

0029

7794

STATE OF UTAH  
DIVISION OF OIL, GAS AND MINING

PERMITTEE

Robert M. Burnham, President  
Sunnyside Coal Company  
Debtor in Possession  
113 Spruce Street  
Boulder, Colorado 80302

FINDINGS  
of  
PERMIT DEFICIENCY  
and ORDER

PERMIT NUMBER ACT/007/007 #3  
DIVISION ORDER # 94B

On January 20, 1986, the Division approved the mining and reclamation plan (Plan) and under the Utah Coal Regulatory Program, issued a permit (Permit) to Sunnyside Coal Company (the Permittee). The Plan, as amended or revised in conjunction with the Act and the Rules, and the subsequently renewed Permit, issued on January 20, 1991, constitute the currently approved Plan for reclamation of the surface disturbance of the Permit area.

The provisions of the Act and the Rules are incorporated by reference herein and hereby made a part of this Division Order. Provisions of the Act or Rules shall supersede conflicting provisions of this Division Order or the approved Plan. The Permittee has agreed to comply with all terms and provisions of the Plan, the Act and the Rules, including the reclamation of all areas disturbed by surface coal mining and reclamation operations, despite the eventuality that the cost of actual reclamation may exceed the bond amount.

Pursuant to R645-303-212, the Division orders the Permittee, Sunnyside Coal Company, to make the permit changes enumerated in these Findings of Permit Deficiency in order to be in compliance with the State Coal Program. The deficiencies are to be remedied in accordance with R645-303-220.

FINDINGS OF PERMIT DEFICIENCY

The information contained in the text of the Plan has been determined to be inadequate to meet the requirements of the Act and the Rules. Excerpts of the information found in the currently approved mining and reclamation plan are attached for reference as "Attachment A".

In general, the maps and text within the plan regarding reclamation have been found inadequate by the Division to demonstrate compliance with the design and performance standards for reclamation mandated in the coal rules.

R645-301-100. Permit Area.

Plates 3-20 through 3-24 are provided in the plan to delineate pre and post law disturbed areas. These maps indicate those areas which were considered pre law disturbance, and, those areas considered to be post law disturbance (area disturbed or redisturbed after 1977 & under bond).

The delineation of these areas as provided by the permittee is inadequate. The areas delineated by the Permittee as post-law disturbance do not incorporate all areas affected by surface mining operations subsequent to 1977 within the permit area. In delineating the disturbed and bonded areas within the permit area, the Permittee has failed to incorporate portal highwalls and face-up areas associated with active mine openings. The Permittee has failed to include cut and fill areas associated with pads and roads currently used by mining operations. Such cut and fill structures are integral parts of the roads, pads and other facilities used during mining operations. Drainages and diversions which have been affected by post-law mining operations are incorrectly shown as lying outside of the disturbed and bonded areas. Without incorporation of these area into the bonded and disturbed area boundaries, the Permittee cannot effectively reclaim the area to meet post-mining land use or approximate original contour requirements.

R645-301-410. Land Use.

Section 3.5.3.2 of the plan describes the removal of surface structures. The permittee states that, 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. Outlying surface facilities including portals, ventilation shafts, substations, upper bathouse, 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.

The Permittee further states that, "most roads will be left to provide access for grazing and recreational activities. Those roads not left for future uses will be ripped, contoured and revegetated. The roads which will not be reclaimed are illustrated on Plate III-1. 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 mine."

The Permittee has failed to demonstrate that the proposed post-mining land uses meet the regulatory requirements. All permanent structures and facilities, including permanent diversions and impoundments, must be located and identified by

the Permittee and submitted to the Division for approval. Each structure proposed for retention must adequately demonstrate, by design and supporting calculations, compliance with the performance standards of the Rules as they apply. All structures and facilities to be left as part of the approved post-mining land use shall adequately demonstrate that the retention, modification or use of the structure constitutes a higher or better land use.

Higher or better uses may be approved by the Division as alternative post-mining land uses, with permanent structures or facilities to remain as part of the approved post-mining land use, after consultation with the landowner or the land management agency having jurisdiction over the lands, if; 1) there is a reasonable likelihood for achievement of the use; 2) the use does not present any actual or probable hazard to public health or safety or threat of water diminution or pollution and; 3) the use will not be impractical, unreasonable or inconsistent with applicable land-use policies or plans, involve unreasonable delay in implementation, or cause or contribute to violation of federal, Utah, or local law. Such a demonstration has not been presented in the Plan. Currently, information in the Plan fails to describe how such facilities and structures will be used in conjunction with the post-mining land uses, or how the implementation or use of such structures and facilities will constitute a higher or better land use.

Section 3.5.3.2 of the plan describes the removal of surface structures. This section refers to Plate III-1 and Table III-1 as the exhibits identifying the structures to remain as permanent. In referring to Plate III-1, structures including, but not limited to, the mine office, shops, warehouse facilities, pump houses, impoundments, and other numerous facilities are marked as "permanent". No justification or criteria is presented in the Plan to demonstrate that the retention of these structures constitutes a higher or better land use, or that these structures are retained in support of an alternate post-mining land use. Accordingly, the Division cannot substantiate that the reclamation plan regarding retention of such structures meets the minimum regulatory requirements. The reclamation plan must be revised to meet the regulatory requirements regarding post-mining land use and the retention of structures in support of that use.

Section 3.5.3.2 of the Plan provides that most roads will be left to provide access for grazing and recreational activities. No justification or information is provided in the Plan to demonstrate that the retention of the roads indicated on Plate III-1 is appropriate for the post-mining land use, nor is there a demonstration that the retention of these roads constitutes a higher and better use in comparison to pre-mining land use conditions.

Roads, structures and transportation facilities within the permit area which are to remain as part of the post-mining land use must have an adequate justification for

their retention. Any roads to remain must be shown to be suitable for an appropriate post-mining land use. In the event that roads are to be left or retained as public roads, documentation must be provided to demonstrate that suitable agreements have been reached for rights-of-way and maintenance. Similarly for the railroad facilities, rights-of way, leases or other documentation must be provided to demonstrate responsibility for the retained trackage.

Section 3.5.3.3 of the plan discusses the disposition of the Grassy Trail dam and reservoir. This facility was constructed in 1952 and is jointly owned by Sunnyside Reclamation and Salvage, Inc., and BP Coal America, Inc., who holds the majority of the interest. The reservoir provides culinary water to the towns of Sunnyside and East Carbon as well as to the mine facilities of the two companies. The Plan indicates that the Permittee will maintain ownership of and liability for the reservoir after expiration of the Permit if 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 is to renovate the dam to design specifications previously approved by the Dam Safety Division of the State of Utah prior to transfer.

No affirmative demonstration of the rights and responsibilities for retention of this impoundment is provided in the plan. No information demonstrating that the retention of the reservoir constitutes a higher and better use as an alternate post-mining land use has been provided in the Plan. The requirements for the renovation of the dam structure have not been included in the Plan. Although the impoundment was exempted from the inspection requirements under MSHA regulations, the structure was constructed and used for mining operations. Accordingly, the Plan must demonstrate that the structure will meet all applicable federal, state and local laws regarding retention of the impoundment as part of the post-mining land use. If ownership of the structure is transferred prior to bond release, provision must be made to clearly show the acceptance of liability for the retention of structures for alternate post-mining land uses.

R645-301-500 Engineering.

Backfilling and grading plans for reclamation of the surface facilities and operations are inadequate. In section 3.5.4 of the plan, the Permittee states that, "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." The permittee further states that, "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[t] appear on the map. The final contours will approximate those shown on Plate III-1."

Plate III-1 is found by the Division to be inadequate to show the final configuration of the surface mining operations to be reclaimed. First, the map is an enlarged version of USDOl 7.5 minute series topographic maps. At their original scale, the scale of these maps is 1 inch = 2000 feet and show only 40 foot contour intervals. The Permittee has photographically enlarged these maps to 1 inch = 500 feet, which does not increase the accuracy or the detail of the drawings. Utilization of Plate III-1 as the final configuration of the mined areas to be reclaimed is wholly inadequate.

Contour information as provided on these drawings not only fails to clearly show the location and the extent of the current mining operations, but provides no detail with regard to the design detail for reclamation. No cross-sections have been provided to show that slopes will be regraded to approximate the original pre-mining surface configuration. No maps or cross-sections for reclamation backfilling and grading have been provided to demonstrate that the site will achieve approximate original contour. No detailed design information such as maps, cross sections or mass balance calculations have been provided to show that suitable reclamation of the surface operations can be accomplished. No design information or justification has been provided to indicate that all reasonably available spoil materials will be utilized during reclamation to achieve approximate original contour, as required by the Coal Program. No cross-sections or design details have been provided to demonstrate that highwalls will be eliminated.

In essence, no backfilling and grading plan has been presented in the permittee's reclamation plan. Accordingly, the Division finds that the Plan lacks design and performance criteria requisite to backfilling and grading, and lacks a demonstration that reclamation of the site will achieve approximate original contour.

#### R645-301-700 Hydrology

Section 3.5.3.3 of the plan indicates that, "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." In section 3.5.4.1, the permittee indicates that specific postmining drainage designs and measures that will be used during the final reclamation phase is contained in Appendix III-12, Post Mining Hydrologic Design.

Appendix III-12, Post Mining Hydrologic Design, could not be found within the text of the currently approved plan. Further, no plans or other requirements to re-establish the drainages affected by surface operations could be found within the text of the Plan.

Grassy Trail Creek has been channelized throughout most of the area affected by mining. Numerous operational disturbed and undisturbed diversions exist within the permit area which have altered drainage patterns. The permittee must provide a comprehensive reclamation plan with sufficient designs and maps to show that drainage areas and permanent diversions will be re-established to comply with the design and performance standards of the rules.

## Requirements

In order to comply with this Division Order, the Permittee must comply with the following requirements:

### **Reclamation Plan.**

In accordance with the requirements of R645-301 and R645-302, the Permittee must provide a plan for the reclamation of the lands within the permit area, showing how the Permittee will comply with the regulatory program and the environmental protection performance standards. The plan shall, at a minimum, contain the following information for the permit area: 1) a detailed timetable for the completion of each major step in the reclamation plan; 2) a detailed estimate of the cost of the proposed reclamation operations required to be covered by a performance bond, with supporting calculations for the estimates; 3) a plan for backfilling, soil stabilization, compacting, and grading, with contour maps or cross-sections which show the anticipated final surface configuration of the proposed permit area; 4) a plan for redistribution of topsoil, subsoil, and other material, along with a demonstration of the suitability of topsoil substitutes or supplements; 5) a plan for revegetation including, but not limited to, descriptions of the schedule of revegetation, species and amounts per acre of seeds and seedlings to be used, methods to be used for planting and seeding, mulching techniques, irrigation, if appropriate, pest and disease control measures, if any, measures proposed to be used to determine the success of revegetation, and a soil testing plan for evaluation of the results of topsoil handling and reclamation procedures related to revegetation; 6) a description of measures to be employed to ensure that all debris, acid-forming and toxic-forming materials, and materials constituting a fire hazard are disposed of appropriately, and a description of the contingency plans which have been developed to preclude sustained combustion of such materials; 7) a description, including appropriate cross-sections and maps, of the measures to be used to seal or manage mine openings, and to plug, case, or manage exploration holes, other bore holes, wells, and other openings within the proposed permit area and; 8) a description of steps to be taken to comply with the requirements of the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act and other applicable air, water and waste management laws and regulations, and health and safety standards.

The Permittee shall submit a schedule indicating the sequence and timing of the required reclamation activities for each sub-area within the Permit area. This schedule shall show the logical progression of the reclamation activities, clearly indicating which activities must be completed prior to initiation of other reclamation treatments, and/or which activities can occur concurrently. The reclamation activities should include, but not be limited to; demolition, installation of surface drainage control structures, installation of sediment control structures, non-coal waste disposal, closure of mine openings, backfilling and grading of disturbed areas, resoiling, soil amendments, revegetation, and modification or reconstruction of facilities or structures to be left as part of the approved post-mining land use.

Field changes or alterations of the final surface configuration due to site constraints or conditions which were not considered in the reclamation design work will be allowed by the Division only when such changes do not significantly affect or diminish the approved design or function of the intended reclamation treatments. Such field changes shall be presented to the Division as part of the as-built reports and other information required in the bond release application prior to consideration for phased bond release.

## **Land Use.**

In accordance with the requirements of R645-301-400, the Permittee must provide a detailed description of the proposed use, following reclamation, of the land to be affected within the proposed permit area by surface operations or facilities, including a discussion of the utility and capacity of the reclaimed land to support alternative uses, and the relationship of the proposed uses to existing land-use policies and plans. This description must explain: 1) how the proposed post-mining land use is to be achieved and the necessary support activities which may be needed to achieve the proposed land use; 2) where a land use different from the pre-mining land use is proposed, all materials needed for approval of the alternative use and; 3) the consideration given to making all of the proposed post-mining activities consistent with surface owner plans and applicable State and local land-use plans and programs.

The description must be accompanied by a copy of comments concerning the proposed use from the legal or equitable owner of record of the surface of the permit area and the State and local government agencies which would have to initiate, implement, approve, or authorize the proposed use of the land following reclamation. Alternative post-mining land uses may be approved. However, before approval, the Permittee must first demonstrate that the land can be returned to its pre-mining land use capability.

Other facilities, including utilities corridors and right-of-ways into and through the permit area, shall be adequately described and characterized in the Plan. Where necessary, the description shall explain any constraints or restrictions regarding the facilities which would limit or restrict reclamation activities within the surface disturbed areas, especially with regard to any effect on AOC requirements. The description will be accompanied by a copy of such documents concerning the existing or proposed use by the legal or equitable owner of record of the surface or surface use of the permit area, and Utah and local government agencies which would have to initiate, implement, approve, or authorize the proposed use of the land following reclamation.

### **Conduct of Reclamation Operations**

In accordance with the requirements of R645-301-515, the Permittee shall provide a statement of the exact number of surface acres disturbed, a map(s) showing those surface disturbed areas, and a map showing the horizontal and vertical extent of subsurface strata (mine workings) in the permit area immediately prior to cessation of operations. The Permittee will close or backfill or otherwise permanently reclaim all affected areas, in accordance with the R645 Rules. The Permittee shall assure that final fills containing spoil or other waste materials are suitable for reclamation and revegetation and are compatible with the natural surroundings and the approved post-mining land uses. All surface equipment, structures, or other facilities not required for continued mining and reclamation activities and monitoring, unless approved by the Division as suitable for the post-mining land use or environmental monitoring, will be removed and the affected lands reclaimed.

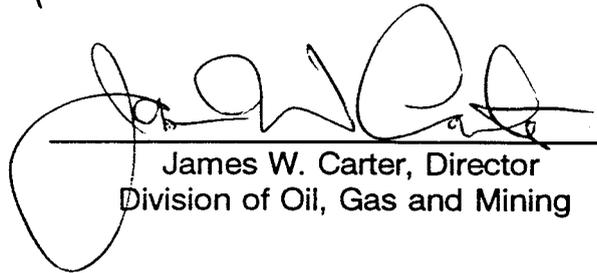
Prior to conducting backfilling and grading operations, the Permittee shall complete the demolition and removal of structures and facilities within the area to be backfilled. All non-coal waste materials, PCB or oil-contaminated materials or soils, or other materials subject to specialized treatment or disposal shall be removed and disposed of in a state-approved waste disposal facility and in accordance with any other federal, state or local regulations as they apply. Inert materials, such as concrete, may be disposed of on-site where the location and method of disposal has been identified by the Permittee and approved by the Division.

For any reclamation activities which may alter or adversely affect surface disturbed or undisturbed drainages or sediment controls within the surface disturbed areas, the Permittee shall notify the Division in writing within 15 days prior to commencement of such reclamation activity. Prior to commencement of any reclamation activities, adequate drainage and sediment control measures must be established and operational.

ORDER

Sunnyside Coal Company is ordered to make the required permit changes in accordance with R645-303-220 and to submit a complete application for permit change to address these Findings of Permit Deficiency, or to provide an acceptable schedule for providing such permit changes, within 30 days of date of the Order. Approval by the Division must be obtained within 60 days of date of this Order. If approval is not obtained within 60 days, a hindrance violation may be issued.

Ordered this 7<sup>th</sup> day of July, 1994, by the Division of Oil, Gas, and Mining.

  
\_\_\_\_\_  
James W. Carter, Director  
Division of Oil, Gas and Mining

**Attachment A**

## CHAPTER III

(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 present industrial waste location has one to two years additional capacity. The operator will submit a new location to DOGM for approval after a new site has been located.

All other non-coal waste is sent to the East Carbon City landfill for disposal. The Authorization letter from East Carbon City (Figure III-7) allows the operator use of their landfill for disposal of non-industrial wastes.

### 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.

The coarse refuse is covered with non-combustible waste material and compacted to eliminate ignition effect, if any, on the surface.

No additional waste facilities are planned, since the existing structures should have sufficient capacity to last throughout the proposed permit period.

### 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. Although the plans utilize state-of-the-art reclamation



NOV 0 1 1991

DIVISION OF

## CHAPTER III

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

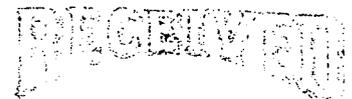
Contemporaneous reclamation has been ongoing at Sunnyside for many years. Although written records were not kept, we do know that plantings of crested wheatgrass began in the late 1950's. The streambanks have been reseeded along channelized sections of Grassy Trail Creek, areas adjacent to roads and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



NOV 01 1991

DIVISION OF

## 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.

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 interpreted by the DOGM.

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.

### 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 of land 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 town-site 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.

NOV 01 1991

DIVISION OF  
MINE RECLAMATION

CHAPTER III

In order to characterize and determine the extent of the in-place soils in 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.

Prior to re-disturbance of some areas, seven 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

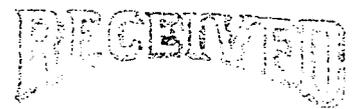
---

<u>Stockpile Location</u>	<u>Quantity</u>
East Borrow Pit	36,600 cu ft
No. 3 Hoisthouse Pond	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	<u>15,800 cu ft</u>
<u>Total</u>	<u>386,800 cu ft</u>

---

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



NOV 01 1991

DIVISION

CHAPTER III

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.

Available Industrial and Reclamation Borrow Material

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

Some of the borrow areas fall on the property currently owned by Sunnyside Fuel Corporation. The Sunnyside Mines 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.

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. In order to cover the entire 282.55 acres of disturbance with 12" of topsoil, 455,847 cu. yds. of material would be required.

RECEIVED  
 NOV 01 1991  
 DIVISION OF  
 CIVIL ENGINEERING

### 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.

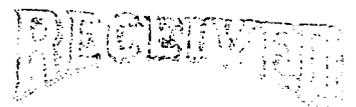
Revegetation test plots have been approved by the DOGM and will evaluate revegetation success under several soil depths, amendments, and seeding regimes (Appendix VIII-3). The results of these tests should provide information concerning the most appropriate reclamation techniques and procedures to ensure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



NOV 01 1991

DIVISION OF  
CLEANING

CHAPTER III

Those disturbed areas which have been revegetated prior to the ACT were 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.

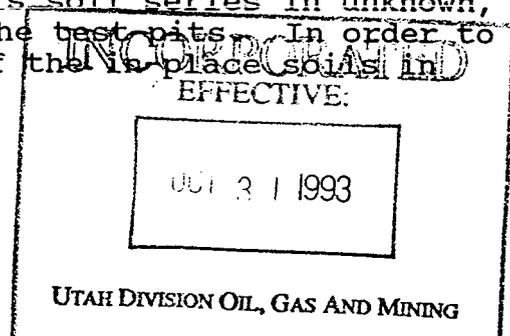
3.5.1.2 Soil Removal and Storage

Because the Sunnyside Mines have been active since the late 1800's, the permit area includes 136.645 acres of land 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

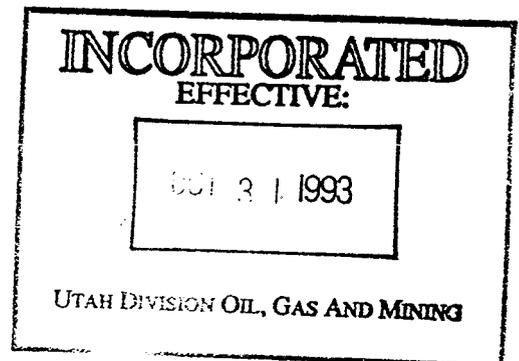


CHAPTER III

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.

The remainder of this page intentionally left blank.



## 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.

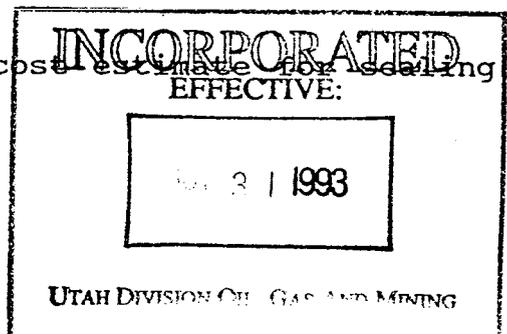
There are a limited number of portals that were broken to the surface from workings inside the mine. Many of these portals are located on top of sandstone cliffs and are inaccessible except by walking and pack horse. These portals will be blasted shut for at least 25 feet from the portal, if possible,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

AT  
4302,



CHAPTER III

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.

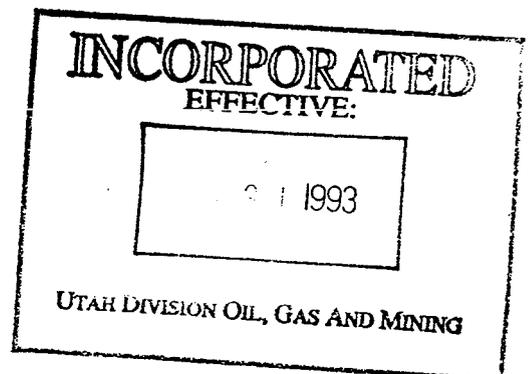
(b) Outlying surface facilities including portals, ventilation shafts, substations, upper bathhouse, equipment and material storage areas, preparation plant, power transmission lines, mine water lines, methane borehole pad and pipeline, and unit train loadout, will be dismantled and eliminated.

(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 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.

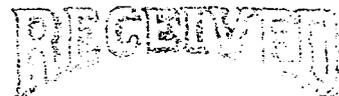
There are a limited number of portals that were broken to the surface from workings inside the mine. Many of these portals are located on top of sandstone cliffs and are inaccessible except by walking and pack horse. These portals will be blasted shut for at least 25 feet from the portal, if possible, 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-41 for drill hole sealing and casing costs.

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.



NOV 01 1991

## CHAPTER III

(b) Outlying surface facilities including portals, ventilation shafts, substations, upper bathhouse, equipment and material storage areas, preparation plant, power transmission lines, 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.

### 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.

## CHAPTER III

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

Fine refuse from coal cleaning is sent to several slurry ponds. Clarified water is recovered for irrigation of alfalfa or released to Grassy Trail Creek. Upon completion of mining, these ponds will be filled, graded, covered with soil or suitable borrow material and, if necessary, revegetated.

### (e) Coarse Refuse Pile

During Final Reclamation the surface drainage from the slopes and terraces of the reclaimed waste banks will be handled by a 36" concrete culvert and drop boxes shown on Plate III-40, Map D4-0130 & Plate III-40, Map D4-0174. The runoff from each slope will be conducted by its terrace to each drop box in the concrete culvert. The 36" concrete culvert will deliver the runoff to the Railcut Pond ditch at the bottom of the refuse pile.

## 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.

RECEIVED

NOV 01 1991

DIVISION OF  
MINE RECLAMATION

## CHAPTER III

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 not appear on the map. The final contours will approximate those shown on Plate III-1.

The coarse refuse pile is contoured throughout its 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.

Specific postmining drainage designs and measures that will be used during the final reclamation phase is contained in Appendix III-12, Post Mining Hydrologic Design.

### 3.5.4.2 Removal or Reduction of Highwalls

Small highwalls have been created at several portal and shaft locations. Most of these highwalls will be regraded to blend with adjacent surroundings. If highwall reduction decreases the stability of adjacent slopes to a point that is potentially dangerous, the highwall will be left intact.

Coal seams naturally outcrop throughout the permit area. Coal seams that are uncovered during mining operations, i.e. at portals or along highwalls, will be backfilled and graded with 4 feet of non-toxic cover so that the coal material is no longer exposed. These seams will be stabilized so that contamination of ground or surface waters by coal or acid/toxic forming materials will not occur and then revegetated according to the procedures outlined in Section 3.5.5.

### 3.5.4.3 Terracing and Erosion Control

Regrading by terracing will be done on the contour when possible for erosion control purposes. The large acreages of pre-law revegetation also aid in erosion control. A diversion ditch (Plate III-12) has been installed to surround part of the surface facilities to minimize erosion across the disturbed area.

RECEIVED  
NOV 01 1991  
DIVISION OF  
MINE RECLAMATION

### CHAPTER III

To aid in the control of runoff and erosion, drainages will be constructed during the regrading process to compliment the natural existing drainages and riprapped if necessary. Any rills or gullies greater than nine (9) inches which form on the regraded or topsoiled areas will be filled, stabilized and reseeded.

#### 3.5.4.4 Soil Distribution and Stabilization

There is very little topsoil to redistribute and will be used where it will be needed the most. Pre-law revegetation has generally been successful without topsoil and it is assumed that reclamation can be accomplished without topsoil.

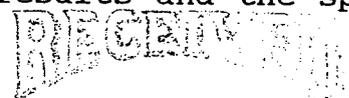
The common depth of topsoil for the mapping units described from the disturbed sites is three inches. Most soil mapping units have only a thin A horizon situated directly over the C horizon. The HBC mapping unit has a 6-inch A horizon, 30-inch B horizon, and 24-inch C horizon. All of this mapping unit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



NOV 01 1991

DIVISION OF

OF THE STATE

## CHAPTER III

cies 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.

### 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. 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 phosphor-

NOV 01 1991

DEPARTMENT OF

AGRICULTURE

CHAPTER III

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.

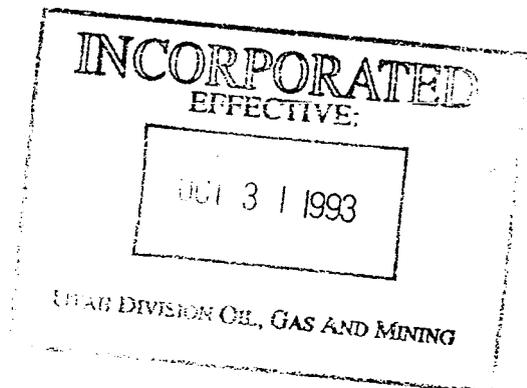
(b) Outlying surface facilities including portals, ventilation shafts, substations, upper bathhouse, equipment and material storage areas, preparation plant, power transmission lines, mine water lines, and unit train loadout, will be dismantled and eliminated.

(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

ous. 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 is currently under study (Chapter VIII).

#### 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.

Each seed mixture is titled for the habitat to be reclaimed. Locations of the disturbed areas, mapped according to habitat type, are shown on Plate III-1. The revegetation plan is designed to return each site to a community similar to what is

RECEIVED

NOV 01 1991

DIVISION OF

## CHAPTER III

thought to have occurred prior to the mining disturbance. The species and procedures may be changed if data becomes available from the test plots that establishes a clear need for change.

Seeding rates are based upon critical areas (Merkel and Herbel 1973, EPA 1975). The main facility sites and other similar gently sloping areas will be drilled with a native seed drill. Slopes and areas difficult to reach will be seeded with a hydroseeder. The seed will be applied in a water slurry. Mulch will be applied in a separate step.

The current plan will require the establishment of about 1,800 shrubs and trees per acre to equal the densities in the pinyon-juniper/grass reference area. This live stem density, as required in UMC 817.117, can be achieved from the shrub seed currently in the seed mix. Shrub transplants (containerized stock) will be hand planted to achieve required stem density only if it is necessary to supplement the seed mix.

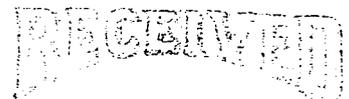
The tree type (pinyon-juniper) is only fifteen acres which consist of small sites or long narrow strips. No trees or shrubs will be transplanted here, as natural invasion should fill in these areas. The shrub seed in the seed mix will provide enough stems per acre to equal the densities (550 stems/acre) in the pinyon-juniper reference area.

The two shrub types (mountain brush and sagebrush/grass) will not require transplanting. The amount of shrub seed mix will provide enough stems/acre to comply with UMC 817.117.

### 3.5.5.3 Mulching

Seeded areas will typically be mulched with native hay at a rate of two tons/acre. The hay will be installed with a hay blower or by hand on small areas. It will be crimped in place on level areas and/or tacked with an application of about 150 pounds/acre wood fiber and liquid organic tackifier such as J-tac. A rate of forty pounds/acre is used on level to gently sloping areas. On steep slopes, the rate of the liquid tackifier is doubled.

Jute matting or excelsior blankets will be used to aid seed establishment in drainage areas or to control localized gully-ing. Gullies are a common component of the local and regional topography. Therefore drainages through planned sites will be constructed during regrading to help control erosion.



NOV 01 1991

RECEIVED

## CHAPTER III

Within limitation of equipment, much of the rock will be replaced. Rocks help act as a deterrent to erosion, improve water retention, and create micro-environments which enhance seed germination.

The rock is not intended to be used as a mulch, but rather to re-create a particular habitat type. Similar use of rocky soils in New Mexico has proven successful (Wolfe 1981), whereas loamy soils without rocks replaced on slopes undergo accelerated erosion until a "stone pavement" of small included pebbles develop. Meanwhile, soil losses of six inches and more are visible as demonstrated by pedestalled grasses.

### 3.5.5.4 Management

#### Grazing Protection

The reseeded areas will be protected from livestock grazing. Protection from wildlife is generally impractical. However, plastic net guards will be used when necessary to prevent browsing of trees and shrub transplants.

#### Irrigation

Irrigation will not be necessary to establish vegetation. The revegetation at Sunnyside will be mulched to increase germination and improve soil moisture retention. The Bureau of Land Management range improvement seedings, in chained pinyon-juniper north of the town of Sunnyside, have been successful without supplementary water.

#### Weed Control

All seed purchased will be labeled in accordance with the Federal Seed Act, Section 201. This law limits or restricts the presence of certain noxious plant species.

Native hay will be selected to introduce a minimum of weed seed. Revegetation experience has shown that after a couple of years, most weeds are naturally eliminated from the stands. If weeds should become a problem for some reason, mowing may be used where terrain permits (EPSA 1975), or in extreme cases, herbicides could be applied.

RECEIVED

NOV 01 1991

BLM/BLISS

## CHAPTER III

### Disease and Pest Control

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

#### 3.5.5.5 Monitoring

Revegetated areas will be monitored on a schedule recommended by DOGM. Revegetated sites not subject to final reclamation will not be monitored until after final revegetation. (Monitoring is discussed in Section 9.8).

#### 3.5.6 Schedule of Reclamation

##### 3.5.6.1 Detailed Timetable

Contemporaneous reclamation is discussed in Section 3.5.1; these activities will continue until the mine closure. Upon completion of mining, reclamation will be performed as described in Sections 3.5.3, 3.5.4 and 3.5.5. Table III-10 presents the proposed reclamation and revegetation time schedule.

##### 3.5.6.2 Reclamation Monitoring

Reclamation success of post 1977 disturbed areas will be determined by comparing data from DOGM approved reference areas with the corresponding reclaimed sites, in accordance with UMC 817.116 and 817.117. The parameters to be compared include vegetation cover and stem density.

Reclamation and revegetation are generally inspected and monitored by OSM and DOGM. Revegetation monitoring is discussed in Section 9.8. On federal lands, disturbed acreage and reclaimed areas will be surveyed regularly and reports submitted according to CFR 211.62.

Qualitative inspections and monitoring of the final reclamation will be done on an annual basis throughout the bonding period. All sites will be inspected at least once a year for seeding or soil stability failure or problem areas (actual or potential). Any damaged areas will be repaired.

RECEIVED

NOV 01 1991

DIVISION OF

## CHAPTER III

The monitoring begins following the final seeding and mulching of the reclaimed areas. According to UMC 817.116(b)(1), the 10-year responsibility period cannot begin until ground cover in the reclaimed site equals (within 70%) that in the reference area.

Vegetation sampling will commence on the reclaimed sites and the reference areas the second year after reseeding. This sampling will continue on a biennial basis until ground cover and stem density reaches the approved standards needed for the ten year responsibility period to begin.

### 3.5.6.3 Responsibility Period Monitoring

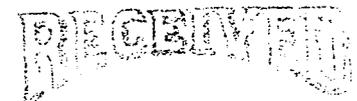
Once the approved densities [UMC 817.111(c)(2)] and ground cover [UMC 817.116(b)(1)] have been achieved, the 10-year responsibility period can begin. Statistically adequate samples and statistical comparisons between the reclaimed sites and the reference areas will be conducted at least four (4) years during the 10-year period. The first two sampling periods will be in the third and sixth years to assure the revegetated areas are progressing and maintaining sufficient cover and density. During the last two years, the areas will be adequately sampled and statistically compared (one tailed t-test) for ground cover and stem density to prove reclamation success and allow for bond release.

Water monitoring during the period between final reseeding and bond release will consist of sampling eight sediment ponds. These ponds being left are limited discharge ponds and only need to be sampled when discharge occurs. The ponds are designed to discharge only after a ten year, twenty-four hour storm event.

Subsidence monitoring will be done annually for three years to make sure that all subsidence has stabilized.

### 3.5.6.4 Statistical Methodology

Any sampling on reclaimed areas or reference areas will be done at statistically adequate levels. To determine adequate samples a two-tailed t-test (Snedecor and Cochran, 1976)  $(t^2s^2)/(dx)^2$  will be used at the 80% confidence level with a 10% (d=10%) change in the mean. The 80% confidence level is because all vegetation types at Sunnyside are either shrublands or woodlands (shrub cover greater than 20% of total cover).



NOV 01 1991

RECEIVED

## CHAPTER III

Once adequate samples are obtained for cover and stem density, these parameters will be compared between reference areas and the corresponding reclaimed sites. These parameters will be compared using a one tailed t-test (Larsen, 1980). Since the primary land use is wildlife, under Section UMC 817.116, the re-vegetation will be considered successful when ground cover of a reclaimed site is 70% of the ground cover in the reference area with 90% statistical confidence. The stem densities on the reclaimed areas must be within 90% of densities on the reference areas with 80% statistical confidence.

### 3.5.6.5 Sampling Methodology

Ground cover will be estimated using the point line method, where a pin is dropped through a frame every 1/2 meter on a 25 meter transect. The first object encountered by the pin will be recorded as cover for that point. However, only understory cover will be estimated and this will not include canopy cover provided by trees or tall shrubs (shrubs over five feet tall). It would not be reasonable to expect trees or shrubs after only ten years' growth in the reclaimed sites to achieve the canopy cover found in the reference area.

The success of tree and shrub establishment will be determined by comparing stem densities of the reclaimed sites with the reference areas. In accordance with UMC 817.117, only shrubs or trees over one foot in height, over two years old, and with at least one-third of its length in the live crown will be counted. Densities will be estimated by counting the number of stems in a known unit area. In the pinyon-juniper types an elbow shaped plot illustrated in Plate IX-5 of the MRP will be used to estimate densities. This plot is two rectangular shaped plots each, 6 x 30 meters, with one parallel to the slope and the other perpendicular. In the mountain brush and sagebrush vegetation types, a plot 13.2 ft x 33 ft (0.01 acre) will be used to estimate shrub density. This size plot was developed because of the size and density of shrubs in this type.

### 3.5.7 Cost Estimate for Reclamation

#### 3.5.7.1 Forecast of Performance Bond Liability During Permit Term and Forecast of Liability for the Life of the Mine

There is no difference between bond for the permit term and a bond for the life of the mine. There are no additional disturbances planned for the Sunnyside Mine during the 5-year permit term.

## CHAPTER III

Table III-29 gives the estimated bond cost for facility removal, entry sealing and reclamation costs for the reclaimed 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 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.

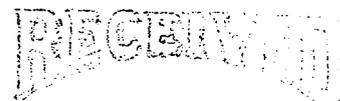
There will be additional revegetation of unbonded pre-law areas in the future. These areas have been mapped (Plates III-20 through III-23) illustrating the current condition of the pre-law disturbances. In Appendix III-10 these areas are described and the acreages are listed in Table 2. About 50% of 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 (1988) Blue Book values (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.



NOV 01 1991

DIVISION OF

RECLAMATION

## 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). 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.

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

### Culvert Removal

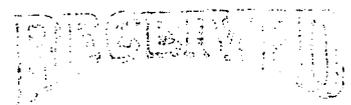
A total of 26 culverts (Table III-22) are to be removed inside the permit boundary during reclamation. Cost and source of information are shown on the table.

### Drill Hole Plugging

Two drill holes are known to be open, based on presently available records. Cementing costs are shown in Table III-10.

### Highwall Regrading

Highwall regrading will be done at portal and shaft locations where cut/fill excavations were done on side hills to place facilities. Regrading involves pulling previous cut material back into the cut with a backhoe and dozing the material into approximate original contours using a dozer. Volumes for areas 2 through 9 were based on cross-sections on Plate III-32. Volumes



### CHAPTER III

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 Highwall

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 cu. yds. (1' 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 sediment ponds and two 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-36 based on average push distances shown in Table III-21 with no ripping required.

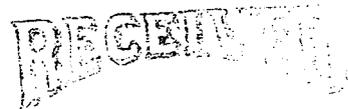
For bonding purposes, it was assumed eight sediment ponds would have to be sampled only once each over the ten year period. Labor and lab costs are shown on Table III-30.

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 Bookcliffs/ACZ Laboratory.

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



NOV 01 1991

### CHAPTER III

disked to break surface crusting. Table III-12 details unit cost and Table III-25 summarizes cost by area.

#### Revegetation

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

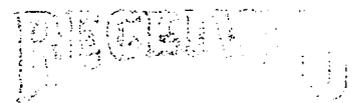
Revegetation failure is high in the high desert environment of Utah where the rainfall is light and erratic during the summer months. A 40 percent failure rate was assumed for all disturbed acreage. Additional cost would include unit costs covered in soil testing, preparation, and fertilizing and revegetation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

#### Contingency

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



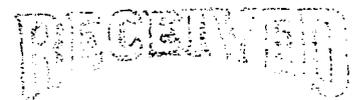
NOV 01 1971

INSURANCE  
C. C. GARDNER

CHAPTER III

3.6 Bibliography

- Campion, Peter S.A. and David K. Benner. 1981. Establishing permanent vegetation on coal refuse without a four foot layer of topsoil. In: Symposium on surface mine hydrology, sedimentology and reclamation. University of Kentucky, Lexington, KY.
- Cook, George. 1981. Personal communication. Range conservationist. SCS, Price, UT.
- Dewey, D.R. Salt tolerance of twenty-five strains of Agropyron. 7gro. J. 52:631-635. 1960.
- Dickerson, G.W. 1978. Control of Black Grass Bugs (Labops hesperius Uhler) in Northern New Mexico. J. Range Mange. 37:398-9.
- Institute for Land Rehabilitation Staff. Selection, propagation and field establishment of native plant species on disturbed arid lands. Utah Agr. Exp. Sta. Bull 500. Utah State University, Logan, UT.
- Jensen, E., M. Beroz, J. Borchert, F. Riggley, T. Haas, S. Howell, D. Hanson and W. Svenjnoha. 1981. Soil Survey of Range Creek Portion of Carbon Area, Carbon County, Utah. USDA. SCS.
- Johnson, James R. and J.T. Nichols, 1970. Plants of South Dakota Grasslands: A photographic study. South Dakota Agr. Exp. Sta. Bull. 566. South Dakota State University, Brookings, SD.
- Maberry, John O. 1971. Sedimentary features of the Blackhawk Formation in the Sunnyside District, Carbon County, Utah. Geological Survey Prof. Paper USGS. US Govt Printing Office.
- Martin, J.H. W.H. Leonard and D.L. Stomp. 1976. Principles of Field Crop Production. Mcmillan, NY.
- McArthur, E. Durrant, A. Clyde Blauer, A. Perry Plummer. 1979. Characteristics and Hybridization of Important Intermountain Shrubs III. Sunflower family. USDA Forest Service. Intermtn. For. and Range Exp. Sta. Res Paper. INT-220.
- Merkel, Daniel L. and Carlton H. Herbel. 1973. Seeding non-irrigated lands in New Mexico. ARS. USDA Report No. 10.

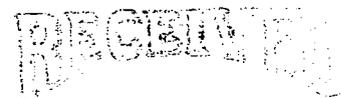


NOV 0 1 1981

STATION

CHAPTER III

- Monson, Stephen B. and Donald R. Christensen. 1975. Woody Plants for Rehabilitating Rangelands in the Intermountain Region. In: "Wildlife Shrubs" symposium and workshop proceedings. Provo, Utah. pp 71-114.
- New Mexico Department of Natural Resources. 1980. New Mexico Forest Practices Guidelines. Forestry Division. Santa Fe, NM
- Oaks, Wendall, 1980. Revegetation of areas disturbed by surface mining of coal in the southern Rocky Mountain resource area. USDA. SCS Project No. 35A-179D.
- Osterwald, Frank W. and R.E. Eggleton. 1958. Geological factors related to coal bounces and rock-bursts in the Sunnyside No. 1 Mine, Utah: USGS open-file report.
- Osterwald, Frank W. 1962. Preliminary map of Sunnyside No. 1 Mine Area, Carbon County, Utah, showing mine workings, mined out areas, overburden thickness contours, and subsidence cracks.
- \_\_\_\_\_. 1968. Sedimentary features of the Blackhawk Formation at Sunnyside, Carbon County, Utah. USGS open-file report.
- Peurifog, Robert L. Estimating Construction Costs. 2nd Edition.
- Plummer, A. Perry, D.R. Christensen and S.B. Monson. 1968. Restoring Big Game Range in Utah. Utah Division of Fish and Game. No. 68-3.
- Schiechtl, Hugo D. Bioengineering for Land Reclamation and Conservation. The University of Alberta Press. Edmonton, Alberta, Canada. 1980.
- Soil Conservation Service. 1980. A Soil Survey of Range Creek Portion of Carbon Area, Carbon County, Utah. USDA-SCS, Price, UT.
- Thornburg, Ashley A. Plant Materials for Use of Surface-mined Lands in Arid and Semi-arid Regions. USDA SCS TP-157. 1982.
- United States Environmental Protection Agency. 1978. Methods of Quickly Revegetating Soils of Low Productivity, Construction Activities. Washington, D.C.



NOV 0 1 1981

DIVISION OF

CHAPTER III

- United States Environmental Protection Agency. Methods of Quickly Revegetation Soils of Low Productivity and Construction Activities. Office of Water Planning and Standards. Washington, D.C. EPA-440/9-75-006. 1975.
- USDA Forest Service. Range Plant Handbook. U.S. Government Printing Office. Washington, D.C. 1937.
- United States Forest Service. 1974. Seeds of Woody Plants in the United States. USDA Agricultural Handbook 450. US Gov. Print. Office. Washington D.C.
- Vallentine, J.A. 1971. Range Development and Improvements. Brigham Young University, Provo, Utah.
- Verner, J.E. 1956. Value of Indian Ricegrass in range seeding. J. Range Manage. 9:240-241.
- West, Neil E. (ed) Galleta: Taxonomy, Ecology and Management of *Hilaria jamesii* on Western Rangelands. Utah Agr. Exp. Sta. Bull. 487. Utah State University, Logan, UT 1972.
- Wolfe, Marcia Hamann. 1981. Reclamation in the mountains of northeastern New Mexico. In: Symposium on reclamation of mountainous areas. Canadian Land Reclamation Association. Canbrook, B.C.
- \_\_\_\_\_. 1982. Establishment of native grasses in the Southern Rocky Mountains. In: Reclamation of Mined Lands in the Southwest. Oct. 20-22, 1982. Eds. Earl S. Aldon and Wendall R. Oaks.
- Wolfe, Marcia Hamann and John Abbott. 1982. Refuse revegetation study report. Unpublished report Kaiser Steel Corporation, Raton, NM.

RECEIVED

NOV 01 1991

DIVISION OF  
CIVIL ENGINEERING

## 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). 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 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. Cementing costs are shown in Table III-10.

CHAPTER III

Highwall Regrading

Highwall regrading will be done at portal and shaft locations where cut/fill excavations were done on side hills to place facilities. Regrading involves pulling previous cut material back into the cut with a backhoe and dozing the material into approximate original contours using a dozer. Volumes for areas 2

The remainder of this page intentionally left blank.

