alleviate compaction caused by equipment and will also provide a roughened surface for bonding with the borrow material. All roadbeds will be ripped twice, once each in opposite directions.

After appropriate surface regrading and ripping is completed, borrow material will be applied. The borrow material will be distributed by end-dumping, and minimal grading will be utilized to redistribute the dumped materials sufficient to cover the reclaimed sites. The borrow materials will not be evenly distributed as to depth, thus the materials will be unevenly distributed and result in a rough uneven surface. The small ruts and ridges will serve as catchment for water during the revegetation process. The average borrow material depths are outlined in Section 9.8.1.

On slopes greater than 2:1 the end-dumped topsoil materials will be pushed onto the slopes with a dozer and a backhoe will be used to systematically gouge depressions from four (4) to eight (8) inches deep on 30% of the slope surface or as needed to roughen smoothed surfaces. The footprints of the workers installing the erosion matting will also provide numerous small depressions.

Prior to seeding, the topsoil and other regraded surfaces will receive a light disking, or be scarified along the contour if a crust has developed since final grading or other soil preparation activities. Otherwise, no special soil preparation will be necessary.

9.8.5 AMENDMENTS

It is expected that the applied borrow material will require fertilizer amendments at the time of reclamation. Soil testing at the time of reclamation will be conducted according to DOGM Topsoil Guidelines to determine appropriate fertilizer rates. SCA will work with DOGM to ensure that the redistributed soils are analyzed according to DOGM Guidelines and that the tests are performed by an approved laboratory. In general, soil amendments will be applied during the fall concurrent with reseeding operations to maximize plant response.

9.9 REVEGETATION

The objective of the post-mining revegetation program is to restore the surface-disturbed area to a land use capability similar to that which existed prior to mining. The initial reclamation objectives will be to stabilize the soils and to restore the disturbed area to approximate original topographic conditions. Ultimately, the disturbed areas will be returned to their pre-mining use with watersheds in their approximate premining character. In general, the long-term appearance and usefulness of the reclaimed permit area will be similar to that encountered prior to mining and also to that found in the adjacent areas that remain undisturbed by mining and related activities.

9.9.1 GENERAL REVEGETATION PROCEDURES

All areas that are currently disturbed are shown on Plate 3-1, as well as those areas that will be disturbed as a result of the Mining Plan or the Reclamation Plan activities will be reclaimed according to the procedures discussed in this section. Areas of contemporaneous reclamation which will occur during the remaining phase are outlined in Plate 9-1b. A Final Reclamation Plan is presented in Plate 10-1. The general procedures outlined below will be used for all reclaimed sites. Additional details on these

procedures can be found throughout this chapter.

Subgrade shall be cleaned of waste material, scarified and pulverized before covering with topsoil or borrow material.

Topsoil or borrow material will be spread unevenly over all areas to depths as described in the final reclamation plan.

The final grade will be blended into the existing grade with a natural finish.

The finished grades will be left in a roughened state.

Fertilizer will be spread just prior to seeding. The fertilizer may be spread by any method that will give an even distribution.

Areas with slopes greater than 2:1 shall be scarified to a depth of 2-inches prior to seeding.

Seeding must be accomplished between October 1st and November 30. If seeding is not finished during this time frame then all remaining seeding and any related reclamation work will be suspended until the following year.

For areas to be hydroseeded the water and 15% of the wood fiber mulch and 50% of the tackifier will be mixed in the hydroseeder. The slurry will then be mixed with water at a rate of 13,000 gallons per acre and the seed will be added to the slurry. The seed/slurry mixture will be applied to form an even cover within 30 minutes of the seed being added to the slurry. Application will begin at the top of the slope and work downward. The remaining mulch and tackifier will be applied immediately following initial seeding.

For slopes greater than 2:1 seed will be broadcast evenly over the prepared slopes by means of a hand-held seeder. Broadcasting will not be done during windy conditions or when the soil is saturated.

All areas which are seeded will be raked to provide adequate seed to soil contact.

On slopes 2:1 or greater, erosion matting will be installed to cover the seedbed surface and protect the barren soil surface from wind and water erosion.

Shrub plantings will be used on a few sites to augment the shrub portion of the existing plant community and to blend in man-made features with the natural terrain. The shrub stock will be pinyon pine and juniper tublings. The tublings will be grouped and not evenly placed at a density of 200 shrubs per acre. The planting site will be saturated with water as the initial irrigation. The planting site and rooting area will be hand-cleared of all vegetative growth to reduce competition from established vegetation.

Rock piles will be placed after seeding at a minimum of four per acre.

9.9.2 INTERIM REVEGETATION

During the remaining phase several areas will receive interim revegetation stabilization including the following:

New berms or other new disturbances associated with the construction of sedimentation ponds or related structures including embankment tops, slopes, ditches, etc. At this time there are no new

sedimentation ponds proposed.

New topsoil piles associated with new disturbances such as the proposed new access road.

Any other areas associated within the SCA Permit Area which are judged to require interim stabilization.

These areas will be disturbed again during final reclamation activities and therefore will not receive topsoil. Because backfilling and construction of hydrologic controls will occur just prior to seeding, many of the seedbeds will require no additional preparation. Furthermore, subsequent surface manipulation of these areas would demolish constructed structures.

Compacted areas will be prepared for seeding by ripping, scarifying, or disking the materials in place. All areas will then be seeded, fertilized, and mulched utilizing standard broadcast or hydroseeder methods.

For any areas requiring interim stabilization during the Mining Period, fertilizer will be applied at a rate of 313 pounds of 16-16-8 per acre. The interim seed mix proposed for use in all areas is shown in Figure 9-1 (Interim Reclamation Seed Mixture). This mix contains a combination of native and introduced species and is proposed because the species establish rapidly and effectively control erosion. Mulch will consist of a wood fiber applied at a rate of one tone (1) per acre.

9.9.3 SEEDING AND PLANTING

All seeding will be done during the fall of the year of reclamation in order to maximize revegetation success. It should be noted, however, that seeding using the interim seed mixture may occur during other seasons if needed to control erosion or soil degradation.

The seed mix, application rate, and seeding techniques are based on reclamation experience in the area, as well as on consideration of local environmental conditions of soil, slopes, elevation, and precipitation. Use of this seed mix will result in a rapidly established and effective vegetation cover capable of minimizing erosion and meeting the goals of the reclamation program. The seed mix proposed for use in final reclamation, shown on Plate 10-1, is designed to reestablish a wildlife vegetative type and will be planted throughout the disturbed area. This proposed seed mix contains species well adapted to the area, and will produce a diverse, effective vegetation cover capable of self-regeneration.

Seed availability will determine the ultimate seed mixture and variety of seed used. If a variety of seed is not available, DOGM will be notified and additional seed of one of the seeds listed or another species or variety will be substituted upon approval by DOGM so that the final PLS per acre is equivalent to the proposed mix.

During final reclamation, the seed mixture will be placed by either hydroseeding or by broadcast seeding, depending upon the slope. On steep slopes where equipment cannot be safely operated, the seed will be broadcast.

The final reclamation plans is designed to provide successful reclamation when compared with the current condition of the two reference area. It is anticipated the required live shrub stem density can be achieved from the shrub seed currently in the seed mix.

Seed Specifications

1. Seed stock must be from the previous year's or current year's seed crops.
2. 90% Pure Live Seed (PLS).

3. All seed furnished shall be those specified in the plan and shall be measured by PLS weight. All seed shall be tested by a certified seed analyst in a duly accredited seed testing laboratory. Each seed species (variety) shall be furnished with a tag which clearly lists: (1) botanical name, (2) common name, (3) collection location and elevation, (4) pure seed (%), (5) inert matter (%), (6) other crop seed (%), (7) weed seed (%), (8) noxious weed seed, (9) germination (%), (10) hard seed (%), (11) date tested, (12) lot number, (13) net weight, (14) name of seed testing laboratory, and (15) name and address of seed company. A report of certification shall be submitted to DOGM prior to shipment. Seed shall not contain prohibited noxious weed seed as listed by state seed law. Wet, moldy, or otherwise damaged seed shall not be accepted.
4. The seeds will be delivered to the site in the fall of the year. A 30-day notice of shipment will be issued when the site is ready for seeding.
5. The seed shipment is subject to inspection by the Utah State Department of Agriculture.
6. The seeding will take place in the fall on the prepared sites after October 1st and prior to November 30th. No reclamation will take place on sites that cannot be seeded prior to November 30th. The fall seeding will allow for a period of exposure to freezing conditions and to spring moisture for the optimum germination conditions for all seed types in the mix.

9.9.4 MULCHING AND SOIL STABILIZATION

Mulch decreases moisture loss, increases site stabilization, moderates soil surface temperature, and reduces wind velocity at the soil surface. All revegetated areas will be mulched with a wood fiber mulch at a rate of two (2) tons per acre. Tackified wood fiber at a rate of 120 pounds per acre will be applied for every 2000 pounds of wood fiber mulch used. Fifteen percent (15%) of the wood fiber mulch and 50% of the tackifier will be mixed in the hydroseeder with the slurry. The remaining mulch and tackifier will be applied immediately following initial seeding.

9.9.5 VEGETATION SUCCESS DETERMINATION

The post-mining land use is wildlife habitat. The objective is to achieve a plant cover sufficient to control erosion and provide a plant community useful as wildlife habitat. The perennial grasses and forbs growing under the moderating influence of the shrubs will stabilize the soil surface. The shrubs will provide cover for small animals. Additional wildlife enhancement features include planted pinyon pine and juniper trees.

The standard for the revegetation will be the two reference sites. In the summer of 1993 the reference sites will be sampled by methods found in the DOGM Vegetation Guidelines.

Permanent revegetation efforts will be monitored according to the following schedule:

First year following seeding — reconnaissance survey and qualitative evaluation of revegetation.

Second year—qualitative as well as quantitative sampling of cover, frequency, and woody plant density.

Third year—qualitative and quantitative sampling of cover, frequency, and woody plant density.

Fourth year—qualitative evaluation only.

Fifth year—all parameters listed during the second year.

Sixth year—qualitative evaluation only.

Seventh year—qualitative evaluation only.

Eighth year—qualitative evaluation only.

Ninth year—all parameters listed during the third year.

Tenth year—all parameters listed during the ninth year.

During the ninth and tenth years, revegetated areas as well as the reference areas will be sampled for all parameters listed in order to test reclamation success. In the tenth year following revegetation, application for bond release will be made.

See R645-301-350, Reclamation Performance Standards for additional information.

9.9.6 SAMPLING PROCEDURES

The qualitative sampling will take place annually in the summer months. The first year will require monthly visits from April to September to closely follow the progress of the seedlings and plantings. The second year will require visits in the spring and late summer to continue tracking the progress of the seedlings and plantings. The visits in years three (3) through ten (10) will occur annually in the summer or be coordinated with the quantitative sampling schedule.

The qualitative sampling will consist of visiting each reclamation area and recording growth, species success, soil conditions, erosion, livestock or wildlife use, insect damage, and other special conditions. The qualitative sampling will incorporate needs identified under the DOGM inspection program.

The quantitative sampling will take place in years two (2), three (3), five (5), nine (9) and ten (10) in the reference areas and revegetated sites. All of the measurements for cover, diversity, and woody stem densities will be taken in each year scheduled for quantitative sampling. Eighty percent of the measurements for woody stem density at bond release will be taken only from shrubs and trees that have existed for sixty (60) percent of the applicable minimum period of responsibility. The qualitative and quantitative data will be included in the annual reports.

See R645-301-350, Reclamation Performance Standards for additional information.

**TABLE 9-3
RECLAMATION MONITORING SCHEDULE**

SAMPLING	YEARS									
	1	2	3	4	5	6	7	8	9	10
Qualitative	x	x	x	x	x	x	x	x	x	x
Quantitative										
Cover		x	x		x				x	x
Frequency		x	x		x				x	x
Woody Plant Density		x	x		¹ x		² x		x	x
Transplant Survival	x	x	x		x					

¹ At this time, if 80% of the standard has not been met, planting methods will be used to increase the woody plant density to the required 80%.

² Subsequent monitoring will occur in year seven if supplemental plantings were required in year 5. Monitoring at this time is for the purpose of determining the success rate of supplemental plantings.

9.9.7 IRRIGATION

Irrigation should not be required to establish successful vegetative growth for final reclamation. All areas will be mulched to increase germination and to improve soil moisture.

9.10 WATER TREATMENT

During the mining period the existing sediment control structures and diversion ditches will be used. This would allow the site to meet the regulatory effluent requirements and to ensure that no significant environmental damage would be caused by the operations.

9.10.1 DIVERSIONS

Plans for diversion ditches within the SCA Permit Area are discussed in Chapter Seven, Hydrology. Included in this chapter are the criteria and the designs of the ditches, culverts and sedimentation ponds required to maintain water quality in accordance with the prevailing regulations.

9.10.2 SEDIMENT CONTROL

There are ten existing impoundments within the SCA Permit Area which have been, and will continued to be used to control sediment during the remaining operations and reclamation activities. The impoundments are discussed in Chapter Seven, sections 732, 733, 742 and 743.

Berms will also be used to control sedimentation from temporarily or permanently reclaimed areas. These berms will be used to ensure that drainage from the area in question will be treated.

9.11 MONITORING AND MAINTENANCE

This section addresses the concerns of the monitoring efforts that will take place during the mining period. This will consist of water, vegetation, and erosion monitoring activities.

9.11.1 WATER

Impoundments which are subject to MSHA requirements are shown in Plate 5-7. These impoundments will be inspected monthly.

Quarterly inspections of runoff and sediment control structures not subject to MSHA, 30 CFR 77.216, will be conducted. Evidence of berm or ditch overtopping, bypass, or erosion will be noted and any needed repairs or upgrading will take place at the time of inspection or shortly after, depending on the scope of work required. The sedimentation ponds will be certified annually and the certification included in the annual report.

In addition, a water quality monitoring program will continue through the bonding period. A description of the monitoring program is included in Chapter Seven, sections 722 through 724. Quarterly monitoring reports will be submitted to DOGM.

9.11.2 VEGETATION

The establishment of weeds will be minimized by ensuring that all seed purchased is labeled in accordance with the Federal Seed Act, Section 201 (see specification in Section 9.9.3). This law limits or restricts the presence of certain noxious plant species. All seed will be tested and certified according to federal and state seed laws. Certificates of testing will be submitted to DOGM.

Mulching will be used during seeding to control weed emergence. Revegetation experience has shown that after a couple of years, most weeds are naturally eliminated from the reclamation stands. If weeds should become a problem, mowing may be utilized where terrain permits, or in extreme cases herbicides may be used.

Any necessary insect or rodent control will be guided by the U.S. Fish and Wildlife Services; The Utah State Cooperative Extensive Service; and the Animal, Plant, Health Inspection Service.

To insure the vigor of the revegetation, strict grazing management may be required to properly utilize the forage in line with wildlife requirements. If wildlife feeding becomes a problem in the first few years of plant growth, steps may be taken to restrict their use of the revegetation. Wildlife management will be coordinated with the Division of Wildlife Resources.

9.11.3 EROSION

When rills or gullies deeper than 9 inches develop in areas that have been regraded and/or topsoiled, they will be filled, graded, or otherwise stabilized. The affected area will then be reseeded or replanted according to the methods described in Section 9.2. If rills or gullies less than 9 inches deep develop, they will be stabilized and reseeded if they are disruptive to post-mining land use, or may result in additional erosion and sedimentation. A mixture of 3 PLS/acre of barley and 3 PLS/acre of oats will be used in order to minimize surface erosion at times of the year when the interim seed mixture is not planted.

9.11.4 TEMPORARY STORAGE AREAS

Maintenance of the three temporary storage areas will consist of providing general maintenance and inspections of the surrounding structures, drainages, culverts, and roads.

Water or other dust control measures will be applied as necessary to reduce dust. General road maintenance procedures will be practiced and inspections will be done as necessary. Inspections will consist of: erosion control, repair of structures and drainage systems, removal of debris in culverts and replacement of road surfacing material as needed.

9.11.5 REPORTING AND EMERGENCY PROCEDURES

If a slide occurs, Intermountain Power Agency will telephone DOGM to notify them of the situation and recommend remedial measures to be taken to alleviate the problem. Additional remedial measures required by DOGM will be implemented.

During impoundment inspections any potential hazards noted will be reported to DOGM along with measures to be implemented to eliminate the hazard.

9.12 SCHEDULE

The different work items described in this chapter will be accomplished continually over the 30 year life of the cogeneration project.

The approximate reclamation sequencing schedule is shown in Plate 9-1b. Each year as sites of two acres or larger are permanently excavated of waste they will be reclaimed. SCA will notify DOGM of the areas that will be reclaimed and will commence implementation of the various portions of the reclamation plans as indicated in Figure 10-1.