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

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March 13, 2000

Chucks Semborski, Environmental Supervisor
Energy West Mining
P O Box 310
Huntington, Utah 84528

Re: Deer Creek Reclamation Plan, PacifiCorp, Deer Creek Mine, ACT/015/018-AM99C-2, Outgoing File

Dear Mr. Semborski:

The Division has reviewed your December 6, 1999, revision to the reclamation plan for the Deer Creek Mine. A copy of the technical analysis is enclosed for your information and records. There are deficiencies that will need to be corrected before the amendment can be approved.

There seems to be some misunderstanding about approval of the highwall elimination plan. The Division did review and agree with a conceptual plan, but the Division has not formally approved a highwall elimination plan. Hopefully this will be resolved when the deficiencies have been addressed and the amendment approved.

The cover letter with your submittal indicates there could be some conflicting or overlapping information between the reclamation plan and the remainder of the mining and reclamation plan. The Division is concerned about the possibility of having conflicting information or commitments. These could lead to possible misunderstandings that might result in enforcement actions if Energy West and the Division do not work together to resolve any questions before on-the-ground work is begun.

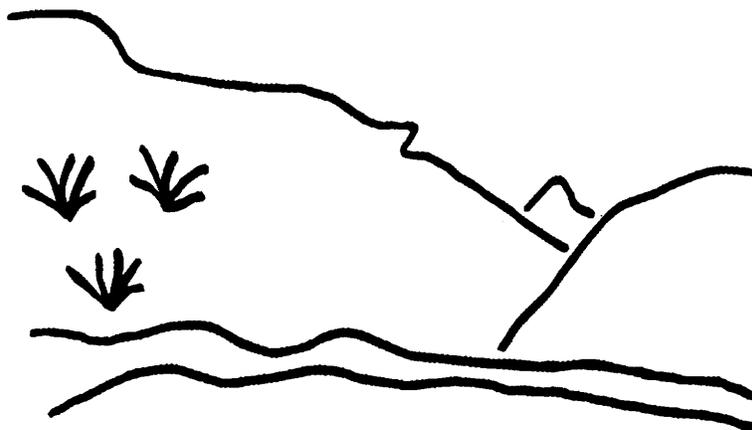
For us to keep this amendment active in our system, please submit a response by May 15, 2000. If you have any questions, please call me at 801-538-5325 or Paul Baker at 801-538-5261.

Sincerely,

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

Daron R. Haddock
Permit Supervisor

State of Utah



Utah Oil Gas and Mining

Coal Regulatory Program

Deer Creek Mine
Revision to Reclamation Plan
ACT/015/018-AM99C
Technical Analysis
March 13, 2000

TABLE OF CONTENTS

INTRODUCTION	1
SUMMARY OF OUTSTANDING DEFICIENCIES	2
ADMINISTRATIVE INFORMATION	6
APPLICATION FORMAT AND CONTENTS	6
OPERATION PLAN	7
TOPSOIL AND SUBSOIL	7
Topsoil Substitutes and Supplements	7
RECLAMATION PLAN	11
GENERAL REQUIREMENTS	11
POSTMINING LAND USES	11
APPROXIMATE ORIGINAL CONTOUR RESTORATION	12
BACKFILLING AND GRADING	15
MINE OPENINGS	17
TOPSOIL AND SUBSOIL	18
Soil Redistribution	18
Soil Nutrients and Amendments	18
Soil Stabilization	18
Refuse Pile Reclamation	19
ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES	20
HYDROLOGIC INFORMATION	20
Ground-water Monitoring	20
Surface-water Monitoring	22
Acid and Toxic-forming Materials	23
Transfer of Wells	23
Discharges Into an Underground Mine	23
Gravity Discharges	23
Water Quality Standards and Effluent Limitations	23
Diversions	24
Stream Buffer Zones	24
Sediment Control Measures	24
Siltation Structures	25
Sedimentation Ponds	25
Other Treatment Facilities	25
Exemptions for Siltation Structures	25
Discharge Structures	25
Impoundments	25
Casing and Sealing of Wells	25
REVEGETATION	27

TABLE OF CONTENTS

Timing	27
Mulching and Other Soil Stabilizing Practices	27
Standards for Success	29
Field Trials	30
Fish and Wildlife Habitat	31
MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS	32
Bonded Area Map	32
Reclamation Backfilling and Grading Maps	33
Reclamation Facilities Maps	33
Final Surface Configuration Maps	33
Reclamation Surface and Subsurface Manmade Features Maps	33
 BONDING AND INSURANCE REQUIREMENTS	 34
Form of Bond (Reclamation Agreement)	34
Determination of Bond Amount	34
Terms and Conditions for Liability Insurance	34

INTRODUCTION

INTRODUCTION

On May 25, 1999, the Division received a proposal to revise the reclamation plan for the Deer Creek Mine. The Division sent its first technical analysis on July 7, 1999, and PacifiCorp responded on December 6, 1999. The revision was prompted primarily by the highwall survey and the requirement to eliminate pre-1978 highwalls to the extent feasible, and it was necessary for PacifiCorp to revise the backfilling and grading plan.

Unlike the rest of the Deer Creek mining and reclamation plan, this application is formatted to the R645 rules. It would replace Chapter 4 of the current plan, but, as PacifiCorp acknowledges, there could be parts of this application that overlap and conflict, with the current plan. PacifiCorp intends to reformat the entire plan to the R645 rules and to rid the plan of discrepancies.

Most baseline information and operation plan regulations were not addressed in this review.

SUMMARY OF OUTSTANDING DEFICIENCIES

The Technical Analysis regarding the proposed permit changes is not complete at this time, pending submittal of additional information by the Permittee and further review by the Division, to address outstanding deficiencies in the proposal. A summary of those outstanding deficiencies is provided below. Additional comments, concerns, and deficiencies may also be found within the analysis and finding make in the Draft Technical Analysis which have not been presented in this summary. Upon finalization of this review, any outstanding deficiencies will be evaluated for compliance with the regulatory requirements. Such deficiencies may be conditioned to the requirements of the permit issued by the Division, result in denial of the proposed permit changes, or may result in other executive or enforcement actions as deemed necessary by the Division at that time to achieve compliance with the Utah Coal Regulatory Program.

Accordingly, the permittee must address those deficiencies as found within this Draft Technical Analysis and provide the following, prior to approval, in accordance with the requirements of:

- R645-301-120 and R645-301-244**, The soil commitment to apply tackifier mainly on slopes greater than 20% appears to be in conflict with the biology commitment to apply tackifier where ever straw mulch is used to stabilize all soil surfaces. 20
- R645-301-120 and R645-301-521**, The refuse sampling plan refers to Map 2-17. Map 2-17 could not be located in the amendment nor in the existing Mine Reclamation Plan. 10
- R645-301-120**, Table 3-1, Reclamation Schedule, and Section R645-301-541 General, do not list soil exploration/sampling and salvage; nor does the table list soil replacement. 20
- R645-301-120, R645-301-224 and R645-301-233**, (Part 1) For substitute topsoil and refuse characterization, include all analyses listed in Table 2, Overburden Evaluation for Vegetative Root Zone, Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining (Leatherwood, 1988). The sampling plan only provides for pH and EC analysis for substitute topsoil characterization. Analyses of refuse does include saturation percent, available water capacity nor rock fragments. (Part 2) Sampling as listed in Table 200-A-1 did not follow the current 1988 Division guidelines for topsoil and overburden. Furthermore, Table 200-A-1 contains erroneous calculations and information for SAR, units, and texture. Therefore, information in Table 200-A-1 is incomplete and erroneous as contained in the amendment and does not show that the fill or refuse materials in Deer Creek and Elk canyons are suitable for achieving the revegetation standards. (Part 3) No analysis results from the November 1999 sampling are included in Table 200-A-2. 10

SUMMARY OF OUTSTANDING DEFICIENCIES

Revised: March 13, 2000

- R645-301-130**, All soil survey work, field sample collecting, and data interpretation must be performed by a qualified Soil Scientist. Sufficient information must be submitted with the amendment to enable the Division to determine the qualifications of the person conducting the soil survey and interpreting the results. 9
- R645-301-232.720 and R645-301-350**, The exploration program assumes that adequate quantities of substitute soil is available, but gives no estimated volumes and cover depths for the reclaimed site. The application needs to contain a commitment to develop a backup plan supplying borrow soils if adequate quantities of substitute soils cannot be procured on-site. 20
- R645-301-341.250**, The applicant needs to clarify the woody plant density success standard. It is not clear if the applicant intends to use baseline information or reference area data at the time of seeking final bond release. If the applicant intends to use data gathered at the time of seeking bond release, the application needs to indicate the standard would need to be approved at that time by the Division of Wildlife Resources and the Division. 32
- R645-301-341.250**, The diversity standard proposed in the application is not acceptable. The applicant needs to propose a different method of measuring diversity and a success standard. 32
- R645-301-512.200**, Correct or provide the following: 1) the K-factor used in Table 7-4 should be the same as the K-factor identified within the text, 2) correct the calculation errors in table 7-4, 3) present the calculations and assumptions used to determine the K-factor within the disturbed area, 4) present the calculations and assumptions used to determine Manning's 'n' for the riprap channel designs. 27
- R645-301-512**, Provide certified designs: hydrologic designs can be certified in a cover page attached to the designs. 26
- R645-301-537**, Since the Permittee plans to disturb the refuse pile during final reclamation they must remove references to using the settle and regraded fill provision from achieving AOC. 15
- R645-301-537**, The Permittee must remove the reference to settled and revegetated fill being left since the backfilling and regrading plan shows that all settled and revegetated fill will be disturbed during final reclamation. 16
- R645-301-551**, The Permittee must give the Division portal closure plans for North Fork Meetinghouse Canyon. 18
- R645-301-552.130**, The Permittee must give the Division detailed calculation for the slope stability analysis. 16

SUMMARY OF OUTSTANDING DEFICIENCIES

R645-301-553.140, The Permittee did not show how erosion and water pollution would be minimized. The proposed slopes are straight rather than concave. Concaved slopes tend to minimize erosion more than straight slopes. 17

R645-301-553.252 and R645-301-233, Since data errors exist, data is incomplete, and roof and floor analyses identify toxicity, the Division cannot make a determination of coal waste and refuse acceptability. (1) All refuse and coal mine waste must be covered with a minimum of four feet of the best available, nontoxic and noncombustible material. (2) Refuse may not be used as substitute topsoil. 19

R645-301-553.252, For the refuse sampling plan, sample density must be statistically based, using a random sample grid pattern to accurately represent and characterize the refuse piles. 10

R645-301-553.500 and R645-301-553.600, The Permittee must demonstrate that the reclamation plan will eliminate all highwall to the extent practical. If highwall remnants are to be left then the Permittee must show that 1) the amount of fill material is insufficient to reclaim the highwalls, or 2) highwall elimination would interfere with reestablishing the drainage system, or 3) highwall elimination would result in slopes that do not meet the stability requirements. 14

R645-301-731.221, Provide a monitoring plan specific to reclamation that: 1) assures impacts to hydrologic balance are prevented, 2) clarifies how underground water recovery will be determined from the monitoring of HM-2 and HM-3, 3) describes how the State Water Quality Standards, Utah Administrative Code R317-8, for the Deer Creek, Huntington Creek, and any other stream receiving minewater discharge will be shown to meet federal and state water quality standards. (The Division recommends a minimum high and low flow season monitoring for selected parameters over the full period of reclamation. Parameters should be reflective of all potential in-mine contaminants), 4) includes a map that differentiates between alluvial and groundwater gradients and identifies; flow direction and groundwater divides in the permit and adjacent area for each mined seam, existing mine floor elevations, in-mine discharge locations, pertinent geologic controls, mine controls such as sealed mine sections, and changes to previously existing hydrologic barriers, 5) provides a water monitoring plan that; a) determines whether changes in groundwater hydrology will occur along the Straight Canyon Syncline during the time mining has idled, b) determines if the groundwater hydrology changes affects baseflows to the Cottonwood Canyon Stream, c) identifies the difference between changes due to climate, or from ground water discharge by including age dating to be conducted every 2nd year during the low flow period for; radio carbon dating, tritium dating, and stable hydrogen and oxygen isotopes (for meteoric waterline determinations) in the Cottonwood Canyon wells and Cottonwood Creek streamflow below well CCCW-1S, and d) identifies all reclamation monitoring sites on a map. 26

R645-301-731, Provide a monitoring plan specific to reclamation that: 1) includes water quality

SUMMARY OF OUTSTANDING DEFICIENCIES

- and quantity monitoring, where flow accumulation is measurable, as determined by with the spring survey to be conducted in the 5th and 9th year following reclamation, 2) demonstrates mine water discharge will meet the criteria for water quality appropriate for the post-mining land use and in accordance with the state and federal standards (For Huntington Creek and tributaries the state standards are: Class 2B, Class 3C and Class 4 criteria), 3) commits to submit the water quality and quantity data quarterly. 26
- R645-301-742.314**, 1) Provide designs for the channel transitions between the upstream and downstream natural channel and the reclaimed channel, and for the proposed soft bio-engineering methods, 2) demonstrate the design capacity for perennial and intermittent streams are at least equal to the unmodified channel upstream and downstream from the diversion. 26
- R645-301-742**, Provide specific information, maps, design detail, and maintenance information for the silt fences and other sediment control measures and include a maintenance plan and commitments to assure BTCA measures are functioning during the reclamation period. Note: no treatment was provided for areas going to the undisturbed culvert during reclamation, pages 7-1 and 7-2. 26
- R645-301-830.130**, The Permittee did not include a detailed reclamation cost estimate in the amendment. The Permittee informed the Division that the reclamation cost estimate would not be submitted until the reclamation plan was approved. The Division agreed to that procedure. Prior to final approval the Permittee must submit a detailed reclamation cost estimate. 34
- R645-310-553.300**, The Permittee must show how the requirements of R645-301-553.300 will be met. That regulation requires that all coal seams and acid- and toxic-forming materials will be adequately covered to control surface impact or contaminate surface or groundwater. The Division is concerned about the exposed coal seams that are located next to the disturbed area boundaries shown on Map DS1796D sheet 1 of 2 will be covered. 17

ADMINISTRATIVE INFORMATION

APPLICATION FORMAT AND CONTENTS

Regulatory Reference: R645-301-120

Analysis:

The cover letter with this submittal says:

The reclamation plan for the Deer Creek mine has been reformatted to the R645 regulations. The remainder of the permit will follow the same format. The permittee realizes that during the interim, several sections of the Deer Creek permit could possibly contain duplicate or conflicting information. The permittee commits to developing a mine reclamation plan that will expedite the review and inspection processes performed by the Division and other agencies.

It is the intent of PacifiCorp to submit the revised reclamation plan to supercede all mine reclamation references in Volume 2, Part 4 of the current Deer Creek MRP. The revised reclamation plan will remain separate from the current plan. PacifiCorp commits to a total reorganization of the current MRP incorporating the revised plan after approval.

The Division recognizes the difficulty in revising an entire mining and reclamation plan; however, the potential for conflicts with other portions of the plan is of concern. There is the possibility of misunderstandings and enforcement actions if the Division and applicant do not resolve any questions before the applicant completes on-the-ground work.

Findings:

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations. The Division needs to make it absolutely clear that the reclamation plan supercedes other portions of the mining and reclamation plan and may even want to add a stipulation to this effect if or when it issues approval.

OPERATION PLAN

OPERATION PLAN

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

Analysis:

Topsoil Substitutes and Supplements

No topsoil was salvaged at the Deer Creek site, and therefore, construction fills within the surface disturbance area will be used as substitute topsoil. The Deer Creek Mine was developed prior to the Surface Mining Reclamation Control Act (SMRCA) and topsoil was not salvaged or stockpiled during construction and mine development activities. The amendment states that no other topsoil is available for reclamation and that soil material will be obtained from the existing fills within the surface disturbance area.

The existing MRP contains several commitments for obtaining and characterizing substitute topsoil within the Deer Creek Mine surface disturbance area through an exploration, sampling program. The amendment contains an Exploration/Sampling Program for locating Substitute topsoil and characterizing Refuse.

Exploration/Sampling Program - Substitute Topsoil

The exploration/sampling program will be implemented during the reclamation phase of the mine. The purpose of the exploration/sampling program is to locate suitable substitute soil to use as cover material where needed. PacifiCorp states that they are confident that the exploration/sampling program, when implemented, will find that the soils within the Deer Creek and Elk canyons will be suitable topsoil substitute. PacifiCorp therefore assumes that adequate quantities and quality material will be available during culvert excavation. Sampling will be conducted as the soil is excavated and will determine soil suitability based on pH and EC analysis. Therefore, the amendment states that PacifiCorp will determine soil suitability promptly and will immediately stockpile the soil to be used as substitute topsoil.

The Division is unable to make an adequacy determination because several problems exist with the exploration/sampling program as follows:

- The sampling plan only provides for pH and EC analysis. The substitute topsoil must include all analyses listed in **Table 2, Overburden Evaluation for Vegetative Root Zone**, Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining (Leatherwood, 1988).
- Field sampling and survey work must be performed by a Certified Professional Soil Scientist or a

OPERATION PLAN

qualified Soil Scientist. In the latter case, sufficient information must be submitted with the amendment to enable the Division to determine the qualifications of the Soil Scientist for conducting a soil survey according to the standards of the National Cooperative Soil Survey.

Exploration/Sampling Program - Refuse Piles

PacifiCorp proposes to sample the refuse piles located in Deer Creek and Elk Canyons while the mine is still in operation. The amendment states that the purpose for the refuse sampling plan is to determine if the refuse material is acid/toxic forming or if the refuse can be used as substitute soil.

Sampling will be performed using an auger (if possible), shovel, backhoe, or coring tool to collect composite samples at 1 foot depth intervals, and will extend to a depth of 4 feet below the proposed final contour. Sampling sites are identified on Map 2-17 in the Mining and Reclamation Plan, volume 4. Samples will be double sealed in plastic bags and sent to a certified laboratory for analysis using soil suitability criteria found in Appendix A of the Division guidelines for topsoil and overburden. According to the amendment's Table 200-A-3, analyses will include pH, EC, color, texture, SAR Se, boron, acid/base potential, sulfur, calcium carbonate, and organic carbon.

The Division is unable to make an adequacy determination for the refuse sampling plan for the following reasons:

- Map 2-17 could not be located in the amendment nor in the existing Mining and Reclamation Plan.
- The sample density must be statistically based, using a random sample grid pattern, to accurately represent and characterize the refuse piles.
- Field Sampling must be performed by a **Certified Professional Soil Scientist, qualified Soil Scientist, or a qualified professional.** In the later two cases, sufficient information must be submitted with the amendment to enable the Division to determine the qualifications of the Soil Scientist or professional for conducting the sampling.
- Analyses of Refuse does include saturation percent, available water capacity nor rock fragments. Physical characterization of the refuse helps determine suitability of the material to retain moisture and sustain vegetative root growth.

Operational Soil Sampling

The existing Mining and Reclamation Plan commits to an operational soil sampling plan where soil materials from fill slopes will be sampled every 5 years. The 5 year sampling commitment has not been met. The only soil sampling periods included samples taken during 1980 and 1983. Appendix 2-A, Table 2-A-1 lists soil sample analysis for disturbed, undisturbed and coal waste of the Deer Creek Mine area for years 1980 and 1983. The amendment states that soil tests on the disturbed and undisturbed

OPERATION PLAN

Revised: March 13, 2000

areas and coal waste show that the materials in the portal area should support selected vegetative materials with the conclusion that procurement of borrow topsoil for reclamation is not needed. The Division recognizes that the 1980 thru 1983 Operational Sampling took place prior to the Division's 1988 guidelines for topsoil and overburden. However, reclamation standards for soil and overburden are now rated using the 1988 guidelines. Therefore, since sampling did not follow the current 1988 Division guidelines for topsoil and overburden, information in Table 200-A-1 is incomplete as contained in the amendment and does not show that the fill or refuse materials in Deer Creek and Elk Canyons are suitable for achieving the revegetation standards. Further sampling using current guidelines needs to be performed before a determination can be made concerning substitute soil and refuse suitability.

Table 200-A-1 contains erroneous information as follows:

- Sodium Adsorption Ratios are calculated incorrectly for samples 1101, 1105 thru 1122, and DC#1 thru DC#4.
- The "Ca + Mg" column does not contain units.
- Differentiate between total and soluble methods for the Ca + Mg, Ca% and Mg% values.
- Texture class as shown for samples 1101, 1102, 1103, DC#1 and DC#3 are incorrect based on particle size distribution.

Contemporaneous Reclamation - Pre-SMCRA Terraces

The amendment states that a series of soil samples was collected along the pre-SMCRA terraces and access road and tested for soil suitability. A hand held auger was used to collect the samples to document the potential depth of the growth media. Hand augers are extremely inefficient in rocky and non-tilled, hard compacted soil. Therefore, potential depth readings using hand augers is at best, unreliable. Sampling was performed during November 1999. Sampling results are referenced to Table 200-A-2, Soil Sample Analysis Results for Terrace Enhancement Project, as contained in Appendix R645-301-200-A. No analysis results from the November 1999 sampling are included in Table 200-A-2.

Findings:

Information provided in the application is not considered adequate to meet the requirements of this section of the regulations. The applicant must provide the following in accordance with:

R645-301-130, All soil survey work, field sample collecting, and data interpretation must be performed by a qualified Soil Scientist. Sufficient information must be submitted with the amendment to enable the Division to determine the qualifications of the person conducting the soil survey and interpreting the results.

R645-301-120, R645-301-224 and R645-301-233, (Part 1) For substitute topsoil and

OPERATION PLAN

refuse characterization, include all analyses listed in Table 2, Overburden Evaluation for Vegetative Root Zone, Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining (Leatherwood, 1988). The sampling plan only provides for pH and EC analysis for substitute topsoil characterization. Analyses of refuse does include saturation percent, available water capacity nor rock fragments. (Part 2) Sampling as listed in Table 200-A-1 did not follow the current 1988 Division guidelines for topsoil and overburden. Furthermore, Table 200-A-1 contains erroneous calculations and information for SAR, units, and texture. Therefore, information in Table 200-A-1 is incomplete and erroneous as contained in the amendment and does not show that the fill or refuse materials in Deer Creek and Elk canyons are suitable for achieving the revegetation standards. (Part 3) No analysis results from the November 1999 sampling are included in Table 200-A-2.

R645-301-120 and R645-301-521, The refuse sampling plan refers to Map 2-17. Map 2-17 could not be located in the amendment nor in the existing Mine Reclamation Plan.

R645-301-553.252, For the refuse sampling plan, sample density must be statistically based, using a random sample grid pattern to accurately represent and characterize the refuse piles.

RECLAMATION PLAN

RECLAMATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

Analysis:

The Permittee submitted a revised reclamation plan for the Deer Creek Mine on May 26, 1999. The Division reviewed the reclamation plan and made the following general findings.

- The Permittee gave the Division a timetable for all reclamation activities.
- The Permittee did not give the Division a detailed reclamation cost estimate. Before the submitting the revised reclamation plan the Permittee and the Division agreed to allow the Permittee to submit the reclamation cost estimate after the reclamation plan was approved.
- The backfilling and regrading plan has several deficiencies. See the backfilling and regrading section of this TA for details.
- The Permittee did not adequately address how acid- and toxic-forming materials would be handled during final reclamation.
- The Permittee did not include information about the portal closures for the North Meetinghouse portal.

Findings:

Information provided in the proposed amendment is not considered adequate to meet the requirements of this section. Other portions of this technical analysis contain details of the deficiencies.

POSTMINING LAND USES

Regulatory Reference: 30 CFR Sec. 784.15, 784.200, 785.16, 817.133; R645-301-412, -301-413, -301-414, -302-270, -302-271, -302-272, -302-273, -302-274, -302-275.

Analysis:

According to Section 412 of the application, the postmining land uses will be grazing and wildlife habitat, and these are the same as the premining land uses. Both the Forest Service and Bureau of Land Management have indicated no foreseeable changes to this use, and the area is zoned by the county for grazing, mining, and recreation.

Findings:

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations.

APPROXIMATE ORIGINAL CONTOUR RESTORATION

Regulatory Reference: 30 CFR Sec. 784.15, 785.16, 817.102, 817.107, 817.133; R645-301-234, -301-270, -301-271, -301-412, -301-413, -301-512, -301-531, -301-533, -301-553, -301-536, -301-542, -301-731, -301-732, -301-733, -301-764.

Analysis:

In the December 6, 1999 response the Permittee states in the Approximate Original Contour Restoration section the following about highwall elimination:

The highwall elimination plan developed for the highwalls within the Deer Creek drainage system complies with the above mentioned regulations. All highwalls in the Deer Creek area are pre-SMCRA and will be eliminated to the extent practical.

Portals in Meetinghouse Canyon and Grimes Wash have no highwalls associated with them according to the OSM highwall review. Grimes Wash portals are currently being reclaimed with completion scheduled for mid-December of 1999.

The reclamation of the Rilda Canyon breakouts is covered in a separate plan that is referenced in the MRP (Vol. 2, chap. 4 Pages 4-54.1 - 4-54.13).

The highwall elimination plan was a requirement by the Division during the midterm review process (refer to July 16, 1999 Division letter to PacifiCorp). The highwall elimination plan was developed and submitted in August of 1998. By September 4, 1999, the midterm process was completed and a TA filed. On September 14, 1999, the Division sent a letter to PacifiCorp finding the review complete with one exception. The MRP needed to be amended to incorporate the plan into the present mining and reclamation plan.

At that time, PacifiCorp decided to revise the reclamation plan of the Deer Creek Mine since cut and fill quantities could not be justified in the current plan. PacifiCorp contends that the plan complies with R645-301-553.500 and R645-301.600 and intends to include the plan in Appendix R645-301-500-B of the revised reclamation plan.

On February 9, 2000, Wayne Western met with Chuck Semborski to discuss the Deer Creek Reclamation Plan. Wayne told Chuck that the highwall elimination plan had not been approved by the Division. Chuck said he had a letter from Daron Haddock confirming the Division approved the plan. Wayne checked the information in the PIC room and concluded that the highwall elimination plan for

RECLAMATION PLAN

Deer Creek was never formally submitted or approved. The Division did review and agree with a conceptual plan submitted by Energy West. However, the highwall elimination plan was never formally approved. The Permittee may have mistaken the agreement with the conceptual plan to mean formal approval. The following is a chronology of the highwall elimination efforts.

- On March 3, 1998, the Permittee was notified that the Division and OSM found the highwall elimination and retention section of the approximate original contour restoration plan inadequate.
- On July 16, 1998, the Division notified the Permittee, as part of the midterm review, that the highwall elimination plan was deficient.
- On September 4, 1998, Wayne Western completed the midterm review. During the review Wayne reviewed a conceptual plan for highwall elimination submitted by the Permittee. Wayne agreed with the conceptual plan and recommended that the plan be formally submitted for formal review.
- On September 14, 1998, the Division notified the Permittee that the conceptual plan was reviewed and found to comply with the requirements for highwall elimination. The Permittee was informed to file an amendment.
- On August 7, 1998, the Division was notified that the Permittee would submit an amendment dealing with highwall elimination once the midterm was completed.
- On September 14, 1998, the Division informed the Permittee that the midterm had been completed and that they needed to submit the highwall elimination amendment.
- On October 6, 1998, the Permittee requests an extension until June 1, 1998, for submitting the highwall elimination plan. Note: 1998 was a typo in the Permittee's letter.
- On October 14, 1998, the Division granted the Permittee an extension until June 1, 1999, to complete the highwall elimination amendment.
- On September 30, 1999, the Permittee acknowledges the Division's concern to include a highwall elimination plan into the Deer Creek reclamation plan and anticipates completing the revision by December 31, 1999.
- On December 6, 1999, the Permittee submitted the response to technical analysis deficiencies outlined in the midterm review.
- On February 9, 2000, in a conversation between Chuck Semborski and Wayne Western, Chuck said the highwall elimination plan had been approved by the Division. Wayne stated that the plan had not been formally reviewed by the Division. Chuck then said he had a letter from the Division to support his claim.

RECLAMATION PLAN

The Division approved the concept for highwall elimination plan but did not formal review or approve the plan. Before the Division can approve the highwall elimination plan the Permittee must show that 1) the highwalls cannot be reclaimed because of insufficient fill material, or 2) the slopes needed to backfill the highwalls would be too steep to be stable, or 3) the slopes needed to eliminate the highwalls would interfere with the drainage system.

- The Permittee does not have adequate cut and fill quantities for the Deer Creek mine, see December 6, 1999, response, page 8. Without adequate cut and fill quantities the Division cannot make a finding about insufficient fill material as required by R645-301-553.610.

On Drawing DS1783D, Stations 21+00 to 23+00 show highwall remnants after final reclamation. The proposed angles for reclaimed slopes for those sections are not greater than 16°. The highwalls could be eliminated with slopes not greater than 20°. If more fill material is available the Permittee could eliminate the highwalls.

- The Division is aware of the difficulty in reclaiming coal mines that are in steep canyons. Establishing the adequate drainage patterns can limit the areas that can be backfilled. If the Permittee claims that highwall elimination would result in an inadequate drainage system then they would need to show that relationship. See R645-301-553.520.
- The reclaimed slopes proposed by the Permittee are straight. The Permittee could probably reclaim more of the highwalls if they used concave slopes. By using concave slopes, the Permittee could compensate for lack of fill material or slope stability factors. On Page 9 of the December 6, 1999 submittal, the Permittee states that they have not yet calculated slope stability factors for the reclaimed sites. Without that information the Division cannot allow highwall retention based on slope stability. See R645-301-553.500.

On Page 9 of the December 6, 1999, submittal, the Permittee states that the refuse piles will be exempt from approximate original contour requirements based on R645-301-537, settled and revegetated fills. In a conversation between Dennis Oakley and Wayne Western, the issue of settled and revegetated fill was discussed. Since the Permittee plans to disturb the slopes of the refuse piles during final reclamation, the provisions for settled and regraded fill do not apply. Dennis agreed to remove reference to settled and regraded fills from the reclamation plan.

Findings:

Information provided in the proposed amendment is not considered adequate to meet the requirements of this section. Prior to approval, the Permittee must provide the following in accordance with:

R645-301-553.500 and R645-301-553.600, The Permittee must demonstrate that the reclamation plan will eliminate all highwall to the extent practical. If highwall remnants are to be left then the Permittee must show that 1) the amount of fill material is insufficient to reclaim the highwalls, or 2) highwall elimination would

RECLAMATION PLAN

interfere with reestablishing the drainage system, or 3) highwall elimination would result in slopes that do not meet the stability requirements.

R645-301-537, Since the Permittee plans to disturb the refuse pile during final reclamation they must remove references to using the settle and regraded fill provision from achieving AOC.

BACKFILLING AND GRADING

Regulatory Reference: 30 CFR Sec. 785.15, 817.102, 817.107; R645-301-234, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

Analysis:

Slope stability

On Page 9 of the December 6, 1999, submittal, the Permittee states:

PacifiCorp attempted to perform slope stability analysis in-house. Due to project priorities and scheduling restrains in-house analysis has not produced any data. PacifiCorp is currently attempting to out-source this project and commits to adding all this data and information as it becomes available. This will need to be completed as a separate amendment.

The Division has concerns about how the original slope stability analysis was done. The Permittee used the stability charts from Rock Slope Engineering to show that the reclaimed slopes would be stable. The charts are based on the assumption that the material in the slope is homogeneous. The Permittee needed to show that the failure surfaces would occur in homogeneous material (provide detailed cross sections). Information in the approved MRP and the amendment show, some slopes will not have homogeneous soils. For example the refuse piles will be covered with material that may have different properties than the refuse. The stability charts are also based on the assumption that the failure surface will be circular. The Permittee must address the possibility that non circular failure could occur.

The slope stability analyses were done under the assumption that the soil was unsaturated. There are at least two sources of groundwater in the areas to be backfilled, the seeps by the French drains and the intake portal. The Permittee must analyze the slope for saturated conditions or show why they would remain unsaturated.

Settled and Revegetated Fills

The Permittee states, on Page 9 of the December 6, 1999, submittal the Permittee states that the refuse piles will be exempt from approximate original contour requirements based on R645-301-537, settled and revegetated fills. In a conversation between Dennis Oakley and Wayne Western, the issue of settled and revegetated fill was discussed. Since the Permittee plans to disturb the slopes of the refuse

RECLAMATION PLAN

piles during final reclamation, the provisions for settled and regraded fill do not apply. Dennis agreed to remove reference to settled and regraded fills from the reclamation plan.

Exposed coal seams, acid- and toxic-forming materials

The Permittee stated on Page 5-9 of the May 26, 1999, submittal that the refuse pile would be covered with less than 4 feet of material. However, on Page 3-67 of the approved MRP, the Permittee committed to cover the refuse piles with 4 feet of materials. The Permittee did not show that the refuse piles needed less cover. Information in the MRP shows that some areas of the refuse piles have high acid-forming potential.

On Page 10 of the December 6, 1999, submittal, the Permittee states:

PacifiCorp commits to a sampling program of the refuse piles at the Deer Creek Mine. Analysis will be conducted as outlined in the Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining (Leatherwood and Duce, 1988). The reader should refer to R645-301-200: Soils, Sampling Procedure for Refuse Piles for a full explanation of sampling at the Deer Creek Mine.

The Permittee did not address the cover requirements for exposed coal seams and acid-and toxic forming materials. The Division's concerns are 1) the acid and toxic forming material in the refuse pile might not be covered with 4 feet of material, and 2) the exposed coal seams that are found next to the disturbed area boundaries shown on Map DS1796D sheet 1 of 2 may not be adequately covered.

Minimize erosion and water pollution:

The Permittee did not address how erosion and water pollution would be minimized. The proposed slopes in the amendment are straight. Slopes that are concave tend to reduce erosion and minimize water pollution better than straight slopes. The Permittee must show that straight slopes will minimize erosion and water pollution before approval of the backfilling and grading plan.

Findings:

Information provided in the proposed amendment is not considered adequate to meet the requirement of this section. Prior to approval, the Permittee must provide the following in accordance with:

Slope stability

R645-301-552.130, The Permittee must give the Division detailed calculation for the slope stability analysis.

Settled and Revegetated fills

R645-301-537, The Permittee must remove the reference to settled and revegetated fill

RECLAMATION PLAN

being left since the backfilling and regrading plan shows that all settled and revegetated fill will be disturbed during final reclamation.

Exposed coal seams, acid- and toxic-forming materials

R645-301-553.300, The Permittee must show how the requirements of R645-301-553.300 will be met. That regulation requires that all coal seams and acid- and toxic-forming materials will be adequately covered to control surface impact or contaminate surface or groundwater. The Division is concerned about the exposed coal seams that are located next to the disturbed area boundaries shown on Map DS1796D sheet 1 of 2 will be covered.

Minimize erosion and water pollution

R645-301-553.140, The Permittee did not show how erosion and water pollution would be minimized. The proposed slopes are straight rather than concave. Concaved slopes tend to minimize erosion more that straight slopes.

MINE OPENINGS

Regulatory Reference: 30 CFR Sec. 817.13, 817.14, 817.15; R645-301-513, -301-529, -301-551, -301-631, -301-748, -301-765, -301-748.

Analysis:

The portals will be sealed after the mine has been shut down. The general portal closure plan is shown on Figure 5-1. A block seal will be placed in the portal 25 feet from the entrance and then backfilled. The general portal sealing and backfilling plan is adequate for all portals in the Deer Creek site except the intake portal.

The intake portal is located down dip from the aquifers. The Permittee does not want to place a hydrologic seal in the portal because the surrounding rock is fractured and water would seep around the seal. The Permittee will place pipes behind the seal and let the water flow through the pipe into the stream channel.

On Page 10 and 11 of the December 6, 1999 submittal the Permittee states:

PacifiCorp commits to incorporating the North Meetinghouse portal reclamation plan when the plan is developed. This plan will also be inserted into Appendix R645-301-500-B

The Permittee needs to include the portal reclamation plan for the North Meetinghouse area.

Findings:

RECLAMATION PLAN

Information provided in the proposed amendment is not considered adequate to meet the requirements of this section. Prior to approval, the Permittee must provide the following in accordance with:

R645-301-551, The Permittee must give the Division portal closure plans for North Fork Meetinghouse Canyon.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Analysis:

Soil Redistribution

The amendment states that reclamation will involve three disturbed areas: Deer Creek Canyon, Deer Canyon, and Elk Canyon. The Deer Creek mine site disturbed area will be reclaimed by redistributing soil and spoil by cutting and/or filling the existing mine site footprint. Reclamation will be completed sequencing activities from top to bottom, thus minimizing construction equipment travel over redistributed material. As re-contouring is completed, salvaged substitute topsoil material will be evenly distributed. The soiled surface will be roughened by deep gouging (pocking) by using a trackhoe to create depressions approximately 3' dia x 1.5' deep. The amendment states that these depressions will be developed throughout the reclaimed area and will influence moisture retention and greatly reduce sediment loss.

Table 3-1, Reclamation Schedule, and Section R645-301-541 General, do not list soil exploration/sampling and salvage; nor does the table list soil replacement.

Soil Nutrients and Amendments

The amendment identifies on-site fills as possible substitute topsoil. The exploration program assumes that adequate quantities of substitute soil is available, but gives no estimated volumes and cover depths for the reclaimed site. If adequate quantities of substitute soils cannot be procured on-site, then a backup plan supplying borrow substitute soils needs to be addressed.

Soil Stabilization

After topsoil distribution, the surface will be roughened by deep gouging. Deep gouging creates depressions across the surface which increases water harvesting and helps reduce surface erosion. In addition, rock litter consisting of various sized rocks and boulders will be randomly placed on the slopes and/or nested into the soil to help control slope slippage. On slopes greater than 20%, a soil tackifier will be used to help stabilize surface soils. The biology section R645-301-341, Revegetation, states that tackifier will be applied at a rate of 500 lbs/ac to cover the straw mulch and stabilize the soil and will be

RECLAMATION PLAN

applied as contemporaneously as possible. The soil commitment to apply tackifier mainly on slopes greater than 20% appears to be in conflict with the biology commitment to apply tackifier where ever straw mulch is used to stabilize all soil surfaces.

Rills and gullies which develop to a depth of nine inches or greater in areas that have been re-graded and topsoiled and which either; (1) disrupt the approved post-mining land use or the reestablishment of the vegetative cover, or (2) cause or contribute to the violation of water quality standards for receiving streams will be filled, re-graded, or otherwise stabilized. The topsoil will be replaced and the areas will be re-seeded.

Refuse Pile Reclamation

The MRP states that refuse within the Deer Creek Portal surface disturbance area will be used as substitute topsoil, in some cases be covered by less than four feet of material, based on analyses for toxic and acid forming properties.

Within the MRP's Chapter 3, page 3-65, Table 7, Deer Creek Mine - Waste Rock Analysis, several problems are identified associated with materials taken from roof and floor materials. Data is incomplete since no determinations were made for selenium or for Acid Base Potential.

The Division cannot make a determination of waste acceptability. The amendment Table 2-A-1, lists several samples taken in 1980 and 1983 for Coal Waste. However, numerous errors exist within the data and analyses are incomplete and do not follow the Division's Guidelines for Topsoil and Overburden. Furthermore, unacceptable criteria are identified for Blind Canyon floor samples for SAR and pH, and poor criteria are met on Blind Canyon split samples for SAR and on Hiawatha floor samples for pH. Therefore, since data errors exist, data is incomplete, and roof and floor analyses identify toxicity, the Division cannot make a determination of waste acceptability. Until further sampling and data are supplied, the worst case scenario must therefore be assumed and the refuse piles and coal mine waste be covered with a minimum of four feet of the best available, nontoxic and noncombustible material.

Findings:

Information provided in the application is not considered adequate to meet the requirements of this section of the regulations. The applicant must provide the following in accordance with:

R645-301-553.252 and R645-301-233, Since data errors exist, data is incomplete, and roof and floor analyses identify toxicity, the Division cannot make a determination of coal waste and refuse acceptability. (1) All refuse and coal mine waste must be covered with a minimum of four feet of the best available, nontoxic and noncombustible material. (2) Refuse may not be used as substitute topsoil.

R645-301-120, Table 3-1, Reclamation Schedule, and Section R645-301-541 General, do not list soil exploration/sampling and salvage; nor does the table list soil replacement.

RECLAMATION PLAN

R645-301-232.720 and R645-301-350, The exploration program assumes that adequate quantities of substitute soil is available, but gives no estimated volumes and cover depths for the reclaimed site. The application needs to contain a commitment to develop a backup plan supplying borrow soils if adequate quantities of substitute soils cannot be procured on-site.

R645-301-120 and R645-301-244, The soil commitment to apply tackifier mainly on slopes greater than 20% appears to be in conflict with the biology commitment to apply tackifier where ever straw mulch is used to stabilize all soil surfaces.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 701.5, 784.24, 817.150, 817.151; R645-100-200, -301-513, -301-521, -301-527, -301-534, -301-537, -301-732.

Analysis:

The Permittee plans to reclaim all roads at the Deer Creek mine site. They also plan to reclaim the access road for the C1 and C2 belt line.

Findings:

The Permittee met the minimum requirements of this section.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Ground-water Monitoring

According to Table 3-2, Section 34, the applicant proposes to monitor the flow from the mine portal biannually during the spring and fall, and will monitor according to the UPDES permit for five years following reclamation. This is not adequate for bond release purposes for the following reasons.

1. The UPDES permit requirements do not monitor for water quality according to all Federal and State Standards (For Huntington Creek and tributaries these standards are: Class 2B, Class 3C and Class 4 criteria and any associated criteria for the post-mining land use); therefore, the proposal is not adequate for the Division to determine that the waters meet all state and federal

RECLAMATION PLAN

water quality criteria.

2. Although the baseline parameters will provide analysis for most of the state standards, monitoring in the 5th and 10th years may fail to cover significantly different climatic periods. Obtaining 2 sets of data will not provide a statistically valid data set and it may be to the operators disadvantage if the final data set exceeds the water quality criteria for a particular parameter.
3. Biannual monitoring may not be adequate to show the seasonal variation that may exist.

The void created by mine workings may redirect water and result in new discharge locations within or below the mined seam at low points and outcrop locations. The plan provides for a spring survey to locate water that may issue from the areas down dip along and below the mined seam. The survey is proposed to be conducted during the 5th and 9th years following mine reclamation and is also stated to be conducted annually during the ground subsidence surveys. Commonly, subsidence surveys are conducted for two years following longwall mining but, the duration for subsidence monitoring over the reclamation period is not mentioned in this amendment. The amendment should include water quality and quantity monitoring for any springs that may issue from these areas along and below the mined seam which accumulate in a measurable stream.

This amendment also suggests water will be discharged through the Deer Creek Portal. Some reference points provided in Table 5-2 identify elevations which will act to control postmining groundwater flow gradients. Because numerous locations were identified in the plan to have a potential to receive minewater discharge, the Division requested the applicant to submit a map showing the flow directions and groundwater divides/watersheds for each mined seam. The existing map CE-10478-EM does not differentiate between alluvial and groundwater aquifers or the changes in flow predicted to occur due from mining. Although some pertinent information is contained in the existing plan it is scattered and does not provide a clear picture of the potential ground water recharge and discharge zones. Where boundary faults were crossed by mining a pre-existing hydrologic barrier may now transmit water. The information presented on the maps should include existing mine floor elevations, in-mine water source locations, pertinent geologic controls, and other controls such as sealed mine sections and changes to any previously existing hydrologic barriers.

Volume 9, pg 17, states that a series of wells in the Deer Creek and Cotton Wood/Wilberg Mine (HM-2 and HM-3) will continue and be utilized to document potential impacts related to groundwater dewatering and recovery from mining. According to information included in the cover letter December 6, 1999, these areas are in-mine wells and access will be disrupted at the end of mining. It is not understood how water recovery following mining will be obtained from these sites.

Specific water monitoring points for sediment production are proposed for two locations above the mine and one location below the mine disturbance. The applicant proposed to report this information annually (page 3-7); however, regulatory requirements are to submit the data quarterly. Proposed locations should be provided on a water monitoring map.

RECLAMATION PLAN

In Volume 9, Appendix C the permittee provided a study conducted after dewatering the Roans Canyon Fault in the Cottonwood Canyon. The Cotton Wood Spring was suspected to be impacted by mining when water was intercepted along the fault: the water was believed to have previously provided recharge to Cottonwood Spring. Subsequent to minewater interception, the mine and consultants concluded that the hydrologic system in the lower Cottonwood Canyon and lower Blackhawk Formation were independent hydrologic systems. According to the application this finding was supported by the Division in a letter dated October 27, 1998. This letter was reviewed and no such confirmation could be found; however, the Division did indicate the citizens complaint from Mr. Peacock, was satisfied.

The information used to support the determination that the Star Point formation and the Cottonwood Spring are separate hydrologic groundwater systems was is obtained from well CCCW-1S. Although the information presented might adequately describe the current conditions, the elevation of water in this well was below and remained below the spring elevation over the study period. Additionally, the data was gathered after hydrologic changes from mining could have already occurred and the well water elevation does increase and decrease over the mine dewatering period similar to the inverse of the minewater discharge pattern. During mining, water is discharged through the portal or controlled by pumping to sumps, following mine closure these conditions will no longer exist. This well is located up-gradient from the trough of the Straight Canyon Syncline and down-gradient from the mine. Similar fracture flow in the Star Point could occurred near the Cottonwood Spring. Because monitoring is conducted to determine whether effects from mining occur through the reclamation period and to further validate the applicants earlier findings monitoring of this area should continue.

During the monitoring period the Star Point Aquifer at well CCCW-1S increased and decreased inversely to the minewater discharge pattern. The applicant indicated the flow in this well is separate from the alluvium and the upper Blackhawk formation but, flow is fracture controlled. If a similar fracture in the Star Point formation was in hydrologic connection with the Roans Canyon Fault prior to mining, the fault may have contributed to the spring flow. The applicant needs to provide a water monitoring plan that: 1) determines whether changes in groundwater flow will occur during the time mining has idled, and 2) determines whether baseflow quantity and quality to the Cottonwood Canyon Stream varies with observed changes in groundwater over the reclamation period. In order to confirm conclusions made in the Cottonwood Canyon study, and to identify the difference between changes due to climate or from ground water discharge, the following age dating should be conducted in the Cottonwood Canyon wells every 2nd year during the low flow period; radio carbon dating, tritium dating, and stable hydrogen and oxygen isotopes (for meteoric waterline determinations). This should be completed in conjunction with streamflow quantity and quality monitoring.

Surface-water Monitoring

The applicant needs to provide a surface water monitoring plan that determines whether changes in flow result during the time mining has idled. In order to identify the difference between changes due to climate, or from mine water discharge, the following age dating should be conducted every 2nd year during low flows; radio carbon dating, tritium dating, and stable hydrogen and oxygen isotopes (for meteoric waterline determinations) in Cottonwood Creek below well CCCW-1S. In conjunction a standard monitoring program for streamflow should be developed for the reclamation period.

RECLAMATION PLAN

The macro-invertebrate study conducted in 1991 was recommended, by the Division, to be repeated in Deer Creek and Huntington Creek in the spring and fall, the year before reclamation, and in the 5th and final year prior to bond release to allow assessment as to whether impacts to fisheries occurs, improves, or remains insignificant over the reclamation period. The applicant indicated, in the December 6, 1999 cover letter to the application, the results from monitoring conducted in 1990, 1991, 1992 and 1994 showed no differences in macro-invertebrate densities in Huntington Creek and the applicant indicated additional studies are not warranted.

According to the memo attached to this amendment, reclamation monitoring will be submitted as a separate amendment in Appendix A , Volume 9.

Acid and Toxic-forming Materials

The applicant has stated that no acid and toxic-forming materials are located at the site. Further discussion can be found in the soils technical analysis.

Transfer of Wells

A discussion on the transfer of wells was not found in this amendment but might be located in other sections in the plan.

Discharges Into an Underground Mine

No discharges into an underground mine are proposed by the applicant.

Gravity Discharges

Water will be gravity discharged out of the Deer Creek Portal. The applicant designed this discharge with a french drain system using a sand filter behind the portal and four 6" pipes. A concern was raised about calcium carbonate precipitation from minewater and a potential for the discharge system to plug with precipitate; therefore, the applicant added additional pipes.

Water Quality Standards and Effluent Limitations

The applicant has not described how the State Water Quality Standards for Deer Creek and Huntington Creek will be shown to meet water quality criteria. The applicant needs to provide a water monitoring plan that demonstrates that the water quality criteria for groundwater and surface water are met so the Division can make a finding for Bond release.

The applicant provided estimates for annual sediment contributions to Deer Creek from the watershed contributing runoff through the disturbed area. The K-factor used in table 7-4 and the K factor identified within the text are not the same value, and there are errors in addition in the table. Calculations and assumptions used to determine the K-factor in the disturbed area should be presented.

RECLAMATION PLAN

Diversions

The ephemeral draws adjacent to the Elk Canyon drainage were developed with the grading plan and channel design (see: DS1797D). The ephemeral draw below the Terrace Enhancement Project area and adjacent to the South Fork Deer Creek drainage will probably collect and convey water. The drainage to this draw is not significant enough to require a diversion design but, land form changes should be provided to minimize erosion and promote stability in this area. Areas that tend to collect water cause gully formation when the grading plan does not consider flows from these locations.

The design capacity for perennial and intermittent streams need to be demonstrated to be at least equal to the unmodified channel upstream and downstream from the diversion. This requirement can be met through providing channel cross sections upstream and downstream from the site and estimating channel forming flows. Channel cross sections were provided but, estimated channel forming flow was not. Designs for channel transitions between the upstream and downstream natural channel to the reclamation channels also need to be provided. A commitment was also made to use various soft bioengineering methods but, design and implementation information was not provided.

The applicant adjusted the channel location to minimize the potential for destabilizing the cut slope across from the Mine Office and Bath House. This area was predisposed to failure in 1992 when a tension crack was developed due to ponding water along the diversion ditch.

The applicant provided riprap and granular filter material designs for the riprapped reclamation channels. Maps were certified but designs were not. Design changes are commonly requested to be submitted with a cover page to certify the designs.

Stream Buffer Zones

The applicant has to demonstrate that all other state requirements for stream channel reconstruction are met prior to reconstruction.

Sediment Control Measures

The applicant proposes to begin reclamation at the upstream end of the site working downstream. In Deer Creek the culverts will be removed and water will be diverted around the construction area using a 12" flexible culvert and discharging to the downstream location. Roughening, mulching, and seeding will be conducted prior to routing the water to the completed channel and removing the next section (pg. 7-1). The activity will then be repeated in the next section. If water is present in Deer Creek Canyon, it will be routed around the construction with a flexible culvert to the undisturbed culvert drainage.

Disturbed runoff treatment measures below reclamation construction will remain intact to treat runoff. The application indicated a sediment trap would be used before the culvert inlet where water is routed to the disturbed area culvert. It is then treated by the pond. However the plan provides no treatment for areas going to the undisturbed bypass culvert (pages 7-1 and 7-2).

RECLAMATION PLAN

Specific information, maps, design detail, and maintenance information for the silt fences and other sediment control measures needs to be provided.

Siltation Structures

See sedimentation ponds.

Sedimentation Ponds

According to page 7-1, the applicant states the sediment pond will be removed after all other reclamation work is completed to ensure that runoff is treated before leaving the disturbed area. A maintenance plan and commitments need to be provided to assure BTCA measures are functioning during the reclamation period.

Other Treatment Facilities

No other treatment facilities are proposed for the reclamation phase.

Exemptions for Siltation Structures

No exemptions from sediment control measures were requested. BTCA measures will be used to control sediment. See sediment control measures above.

Discharge Structures

No discharge structures associated with impoundments are proposed for the reclamation period. The existing discharge structure associated with the sedimentation pond will be used temporarily during reclamation construction.

Impoundments

See sedimentation ponds.

Casing and Sealing of Wells

The applicant stated that each well will be cased, sealed or otherwise managed, as approved by the Division.

Findings:

The plan does not meet minimum regulatory requirements for this section. The permittee must provide the following in accordance with:

R645-301-731, Provide a monitoring plan specific to reclamation that: 1) includes water

RECLAMATION PLAN

quality and quantity monitoring, where flow accumulation is measurable, as determined by with the spring survey to be conducted in the 5th and 9th year following reclamation, 2) demonstrates mine water discharge will meet the criteria for water quality appropriate for the post-mining land use and in accordance with the state and federal standards (For Huntington Creek and tributaries the state standards are: Class 2B, Class 3C and Class 4 criteria), 3) commits to submit the water quality and quantity data quarterly.

R645-301-731.221, Provide a monitoring plan specific to reclamation that: 1) assures impacts to hydrologic balance are prevented, 2) clarifies how underground water recovery will be determined from the monitoring of HM-2 and HM-3, 3) describes how the State Water Quality Standards, Utah Administrative Code R317-8, for the Deer Creek, Huntington Creek, and any other stream receiving minewater discharge will be shown to meet federal and state water quality standards.(The Division recommends a minimum high and low flow season monitoring for selected parameters over the full period of reclamation. Parameters should be reflective of all potential in-mine contaminants), 4) includes a map that differentiates between alluvial and groundwater gradients and identifies; flow direction and groundwater divides in the permit and adjacent area for each mined seam, existing mine floor elevations, in-mine discharge locations, pertinent geologic controls, mine controls such as sealed mine sections, and changes to previously existing hydrologic barriers, 5) provides a water monitoring plan that; a) determines whether changes in groundwater hydrology will occur along the Straight Canyon Syncline during the time mining has idled, b) determines if the groundwater hydrology changes affects baseflows to the Cottonwood Canyon Stream, c) identifies the difference between changes due to climate, or from ground water discharge by including age dating to be conducted every 2nd year during the low flow period for; radio carbon dating, tritium dating, and stable hydrogen and oxygen isotopes (for meteoric waterline determinations) in the Cottonwood Canyon wells and Cottonwood Creek streamflow below well CCCW-1S, and d) identifies all reclamation monitoring sites on a map.

R645-301-742.314, 1) Provide designs for the channel transitions between the upstream and downstream natural channel and the reclaimed channel, and for the proposed soft bio-engineering methods, 2) demonstrate the design capacity for perennial and intermittent streams are at least equal to the unmodified channel upstream and downstream from the diversion.

R645-301-512, Provide certified designs: hydrologic designs can be certified in a cover page attached to the designs.

R645-301-742, Provide specific information, maps, design detail, and maintenance information for the silt fences and other sediment control measures and include a maintenance plan and commitments to assure BTCA measures are functioning during the reclamation period. Note: no treatment was provided for areas going to the undisturbed culvert during reclamation, pages 7-1 and 7-2.

RECLAMATION PLAN

R645-301-512.200, Correct or provide the following: 1) the K-factor used in Table 7-4 should be the same as the K-factor identified within the text, 2) correct the calculation errors in table 7-4, 3) present the calculations and assumptions used to determine the K-factor within the disturbed area, 4) present the calculations and assumptions used to determine Manning's 'n' for the riprap channel designs.

REVEGETATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.111, 817.113, 817.114, 817.116; R645-301-244, -301-353, -301-354, -301-355, -301-356, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

Timing

Table 3-1 shows the timing of various steps in reclamation, and Table 3-2 is a schedule of monitoring activities. The reclamation timetable does not show months in which the activities would occur, but a note below the table discusses the timing of seeding and planting more specifically. Advantageously, seeding will occur in the fall, but if recontouring is completed in the spring on the upper portions of the disturbed area, seeding will follow. Tree and shrub plantings will occur in early spring.

The seeding and planting schedule is acceptable, but the applicant should attempt to seed as much of the area as possible in the fall. Grading cannot usually begin in the spring until the ground has dried to some degree, and by this time, seeding would be very risky.

Although spring is recognized as a good time to plant seedlings, other operators have had good success planting containerized stock in the fall, particularly at mid- or higher elevation sites that are likely to have some snow cover for much of the winter. Snow cover reduces frost heaving.

The application is not required to have a revegetation monitoring schedule, but the schedule shown should be adequate for showing revegetation success for bond release.

Mulching and Other Soil Stabilizing Practices

Sections 240 and 340 discuss soil redistribution and surface preparation. As areas are recontoured and topsoil is distributed, they will be roughened by discontinuous tilling and/or deep gouging with a trackhoe bucket or similar equipment. Pocking will incorporate fertilizer and one ton per acre of certified noxious weed free alfalfa hay. Where feasible or helpful to prevent slope slippage, rocks and boulders will be randomly placed on slopes. These methods are designed to control slope slippage, reduce runoff and erosion, promote microhabitats, and provide a more aesthetically-pleasing appearance.

The applicant has revised the three seed mixes in the mining and reclamation plan and has followed Division recommendations. Every species in the mixtures is native to the area, and the mixtures are diverse and should lead to vegetation stands that comply with the revegetation performance standards. Drawing DS-

RECLAMATION PLAN

1797-D shows which seed/planting mixes will be planted in which areas of the mine.

Seed will be applied with a hurricane spreader or with a hydroseeder. If the area is hydroseeded, a small amount of wood fiber mulch will be added to mark the coverage area. These are standard techniques and are acceptable.

After seeding, certified noxious weed free straw mulch will be applied at the rate of one ton per acre followed by application of a tackifier at the rate of 500 pounds per acre. The tackifier will serve to anchor the mulch and also to stabilize the soil. At least two other coal mines in Utah have used a similar mulching technique with good success. The applicant should not use an asphalt-based tackifier.

The soils section of the application indicates tackifier would mainly be applied on slopes steeper than 20%. This discrepancy with the biology section of the application needs to be corrected, and a deficiency is included in the soils reclamation plan section of this technical analysis.

Two of the seed mixes include some combination of containerized plants, cuttings, rooted cuttings, bare root plants, and poles. In the riparian areas, 25% of each of these would be planted during each of the first four years. This allows some sedimentation and development of suitable planting sites to occur before all the seedlings are planted. In the Division's experience, there are not always enough places to plant along a restored stream during the first year after reclamation.

The concept of not planting all of the transplants at first was suggested by the Division, but the applicant needs to be aware it would lead to a longer extended responsibility period. The success standard for woody plants in the riparian area is 3412 per acre. Rule R645-301-357.311 allows planting trees or shrubs at a rate of up to a cumulative total of 20% of the required stocking rate through 40% of the extended responsibility period without restarting the extended responsibility period. Therefore, up to 682 trees or shrubs per acre could be planted for the first four years after the initial planting without affecting the extended responsibility period. According to the application, however, about 1014 per acre would be planted each of the first four years for a total of about 3042. This, of course, is much greater than 682.

The applicant is required by R645-301-358.400 to enhance where practicable, restore, or replace, wetlands and riparian vegetation along rivers and streams and bordering ponds and lakes. Since these areas are considered habitat of unusually high value, the applicant needs to use the best technology currently available to achieve these goals. Deer Creek above and below the mine supports a riparian community that needs to be restored as far as possible. The seed and planting mix contains many of the species assumed to have been in the riparian area before disturbance as shown in Table 6, page 2-156, of the current mining and reclamation plan. Many of the species in the seed and planting mix are upland species, but there are other species in the mix that would grow strictly in areas with enhanced moisture availability.

The *Interagency Forage and Conservation Planting Guide for Utah* indicates forbs do not normally need to be planted in riparian areas because, with proper management, they will come in on their own. Some forbs have been included in the seed mix, but these are species that would normally grow in more xeric upland sites rather than true riparian areas. It is anticipated that seeds of sedges, rushes, broadleaf forbs, and other plants would be washed into the riparian area from areas above the mine.

RECLAMATION PLAN

Revised: March 13, 2000

In Section R645-301-342, the application says channel designs will incorporate soft bioengineering in slope areas of less than 5% along the Deer and Elk Creek drainages. Instead of riprap, alternative instream controls, such as wing deflectors, boulder clusters, and "U" or "V" shaped weirs, will be used. The application, however, does not include designs for these features. Instead, Drawing DS-1780-D in the hydrology section shows traditional riprap designs for the full lengths of these channels.

While it is probably possible to restore the riparian habitat without using soft bioengineering techniques, the methods discussed in the application would probably give good results. The Division encourages the applicant to pursue incorporating these designs into the mining and reclamation plan.

The application does not discuss irrigation, so it is assumed the reclaimed area will not be irrigated. However, Appendix R645-301-200-A indicates irrigation water is available. If the applicant intends to irrigate reclaimed areas, this need to be made clear.

Rodent control measures will be implemented as necessary. Weed control will not be done unless it is necessary, but all noxious weeds will be eradicated if they become established on the site. The Division does not anticipate that irrigation or pest control will be needed except for noxious weeds. The husbandry practices in R645-301-357 allow control of noxious weeds through the entire extended liability period.

The application says rills and gullies will be filled and the soil reseeded. For repaired areas larger than 15% of the total reclaimed area, the Division will be notified and the affected area will be reported in the annual report. Repairs and seeding of up to 15% of the area is allowed for the first two years of the responsibility period without restarting it. After two years, seeding this large of an area would increase the length of the extended liability period. This is not considered a deficiency in the application, but the applicant needs to be aware of the potential problem.

Standards for Success

The current mining and reclamation plan contains information about three reference areas that will be used as revegetation success standards. It appears from the data and comparisons in the plan that these reference areas are acceptable.

The application discusses ways of measuring vegetation cover, productivity, and the density of woody plants. It also mentions the statistical tests that will be used, and these methods are acceptable.

The Division is required to consult with the Division of Wildlife Resources (DWR) about woody plant density success standards. In many cases, the numbers of woody plants in reference areas are not ideal for the type of habitat sought. When measured in 1980, the mixed conifer, pinyon juniper, and riparian reference areas had 3320, 584, and 3412 woody plants per acre, respectively. These are considered acceptable standards for these areas.

The application says revegetation for tree and shrub species will be considered successful when the tree and shrub counts in the reclaimed areas are similar to the counts in the reference areas. It is not clear from this statement whether the applicant intends to use the baseline data in the current plan as the standard or if the numbers of woody plants will be remeasured when the applicant is seeking final bond release and that this new value will be used as the standard. If the baseline data is to be used, the applicant should show

RECLAMATION PLAN

the numbers in this section of the application (see previous paragraph). If the applicant intends to use data gathered at the time of seeking final bond release, the application needs to indicate the standards will be approved by DWR and the Division at that time.

The Revised Universal Soil Loss Equation (RUSLE) will be used to model sediment loss from disturbed and reclaimed areas, and sedimentation will be monitored above and below the mine. While there are difficulties and problems with every method developed for measuring erosion, those discussed in the application are acceptable.

The application says the success standard for determining diversity will compare cover, density, and production of the reclaimed area to the reference area. The reclaimed area will achieve at least 90% of the reference area and a 10% margin of error in the mean. At least 80% of the plants will have been in place for at least 60% of the responsibility period. This standard does not measure diversity, only cover, density, and production.

It is important that the plan discuss at least one acceptable method of measuring diversity and that it include a success standard for this method. Without an approved method and standard, both the Division and the person seeking bond release must arbitrarily decide whether a site meets bond release criteria.

Seasonality of established plant species is an important issue at some mines, but most or all of the species encountered in the vegetation sampling at Deer Creek were cool season species. These are generally much easier to establish than warm season species, so seasonality should not be a concern. To achieve revegetation success, essentially all of the species in the reclaimed area should be cool-season.

The other requirements in R645-301-353 would be very difficult to measure quantitatively, so a qualitative analysis at the time the applicant is seeking bond release is most appropriate.

Field Trials

The applicant has not proposed field trials, and they may not be needed. There are several ambiguities in the application that need to be resolved before the Division can determine if field trials are necessary.

At this time, the Division cannot make a finding that revegetation is feasible using the proposed reclamation plan. The applicant has not presented a definitive soils reclamation plan. The application says, in effect, that soils and refuse material will be sampled at the time of reclamation, and the applicant and Division can then determine how much suitable soil is available and the nature of the refuse. The application does contain some analysis results for some soils and refuse, but, as discussed in the technical analysis for soils, there are problems with these results that make them unreliable.

It is vital that there be adequate suitable soils for revegetation. Most perennial species in Utah have relatively deep roots so they can extract water from increasing depths as the summer progresses. If root growth is inhibited by poor chemical or physical characteristics or if the soil has low water holding capacity, vegetative cover, production, diversity, and erosion control will all suffer.

Fish and Wildlife Habitat

RECLAMATION PLAN

The seed mixtures in the application are acceptable for providing proper habitat conditions for wildlife.

According to the application, development of enhanced wildlife habitat is accomplished by constructing pools along portions of the Deer Creek drainage, and pools will be placed at the confluences of the drainages from Deer and Elk Canyons with Deer Creek.

No other enhancement measures are discussed in this section of the application, but the application says rocks and boulders would be placed on the surface. This enhancement method has been used successfully at other mines to create habitat for birds and small mammals.

The application discusses possible water discharge from the portal after reclamation. In the July 7, 1999, technical analysis, the Division required a program to study the effects of the discharge on macroinvertebrate populations in Deer Creek and Huntington Creek. The applicant responded in the cover letter for the current proposal that it believes there is no justification to perform a macroinvertebrate study before or after reclamation.

Volume 9A of the current mining and reclamation plan contains a report from the Ecosystem Research Institute about the water quality and macroinvertebrate studies done in Deer and Huntington Creeks in 1990, 1991, 1992, and 1994. The report concludes the water discharge from the Deer Creek mine had no measurable effects on the macroinvertebrate populations of Huntington Creek. However, it did affect Deer Creek.

Water from the mine had a pH of near 7, but as CO₂ was lost from the water, the pH increased to about 8.5 and calcium carbonate precipitated. The report estimates about 250,000 kg of calcium carbonate was deposited as limestone in Deer Creek over a three year period. The report concludes that this rate of precipitation would "seal the stream bottom and thus prevent accrual of stream water into the adjacent riparian community." It also says this precipitation would decrease the amount of macroinvertebrate colonization in Deer Creek. This could be through alteration of the substrate or direct effects on the macroinvertebrates as observed in the stonefly study.

The Division contacted DWR about this issue, and they are primarily concerned about any effects on Huntington Creek rather than Deer Creek. They do not feel the effects on Deer Creek are of enough significance to warrant further monitoring of the macroinvertebrate populations. Therefore, while there have been and probably will continue to be effects on the macroinvertebrate populations of Deer Creek, these are not significant enough to require additional studies.

After the mine is reclaimed, there will, presumably, continue to be some discharge from the mine and calcium carbonate precipitation; however, most precipitate should form near the disturbed area with less happening farther down the canyon. The report in the plan discusses the sealing effect the calcium carbonate had on the streambed and indicates the calcium carbonate decreased infiltration into the soil in the riparian area. This could continue to occur after reclamation, but the area most likely to be affected would be the reclaimed area. Since the applicant will be responsible for successful reclamation of these areas and will be monitoring them for successful revegetation, no additional monitoring or mitigation requirements are needed.

RECLAMATION PLAN

Findings:

Information provided in the proposal is not considered adequate to meet the requirements of this section of the regulations. Prior to final approval, the applicant must supply the following in accordance with:

R645-301-341.250, The applicant needs to clarify the woody plant density success standard. It is not clear if the applicant intends to use baseline information or reference area data at the time of seeking final bond release. If the applicant intends to use data gathered at the time of seeking bond release, the application needs to indicate the standard would need to be approved at that time by the Division of Wildlife Resources and the Division.

R645-301-341.250, The diversity standard proposed in the application is not acceptable. The applicant needs to propose a different method of measuring diversity and a success standard.

Based on the lack of soils data and a definitive soils reclamation plan, the Division cannot make a finding at this time that revegetation is feasible using the proposed plan. Requirements for sampling soils are discussed in the portion of the technical analysis discussing soils.

This analysis contains recommendations and comments of which the applicant should be aware.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

Bonded Area Map

The Permittee shows some areas covered by the reclamation bond on Map DS1782D (Deer Creek Mine Disturbed Area Final Reclamation Contour Map), Map CE-10884-FM (Deer Creek Mine Rilda Canyon Final Reclamation of Surface Facilities and Access Road). Map DS1782D does not show the disturbed area boundaries. The disturbed area boundaries must include full length of the conveyor belt and the mine site.

Map CE-10884-FM does show the disturbed area boundaries for the Rilda Canyon area. That map is considered adequate.

The Permittee does not show the disturbed area boundaries for the North Fork Meetinghouse Canyon portals or the Grimes Wash Canyon portals. The Permittee must include in the amendment reclamation maps of the North Fork Meetinghouse Canyon portals and the Grimes Wash Canyon that show the disturbed area boundaries.

The Permittee is under a Division Order to upgrade the permit and disturbed area maps. Those maps will be evaluated under the Division Order.

RECLAMATION PLAN

Reclamation Backfilling and Grading Maps

Map DS1782D shows the proposed final surface configuration for the Deer Creek Mine Site. The cross sections for the Deer Creek Mine are shown on Drawing DS1783D (2 sheets) and Drawing DS1784D (1 sheet). +

Reclamation Facilities Maps

The Permittee proposes to remove the structures and most of the facilities from the permit area. The Permittee plans to leave the coal mine waste facilities (refuse piles) on the mine site. The location of those facilities is shown on the reclamation maps.

Final Surface Configuration Maps

The Permittee did give the Division final surface configuration maps. The contour map of the Deer Creek facility show the contour for the entire disturbed area and the area 100 feet beyond the disturbed area boundaries.

Reclamation Surface and Subsurface Manmade Features Maps

The Permittee shows the location of each public road that will be located within 100 feet of the permit area. The Permittee shows the location of the county road that is next to the conveyor belt on the reclamation maps.

Findings:

The Permittee met the minimum requirements of this section.

BONDING AND INSURANCE REQUIREMENTS

Regulatory Reference: 30 CFR Sec. 800; R645-301-800, et seq.

Analysis:**Form of Bond (Reclamation Agreement)**

The regulations concerning the form of bond do not apply to the submittal.

Determination of Bond Amount

The Permittee did not include a revised reclamation cost estimate in the amendment. The Division was informed by the Permittee that a cost estimate would not be included until the reclamation plan was approved. The Division agreed with the concept since the reclamation bond estimate must be based on the

RECLAMATION PLAN

approved plan.

Terms and Conditions for Liability Insurance

The Permittee did not submit a new insurance policy.

Findings:

Information provided in the proposed amendment is not considered adequate to meet the requirements of this section. Prior to approval, the Permittee must provide the following in accordance with:

R645-301-830.130, The Permittee did not include a detailed reclamation cost estimate in the amendment. The Permittee informed the Division that the reclamation cost estimate would not be submitted until the reclamation plan was approved. The Division agreed to that procedure. Prior to final approval the Permittee must submit a detailed reclamation cost estimate.