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State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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November 21, 1994

Ms. Paige B. Beville
Manager, Environmental, Health & Safety
ARCO Coal Company
555 17th Street, Room 2170
Denver, CO 80202

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Re: Deficiencies in Reclamation Plans, Mountain Coal Company, Gordon Creek #2, #7, & #8 Mines, INA/007/016, Folder #3, Carbon County, Utah

Dear Ms. Beville:

The Division has completed a review of the information submitted through September 30, 1994 regarding the reclamation of the Gordon Creek #2, #7, and #8 mines. Enclosed please find a copy of the technical analysis and findings. A few deficiencies have been identified that will need to be corrected in order to receive final approval of the plans. The Division met with Dan Guy on November 14, 1994 to discuss the deficiencies and what would need to be done to resolve them.

It appears that Dan has a good handle on how to proceed. Please review the Technical Analysis and provide a response to the deficiencies by December 21, 1994. Thank you for your help during the permitting process. Please call if you have any questions.

Sincerely,

A handwritten signature in black ink that reads "Daron R. Haddock".

Daron R. Haddock
Permit Supervisor

enclosure

cc: P. Grubaugh-Littig
J. Kelley
S. White
T. Munson
H. Sauer

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TECHNICAL ANALYSIS AND FINDINGS

MOUNTAIN COAL COMPANY GORDON CREEK #2,#7 AND #8 ACT/007/016

November 7, 1994

SYNOPSIS

Mountain Coal Company submitted a revised reclamation plan for the Gordon Creek #2, #7, and #8 Mines area on August 6, 1993. On September 30, 1994, the permittee submitted the latest revision of the reclamation plan which addressed deficiencies identified in the Division's June 30, 1994 review. This document analyzes the submittals and discusses findings that have been made.

R645-301-233.100 Topsoil Substitute and Supplements

ANALYSIS

The permittee has committed to implement a soil/spoil sampling program **prior** to the commencement of backfilling and grading operations (page 3-52 thru 3-53). Soil sample site locations are depicted on Plate 3-1. The purpose of the sampling program is two fold. One purpose is the identification of potentially acid-and/or- toxic forming materials and the other is the determination of the fertility status of the stockpiled topsoil and subsoil. The laboratory results, and there interpretation will be the basis (in part) for material handling on-site. The laboratory results must be submitted to the Division for review at the earliest possible date. Discussions between the permittee and the Division with regards to the interpretation of these data and the data from the sampling of the No. 2 Mine yard must occur subsequent to each parties independent review.

The permittee states that the first lift of redistributed topsoil (approximately 4-6 inches) and the underlying spoil material will be ripped simultaneously (page 3-52). The permittee also commits to ripping the spoil to twelve inches subsequent to backfilling and grading (page 3-33 & 3-46). The following questions must be clarified. Are these commitments one in the same? Will they be applied on all disturbed areas which are accessible by earth moving equipment? Will one ripping practice be applied on areas which will have topsoil applied and the other where topsoil is not applied?

R645-301-240 Reclamation Plan

Concrete slabs are not considered suitable growth medium and must be buried with at

least four feet of suitable cover material.

Findings of Deficiencies

The permittee must provide the following prior to approval of the proposed reclamation plan.

- 1) A commitment to submit soil/spoil laboratory results to the Division as soon as possible.
- 2) Clarification of ripping practices.
- 3) A commitment to cover all concrete slabs with four feet of suitable material.

R645-301-340 Revegetation

The revegetation portion of the plan is found on pages 3-52 thru 3-65. The revegetation seed mixture is specified on page 3-56. The mixture contains grasses, forbs, and shrubs which are known to be palatable to big game animals. Cicer milkvetch and alfalfa are the only non-native species proposed in the mixture. Cicer milkvetch is used because it is a legume and also known for its palatability to big game animals. Alfalfa is desirable for its quick establishment and nitrogen fixing capabilities. Alfalfa usually does not persist on these sites for more than a few years. Five other native forb species are included in the mixture. Besides five shrubs species to be seeded the riparian areas will also be transplanted with containerized stock of Salix, Elderberry, Serviceberry and Chokecherry (page 3-57). The riparian areas will have an augmented seeded mixture applied which includes additional grass and forb species.

All seeding will be done by broadcast methods. Either hydroseeding or hand broadcasting methods and followed by light raking (page 3-54). This method has been found to be effective for this area from past interim seeding efforts. A commitment should be made to limit the amount of time the seed is in the hydroseeder to 30 minutes.

A commitment is made in the plan to leave the site in a roughened state (page 8-32). By using a large backhoe bucket to redistribute the topsoil, depressions 2' to 3' in diameter will be left. The areas which are not backfilled and will not have topsoil redistributed will be hand roughened (page 3-53). " The hand roughening will consist of surface loosening of the soil to a depth of 4 to 6 inches, leaving numerous small pockets for retention of seed, organic mulch and water." This is inadequate to meet the performance standards. The cut above the conveyor belt does not meet vegetation performance standards and more drastic measures are required for vegetation success. A track hoe bucket should be used to reach as far as possible to provide for surface roughness in these areas. These non-topsoiled areas

should have organic matter **incorporated** into the soil surface. This cannot be done by simply hydromulching. Therefore, the operator must commit to other methods of soil preparation for non-topsoiled areas.

Revegetation: Timing.

The plan commits to seeding no sooner than September 1 (page 3-54) and to complete the seeding in the fall of the year. This is the normally accepted time of year for seeding with this particular seed mixture and for this area. The revegetation schedule is outlined on page 3-59. Preliminary work will begin in May such as seed orders and soil sampling in June. Recontouring will begin in July with final mulching occurring in October.

Revegetation: Mulching and other soil stabilizing practices.

A hydromulch will be applied to all seeded areas with slopes less than 2:1 and on nontopsoiled slopes greater than 2:1 (page 3-58). Hydromulching has been effective in controlling erosion and stabilizing the soil surface on slopes less than 2:1 during interim revegetation on site. Erosion control matting will be used on topsoiled slopes which are 2:1 or greater. However erosion control matting is not expected to be used on site. Most slopes 2:1 or steeper will not be topsoiled.

Revegetation: Standards for success.

The postmining land use in wildlife habitat. Therefore, the requirements of R645-301-356.230 must be met. Success of vegetation will be determined on the basis of shrub stocking and vegetative ground cover. The plan does not specify a shrub standard. The Division and DWR have decided that a minimum shrub stocking standard of 2000 shrubs per acre is a reasonable goal for this site to achieve (correspondence dated 10/31/94, from Bill Bates, DWR). Therefore, the plan must commit to this standard. The stated success standard for the cover and diversity requirement is to use the Oak Shrubland Reference Area (page 3-60). As measured in 1984 the vegetative cover for this area was 48%. This is a high standard for this site to meet, however given good reclamation techniques and good soil material the site should be able to meet this standard.

Findings of Deficiencies:

Several deficiencies still exist with the revegetation plan and the reclamation findings cannot be completed until these are adequately addressed. Please refer to the following summary of deficiencies regarding revegetation.

- 1) A statement must be included in the seeding methods which commits to limiting the amount of time seed is in the hydroseeder to 30 minutes or less in accordance with R645-301-341.220.
- 2) The commitment to hand roughen nontopsoiled slopes is insufficient to make a finding of revegetation success. The plan must detail the methods for vegetation establishment on nontopsoiled slopes which assure compliance with the performance standards and R645-301-341.220.
- 3) The operator must commit to a success standard of 2000 shrub or trees per acre for bond release as required by R645-301-356.231.

R645-301-500

Engineering

ANALYSIS

The first reclamation operation following the final closure of the mining operation was the sealing of the portals. The No. 2 mine was sealed permanently in October of 1985 and the No. 7 and 8 mines were sealed in December of 1990. Each portal was first sealed by placing a block seal 25 to 50 feet in by the portal. The portal structure was then removed and the area out by the seal was completely backfilled to prevent access to the seal and to minimize roofbreaking. Exposed coal seams in the portal areas were also covered.

The 2, 7 & 8 mines are considered dry mines, i.e., the mines themselves do not produce enough water to supply the needs of the mining operation. Most of the workings are downdip from the portals. The only area updip from the portal is the area northwest of the No. 2 west portals through the 70-acre lease modification. No water was encountered during the mining of this area. Because of the dryness of the mines and the locations of the portals relative to the dip of the seam, water is not expected to impound behind the seals and so no hydrologic seals were used.

Shortly after final cessation of operations and portal sealing, all surface structures were removed. Metal, wood, pipe, and other such structural material was hauled away and either resold for scrap or disposed of in a municipal landfill. All concrete, including foundations, floors, and structural supports, was broken up and buried at the toe of the portal faceups.

Reclamation of the minesite will occur in two phases. During the first Phase, the entire site will be reclaimed down to the lower end of the No. 2 mine area. The natural

drainage channels will also be reestablished and reconfigured to that point. The No. 7A Pond will be completely removed and the No. 2 pond will be enlarged to enable it to receive runoff from the entire site. All disturbed *and* undisturbed drainage will flow into the pond. The main road from the entrance gate to the pond will remain in place for pond cleaning and maintenance.

Once vegetation is reestablished and the sediment contribution to the pond is within acceptable limits, the sediment pond and the main road will be removed and reclaimed. The reclaimed main drainage channel will also be extended to intersect the undisturbed channel below the site. This will constitute the second phase of the reclamation process.

Those areas not draining to the pond, which are in the area immediately below the pond, will have alternate sediment controls such as silt fences, straw bales and containment berms.

Sweets Pond will not be reclaimed. It is located on private land and the landowner has requested that the pond be left in place for private use. The permittee will turn the pond over to the landowner when reclamation is complete. The pond is designed for long-term stability and is a utility improvement as well as a source of water for wildlife.

All cutslopes along pad and road areas will be reduced as much as possible while maintaining the required minimum stability safety factor of 1.3. This will be accomplished by recovering downslope material with a backhoe and placing it against the cutslope faces with a bulldozer. The fill material will be compacted with a sheepsfoot compactor to improve stability. Temporary erosion controls, such as straw bales and silt fences, will be placed below these backfilled areas to prevent sediment from leaving the site and entering the natural drainage. The Grand Junction consulting firm of J.F.T. Agapito & Associates, Inc. determined the limiting dimensions of the fills in the respective areas by a detailed stability analysis. This analysis is discussed and its results are shown in the discussion which follows.

Since different parts of the site were originally disturbed at different times and under different regulatory requirements, the site has been divided, for the purposes of the backfilling and grading plan, into 4 different areas: the No. 2 area, the No. 7 area, the No. 8 area, and the Old Fan Portal area.

No. 2 Area

A stability analysis of this area was done by the Grand Junction consulting firm of J.F.T. Agapito & Associates, Inc. in August of 1992. For this area, Agapito determined the

following slope geometry parameters for a stability safety factor of 1.3.

Slope Angle (degrees)	Width of Base (feet)	Maximum Height (feet)
15	933	250
20	343	125
25	197	92
30	126	73
35	90	63

The natural channels that must be reestablished through the No. 2 area limit the width of the base of the fill. Thus, the slope of 20° and base width of 343 feet were used in the design of the fill. This configuration allows a maximum slope height of approximately 125 feet.

The No. 2 area was initially disturbed prior to SMCRA. For such a site, both the R645- rules and the Federal regulations require that "all reasonably available spoil" be used in backfilling the highwall *and* that the backfill achieve a stability safety factor of at least 1.3. The designed backfills of the highwalls and cut slopes of the No. 2 area fulfill both of these requirements. Given the space constraints imposed by the reestablished natural channels, it would be impossible to completely eliminate the cut slopes and still achieve a stable configuration. The designed backfills use all the reasonably available spoil that is necessary to achieve a stable configuration *and* they eliminate as much of the cut slope as possible, even though the upper part of the cut slope will not be eliminated.

There are two seeps which daylight in the cutslope of the No. 2 area: one near the end of the No. 7 road and one above the office/shop area. The permittee plans to route the flow from these seeps over the surface of the fill in rip rap channels. However, both springs originate in fissures which span the face of the cutslope and there is some uncertainty as to whether the water from the seeps originates high in the cutslope or issues from the entire length of the fissures. If the water issues from the entire length of the fissures, it could flow out directly into the fill material, notwithstanding the precautions taken by the permittee in constructing the rip rap channels. And this means, that the stability of the fill in the seep areas could be jeopardized by saturation of the fill material and by buildup of pore pressure. This is particularly worrisome since repair of the fill will be difficult or impossible after the

completion of the earthwork.

For the sake of caution, the design of the seep areas should be revised to prevent the possible saturation of the fill by seep water. The revised design might include the opening of the fill in these areas and the establishment of actual channels for the flow of seep water. Or the design might include the installation in these areas of channels of filter gravel or some vertical extent, similar to that which is planned for the seep in the No. 8 area, which would allow water to escape from the entire length of the seep fissures.

No. 7 Area

A stability analysis of this area was done by the Grand Junction consulting firm of J.F.T. Agapito & Associates, Inc. in April of 1992. For this area, Agapito determined the following slope geometry parameters for a stability safety factor of 1.5.

Slope Angle (degrees)	Width of Base (feet)	Maximum Height (feet)
15	291	78
20	124	45
25	77	36
30	50	29
35	36	25

A safety factor of 1.5, rather than 1.3, was used for this area for a couple of reasons. First, the area contains two seeps and a small fault and has a history of natural instability. And since the planned earthwork will make it impossible to reach and repair this site in the event of failure, the slightly higher safety factor will provide a greater margin of safety. Second, the MSHA safety bench in this area is approximately 40 feet high and thus forms a good place into which to key the crest of the fill. The planned backfill will be approximately 45 feet high and will thus just cover the safety bench while leaving the upper 60 feet of the faceup as it is. The natural channel that must be reestablished through this area limits the width of the base of the fill. So again, as in the No. 2 area, the slope of 20° was used in the design of the fill. This allows a maximum base width of 124 feet and a maximum slope height of 45 feet.

Given the space constraints imposed by the reestablished natural channel, it would be

impossible to completely eliminate the portal faceup and still achieve a stable configuration. The planned configuration is thus the only one that will fulfill the requirement of R645-301-553.130 that the postmining slope be stable.

R645-301-553.140 requires that the postmining configuration minimize water pollution both on and off the site. The planned configuration will best fulfill this requirement for several reasons. First, the stable configuration achieved using the stability safety factor of 1.5 will prevent slides and minimize erosion. Second, the designed slope of approximately 2.7h:1v will best promote successful revegetation by providing a stable seed bed. Third, the lower fill height will allow for the channeling of water from a seep above the fill over the surface of the fill. This will prevent the seep from saturating and destabilizing the fill. And fourth, the planned configuration is the only possible configuration which will meet all the requirements of approximate original contour without interfering with the reestablishment of the natural drainage channel.

The planned configuration will also closely resemble the general surface configuration that existed prior to mining and will mimic the visual attributes of the surrounding area. The surrounding area is steep and contains many cliffs and ledges. The remaining 60 feet of faceup above the fill will resemble these cliffs and ledges and the fill at its base will closely resemble the talus slopes which underlie those cliffs and ledges.

The planned configuration will be entirely compatible with the postmining land use of grazing and wildlife habitat. Grazing area and wildlife habitat will merely be displaced, but not eliminated, by the remaining faceup. And the emphasis given in designing the fill to stability, good vegetation, and preservation of good water quality will enhance the value of this area as livestock land and wildlife habitat.

No. 8 Area

This area, which lies opposite the No. 7 area and on a much gentler slope, will be completely backfilled and restored to approximate original contour.

There is a seep in the road cut just below the No. 8 mine pad. This seep has been controlled by two gravel drains. The first, which is approximately 36 inches deep by 12 inches in thickness by 24 inches wide, crosses the road and discharges into a small concrete retention basin in an otherwise undisturbed area. The second is approximately 24 inches wide by 18 inches deep and parallels the road to where it discharges into the main undisturbed culvert.

The permittee plans to leave both gravel drains in place, as well as the concrete

retention basin, and to cover both gravel drains with additional fill material. The second gravel drain will be supplemented with an additional 24-inch-square section of gravel along the road ditch. This will be covered with roofing paper before it is covered with fill material. The resulting enlarged drain will empty into the restored natural drainage channel between the No. 8 and No. 7 areas.

The plan for supplementing and retaining the gravel drains is sound. But the concrete retention basin, however small, must be removed as it would otherwise constitute a permanent structure.

Old Fan Portal Area

This area was abandoned and reclaimed in 1984, and is, therefore, subject to the reclamation requirements of both SMCRA and the R645- rules. The present plan is to leave this area in its present configuration.

The permittee claims that this area was reclaimed properly under the interim regulations, but can provide no documentation of this in the form of an approved plan or corpus of correspondence. In addition, the area contains a highwall and cutslope and very little earthwork has been done there.

The permittee also claims that there is insufficient fill material to fill and reconfigure this area. However, there is surely sufficient material for this purpose to be found in the canyon below since material was simply downcast, and not hauled elsewhere, during the construction of the area. Additional fill material will also be available in the No. 2 and No. 7 areas since the faceups and cutslopes in these areas will not be entirely eliminated.

The permittee also claims that this area constitutes a settled and revegetated fill and that it would be environmentally detrimental to redisturb it. While it is true that further modification of this area will extend its final reclamation several years into the future, it is not necessarily true that such modification would be an impossible or even inordinately difficult reclamation endeavor. This area gets ample precipitation so that revegetation should not be difficult.

This area contains an unreclaimed highwall and cut slope. The highwall and cutslope are the subject of a recent violation because they are almost entirely without vegetation and have, consequently, been eroding and contributing sediment to the drainage system of the main canyon. Therefore, in accordance with R645-301-100, the highwall must be eliminated and the area must be restored to approximate original contour.

Reclamation Costs

The total cost of reclaiming this site is anticipated to be approximately \$350,711, in 1983 dollars. The plan escalates this cost at an annual rate of 10% through 1988, for which year the total cost is approximately \$564,824. When the reclamation cost is escalated through 1999, the cost in that year's dollars totals \$692,769. The present reclamation bond is in the amount of \$641,443. As the following table shows, the present bond is adequate for the present plan only through 1995.

<u>Year</u>	<u>Escalation Factor*</u>	<u>Reclamation Cost</u>
1988	--	\$564,824
1989	1.77%	\$574,821
1990	0.77%	\$579,248
1991	1.27%	\$586,604
1992	2.21%	\$599,568
1993	2.54%	\$614,797

<u>Year</u>	<u>Escalation Factor*</u>	<u>Reclamation Cost</u>
1994	2.01%	\$627,154
1995	2.01%	\$639,760
1996	2.01%	\$652,619
1997	2.01%	\$665,737
1998	2.01%	\$679,118
1999	2.01%	\$692,769

*Escalation factors are taken from Means[®]

However, the reclamation cost estimate does not include the cost of reclaiming the Old Fan Portal area and the present reclamation bond does not, therefore, include that cost. The bonding section of the plan is, therefore, not adequate.

Findings of Deficiency:

The revised reclamation plan is mostly acceptable. However, the following items, which have been discussed, must be changed.

- 1) The small concrete retention basin which receives water from the No. 8 area via the across-road gravel drain must be removed during the first phase of reclamation.

- 2) The Old Fan Portal area cannot be left in its present, unreclaimed state. The permittee must modify the reclamation plan to provide for the elimination of the highwall, the restoration of the area to approximate original contour, and all other procedures required to reclaim the area.
- 3) The reclamation cost estimate must be revised to include the anticipated cost of reclaiming the Old Fan Portal area, as that cost is reflected in the revision of the reclamation plan for that area which is mandated by finding (2) above. The reclamation bond must then be adjusted, if necessary, to cover this costs.
- 4) The design of the seep areas must be revised to prevent the possible saturation of the fill by seep water.

R645-301-210 and 356.300 Impoundments

ANALYSIS

The requirements for providing for an adequate pond maintenance plan are spelled out above. The Operator has provided for maintenance of the temporary sediment pond during the reclamation phase. It will be reclaimed and the original channel restored when bond release requirements are met for sediment control and vegetation (page 7-33). Per the requirements of R645-301-880-320 and R645-301-732-210 and Phase II bond release criteria, the following structures will be affected (Sweet's Canyon Pond and the temporary sediment pond) and as such, a Division of Water Rights permit, a Division of Dam Safety permit and a maintenance agreement for these structures have been supplied. The Operator has stated how he will comply with the requirements for permanent maintenance including sediment removal if required for the reconstructed sediment pond on page 7-50 of the plan. Sediment levels are shown as being determined by direct measurement at the outlet riser, as shown on Plat 7-8, and will be cleaned-out when the sediment reaches the cleanout level of 7882,0'. The pond will be inspected quarterly and on an annual basis as required.

The Sweet's Canyon Pond will remain and be maintained by the landowner as stated in the September 28, 1994 letters found in appendix 3-5 to Beaver Creek Coal Company from Agnes K. Pierce. A Slope Stability Analysis for the Sweet's Canyon Pond is found in Appendix 3-4 demonstrating a slope stability of 2.35 for saturated conditions. Water Rights Lease and Sale Agreement allocated to the Sweet's Canyon Pond was entered into on the 7th of April, 1993 and is found in Appendix 3-9.

The following forms and applications have been approved for the following impoundments to be retained or used during reclamation.

Sweet's Pond

- 1) Form 69 filed with the Division of Water Rights is found in appendix 7-4.
- 2) A transfer of Water Rights to the Sweet's Pond from Gordon Creek is found in appendix 3-9 but a change application for the point of use needs to be filed by the owner for the water rights to be valid.
- 3) A clarification of the use and responsibility for maintenance of the pond now that Mr. E.E. Pierce is deceased is found in appendix 3-5.

Temporary Sediment Pond

- 1) Sediment clean-out levels will be marked with a sediment marker in the pond.
- 2) Clean-out of the pond will occur at the 60 % sediment storage level.
- 3) Form 69 for this structure is found in appendix 7-4.

Finding of Adequacy:

The permittee meets the requirements of the rules regarding the sediment ponds and permanent impoundments.

**R645-301-742.300 et. al.
and
R645-301-742.400 thru 743**

Diversions

ANALYSIS

The plan provides for reclamation of the Right and Left Forks of Bryner Canyon using the 100-year 6-hour storm event in accordance with R645-301-742.323. Permanent channels for the ephemeral drainages were designed using the 10-year 6-hour event in accordance with R645-301-742.333. The main channel and the Right Fork of Bryner Canyon were considered intermittent and all others considered ephemeral. The watershed boundaries used to determine precipitation runoff from undisturbed areas within Bryner Canyon are shown on Plate 7-5A. The locations of all channels showing riprap sizes and slopes are shown on Plate 3-7. All design information for the plan regarding the applicable calculations and methodologies is found in Appendix 7-1. It was noted that the operator is planning on using 4 to 6 inches of soil on top of the filter fabric as stated on page 3-45 prior to placement of the riprap. This is not standard engineering practice and as such can not be accepted. It is recommended that if the goal of the operator is to allow vegetation to become reestablished in the channel then use of a graded filter blanket would be more appropriate.

The plan provides for the restoration of the Right Fork of Bryner Canyon to restore premining characteristics of the original stream channel where it meets the old pad fill. Ponding, in what is considered a natural depression that appeared to be caused by the presence of the pad and failure to reestablish original grade for the channel, has been eliminated.

As a recommendation to the Operator, to document any failure of riprap or channels caused by greater than the design storm, the following methodologies will be deemed acceptable.

The reclamation of the channel will take place in two phases. The first phase is the reclamation of the entire mine site down to the lower end of the mine yard as shown on Plate 3-7, the natural channels will be reclaimed down to this area. During this phase the No. 7A Sediment Pond will be removed. Also during this phase the No. 2 Pond will be enlarged as shown on Plate 3-7 and 7-14. All disturbed and undisturbed drainage above this point will flow to the pond. The road from the gate to the pond will be left in place with a turnaround on the south side of the pond. This will allow access for cleaning and pond maintenance.

There are several diversions of miscellaneous spring flow which drains across reclaimed slopes (springs located at the 2, 7, and 8 mine areas). Provisions are discussed on page 3-45 regarding the use of riprap for all seep locations. This will not prevent undercutting of the riprap. Use of a graded gravel filter blanket or a semi-porous filter fabric underliner to promote vegetation reestablishment but prevent erosion is required. The spring at the 8 mine flows into a concrete basin and as such provisions should be made to remove this basin and a more natural basin installed using native rock and vegetation.

Finding of Deficiencies:

1. The Permittee must address the three perennial springs found at the 2, 7, and 8 mine sites in regards to providing stable and secure passage of this water either over or through the backfill by providing an underlining for the proposed riprap which will allow vegetation to become established.
2. The Permittee must decide whether a graded gravel filter blanket is more appropriate for the reclaimed channels to promote vegetative growth in the channel bottoms. Please remove conflicting plans for underliners and make the plan consistent. The use of 4 to 6 inches of soil over the filter cloth is not accepted engineering practice and will not be allowed. Please make the appropriate changes to page 3-45 to reflect the designs shown on Plate 3-12, using a graded filter blanket of what is referenced as 3/4 inch gravel. The filter thickness should be approximately 1/2 the thickness of the riprap but in no case less than 6-9 inches. No specifications for the graded filter are given and must be discussed.

Finding of Adequacy:

1. The Permittee has filed the necessary Stream Alteration Permit for the reclaimed stream channel with the Division of Water Rights and as such a positive finding can be made pending approval by the Division of Water Rights.

R645-301-742

Sediment Control Measures

ANALYSIS

The Permittee has provided details on mulching rates, hydromulch application rates, tackifier amounts and types, and erosion control matting. Commitments to maintain the site from an erosion standpoint have been made in the permit in Section 7.2.8.5, Maintenance Plan For Erosion. The plans for all areas not draining to the sediment pond are shown on Plates 3-7, 3-7A, and 3-7B. A summary of the BTCA areas and the runoff they contribute is contained in Table 4-2. The use of silt fences as opposed to land form structures such as berms and swales, which can be left in permanently and revegetated, is something that the Permittee may want to consider if maintenance of silt fences is an issue of concern. A more permanent control such as a berm with a gravel or coarse rock outlet would provide the same level of sediment control with less maintenance. The Division will be willing to provide suggestions for other sediment control alternatives. The Sedcad analysis found in appendix 7-3 is considered good for the areas of the fan portal which are reclaimed but does adequately incorporate the areas which are not considered reclaimed and as such can not be considered to preclude sediment control for this area.

Finding of Deficiency:

The Permittee does not meet the requirements of the rules regarding erosion control and control of sediment for the fan portal area.

R645-301-723 and 742.100,200,300

Water Quality Monitoring

ANALYSIS

The Permittee has proposed a plan which monitors 6 stations for the parameters shown in Table 7-18. The sampling program provides information on seasonal flow and water quality on intermittent and ephemeral streams that have potential to be affected by

mine discharge and surface disturbance. Discussion of surface water monitoring locations, type, frequency and flow device may be found in Table 7-17. A map of monitoring locations is provided on Plate 7-2. Analyses will be for parameters listed in Table 7-18. The Post Mining Water Monitoring plan is described on 7-67 of the permit.

Findings of Adequacy:

The Permittee meets the requirements of the regulations regarding water monitoring.