

PRO/007/038 WILLOW CREEK

TECHNICAL ANALYSIS

NOVEMBER 6, 1995



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

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November 6, 1995

Mr. Ben Grimes  
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Cyprus Plateau Mining Corporation  
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Price, Utah 84501

Re: Technical Review of Willow Creek Application, Cyprus Plateau Mining Corporation,  
Willow Creek Mine, PRO/007/038, Folder #3, Carbon County, Utah

Dear Mr. Grimes:

The Division has completed the technical review of the Willow Creek Mine Application. Enclosed is the Analysis which documents the Findings that the Division has made at this point in time. You will note that we have identified deficiencies in your application and therefore it is not considered technically complete at this time. While most of the deficiencies have previously been conveyed to you informally, this letter is your formal notification of our findings. In order for us to further process your application you must adequately address the deficiencies identified in the analysis (summarized on pages 1 through 17). Please provide a response by no later than December 22, 1995.

If you have any questions please call me.

Sincerely,

Daron R. Haddock  
Permit Supervisor

Enclosure

cc: S. Johnson  
W. Western  
P. Baker  
J. Smith  
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State of Utah  
Division of Oil, Gas and Mining  
Utah Coal Regulatory Program



Willow Creek Mine  
Analysis and Findings  
First Draft  
November 3, 1995

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# TECHNICAL ANALYSIS

## INTRODUCTION

## 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 findings made in this 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 action as deemed necessary by the Division at that time to achieve compliance with the Utah Coal Regulatory Program.

## ENVIRONMENTAL RESOURCE INFORMATION

### General Deficiencies

1. R645-301-521.120 - The pipes carrying water through the proposed permit area from the Price water treatment plant to Price are not shown on any map.
2. R645-301-521.120 - Maps 11 and 18 are confusing in that they show both existing and projected surface facilities, contours, etc.
3. R645-301-521.120 - There is no map that clearly identifies existing surface facilities and features.
4. In the table "Permit Section Regulatory Provisions Addressed" in Section 3.6.1.1: 3.6.1.1 is cross referenced to R645-301-610 through 612 - R645-301-611 concerns general requirements for descriptions of the geology and operations, which are covered by reference to subsequent sections of the MRP; however, R645-301-612 concerns certification of cross sections, maps, and plans as described under R645-301-512.100. There is nothing in 3.6.1.1 nor in the rest of section 3.6 addressing certification of cross sections, maps, and plans. Certification is covered in 4.5.1.8., but there is no reference to that section in 3.6.1.1.
5. 3.6.1.2 is cross referenced to R645-301-130,140, and 624 - however R645-301-140 concerns map scales and maps and plans used to distinguish among each of the phases of the coal mining and reclamation operation - specifically between pre- and post-SMCRA operations. There is nothing in 3.6.1.2 addressing these subjects.

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6. 3.6.2.3 is cross referenced to R645-301-634.210 and 310 - it should be R645-301-624.210 and 310.

### **Identification of Interests, Violation Information, and Right of Entry Information**

1. The application needs to include right of entry information for the entire proposed permit area. (See Findings from this Section for specific information.)

### **Unsuitability Claims**

### **Permit Term, Insurance, Proof of Publication, Facilities or Structures Used in Common, Filing Fee, Notarized Signature**

1. Cyprus must include a copy of the proof of publication in its application.
2. Before the Division issues a permit, Cyprus will need to submit a certificate of insurance or other evidence of insurance satisfying the requirements of R645-301-800.
3. When Cyprus has advertised for the permit submission, they will need to submit proof of publication.

### **Historic and Archeological Resource Information**

1. The application references Map 3-8 for cultural resources information. It appears this should be a reference to Map 11.
2. Map 11 and some of the cultural resources information in the text of the plan should be considered confidential. These materials contain enough detail for a person to easily locate the significant cultural resources sites identified in the application.
3. The application need to contain evidence of clearances from the Division of State History.

### **Climatological Resource Information**

### **Vegetation Resource Information**

1. The applicant needs to include baseline vegetation information for all areas proposed to be disturbed.
2. The applicant has proposed to use the baseline method for the revegetation success standard, but the baseline information in the plan was not gathered during a "normal precipitation year" as defined in the "Vegetation Information Guidelines." Also, since much of the previously disturbed area has been redisturbed, it is impossible to gather this information for these areas. If the applicant decides to use a reference area or range site, the application would need to include baseline vegetation information for this area.

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### Fish and Wildlife Resource Information

1. Section 3.3.2.1 contains generalizations and opinions not necessarily supported by data and which may be irrelevant to the application. The applicant is apparently trying to show the value of the area to wildlife is minimal. These types of statements need to either be supported with data or eliminated from the application.
2. The application says comprehensive site-specific wildlife baseline studies are not required based on applicable Division and Wildlife Resources guidelines and conversations with representatives of these agencies. This statement should be modified. The extent of wildlife informational requirements is not yet known. R645-301-322 says the scope and level of detail of wildlife information is to be determined by the Division based on consultations with State and federal Information Agencies with Responsibilities for Fish and Wildlife. These state and federal agencies have not yet provided their comments to the Division. Further baseline information could be needed.
3. The applicant has committed to check cliff areas for "sensitive species," such as canyon sweetvetch and golden eagles, in advance of mining that could cause subsidence. In addition, the applicant should check areas with potential habitat for tree-nesting birds of special interest, such as raptors.
4. The application discusses habitat requirements for some bird and mammal species that are not known to occur in the West Tavaputs Plateau and that are unlikely to inhabit the mine plan area. Discussions about these species should be eliminated from the plan unless they are relevant.
5. The Division of Wildlife Resources considers the proposed surface facilities area to be marginal critical deer winter range. The area may not produce as much forage as adjacent undisturbed areas, but because of the terrain, water availability, and other factors, deer tend to congregate there. This use should be identified in the application

### Soils Resource Information

1. **R645-301-222 Soil Survey.** The application must include an organized, clear and concise description of the premining soils resource, including a map delineating the different soils, soil identification and description.
2. The text implies greater understanding of the Willow Creek Mine site soils resource than the provided documentation can confirm. A site specific investigation of the soils prior to disturbance is warranted to establish present conditions of the soils in the 6.8 acres of new disturbance. This information and the results of the proposed sampling (pg 4.2-5) prior to removal of the refuse cover material should be disclosed within section 3.1. An isopach map of the removal depth for the undisturbed sites and the disturbed regolith should be sketched to identify those areas where soil will not be salvaged and to ensure that all suitable cover material is identified for salvage. This is very important considering that 6.8 acres of disturbance will be added to the site, but not all of those acres will contribute additional topsoil for reclamation.

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3. All soil sampling locations discussed in the text must be included in the map legend and located on the map. All notations on the map must be in the legend. All soil analyses discussed in section 3.1 must be included in Ex. 5. Exhibit 5 must be prefaced by a table of contents for easy reference. Exhibit 7, Documentation of Existing Site Conditions, must be completed.
4. Castle Gate Mine Plan soils information (found in chapter 8 of the Castle Gate Mine Plan and its appendix) must be included as an exhibit, since this chapter provides a complete description of the Crandall Canyon, Preparation Plant and Refuse soils and analyses.

### Land-use Resource Information

1. The application references Maps 3-9 and 3-10, but these maps could not be located in the application.
2. The application needs further information about the current land uses of the proposed permit area. In particular, the applicant should include landowner comments about current uses so it can be determined if certain areas are undeveloped land or if they can be classified as wildlife habitat or grazing lands.
3. The application needs to describe the industrial use in the area of the formerly-permitted Willow Creek Mine. This use may have been terminated.

### Alluvial Valley Floors

### Geologic Resource Information

1. No potentiometric surface map has been made.
2. The statement on p. 3.6-13 concerning well W94-31-1, "Water in-flow was suspected at 62 feet with loss at the fractures at 19 feet." is unclear, indicating, among other possibilities, either that water is flowing into the bore hole at 62 feet, flowing up the bore hole, and flowing into fractures at 19 feet; or that drilling mud was lost at 19 feet as drilling progressed downward. The hole completion report and cuttings log in Exhibit 9 provide no information on this.
3. It is unclear whether or not W93-33-1 on Map 12 is the same as W94-33-1 on cross section A-A'-Map 13A (and B331-1 & -1A on Map 15 and W94-33-1 & -1A on page 3.6-13)?
4. W94-31-1 is designated as BW311 on Map 15, not B311 as stated on page 3.6-13.
5. The monitoring well at Castle Gate and labeled BW36 on Map 15 is not mentioned in the text on page 3.6-13. It is unclear whether or not BW36 is the same as CG045 on Map 12.
6. It is unclear whether or not "1994SITE" on Map 12 the same as B51 on Map 15 (and W94-5-1 in the text on page 3.6-13).

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7. In the statement concerning W94-5-1 on p. 3.6-13, "... 5-7 gpm at 325 feet (Aberdeen Sandstone). One day after pump tests were completed, the water level was measured at over 310 feet deep; over 45 feet below the top of the Aberdeen Sandstone indicating a recharge rate of about 0.25 gpm." the relationships between the top of the Aberdeen Sandstone, the water level before the test, the water level during the test, and the water level after the test are unclear: is there an artesian head in this sandstone, and in the context does "... over 310 feet deep; over 45 feet below the top of the Aberdeen Sandstone ..." mean deeper or shallower than 310 feet.
8. It is unclear whether either "DH001" or "W94?201" on Map 12 the same as B121 on Map 15 (and W94-12-1 in the text on page 3.6-13).
9. It is unclear if "MC049" (?) on Map 12 the same as B311 on Map 15 (and W94-31-1 in the text on page 3.6-13).
10. It is not clear that the large (approximately 550') apparent artesian head in Well B331 is a real indication of the static water level in the regional aquifer.
11. In the statement concerning W94-5-1 on p. 3.6-13, "... 5-7 gpm at 325 feet (Aberdeen Sandstone). One day after pump tests were completed, the water level was measured at over 310 feet deep; over 45 feet below the top of the Aberdeen Sandstone indicating a recharge rate of about 0.25 gpm." the relationships between the top of the Aberdeen Sandstone, the water level before the test, the water level during the test, and the water level after the test are unclear: is there an artesian head in this sandstone, and in the context does "... over 310 feet deep; over 45 feet below the top of the Aberdeen Sandstone ..." mean deeper or shallower than 310 feet.

### Hydrologic Resource Information

1. The PHC section on surface water consequences does not give specific information about how the disturbed area will be minimized. (See page 4.7-28, paragraph 4.)
2. The PHC does not cover the stream alteration proposed for Willow Creek which should be specifically covered under surface water consequences.
3. There is no information about the quantity water withdrawn from the Price River.
4. Page 4.7-29 in the PHC speaks of surficial materials, but the source of this material is not clear from this information. (See page 4.7-30, also.)

Ground water baseline information is complete and accurate except for the following:

5. There is no map of the potentiometric surface.
6. Water rights for springs and ponds in Sec's. 23 and 24, T. 12 S., R. 10 E. are marked on Map 17 but the municipal water wells and water rights of the Price River Water Improvement District in the same area are not shown.

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7. PacifiCorp's UGW well in Sec. 35, T. 12 S., R. 9 E. is also not marked on Map 17.
8. Locations of fifteen boreholes that were drilled in 1994 in the alluvial/colluvial aquifers along Willow Creek and the Price River are shown on Map 2 of Exhibit 11 but not shown on Map 16, and bore hole logs are not in Exhibit 9.
9. Drill holes MC-205 and MC-206; springs MC-207, B-32, and B-33; and mine water sample locations BM-25, BM-26, BM-27, and BM-28 (Table 3.7-4) are not shown on Map 15. It is not clear whether or not B-001 is the same as 001 on Map 15.
10. Spring B321 is identified as "Willow Creek Spring" in Table 3.7-4 but as "Sulphur Spring" on Map 15.

### Surface-water information.

11. Surface water monitoring points 492, BN131, and B3N (Surface and Ground Water Analysis Results - Exhibit 10) cannot be located on Map 15, and it is unclear whether they are samples from the Willow Creek project or from another project/area, similar to the "Nuck Woodward", etc. samples.
12. It is not clear whether or not B3N the same as BN3 on Map 15.

### Maps, Plans, and Cross Sections of Resource Information

1. The Operator must include cross references for all required maps and cross sections in the operational section of the PAP.
2. A statement that maps and cross sections required in Section R645-301-521.111, 521.112, 521.121, 521.122, 521.123, 521.124, 521.132, 521.141, 521.150, 521.151, 521.152, 521.190 have been properly certified must be included in the text of the PAP.
3. CMPC must show the permit boundary on all maps in which the boundary lies.
4. Strike and dip of major beds and coal seams are not explicitly portrayed on any map.
5. The locations of other gas wells in the region, namely wells located northeast of the permit area that were installed to extract gas from the coal seams, are not in the PAP.
6. There is no map of the potentiometric surface for the regional or other aquifers, and seasonal differences of head (if any) have not been portrayed.
7. The location and extent of subsurface water and seasonal differences of head (if any) within the proposed permit area are not portrayed on maps or cross sections.

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### OPERATION PLAN

#### General Requirement

#### Existing Structures

1. The Operator needs to state if there are any pre-existing structures in the Willow Creek area that will be used for mining.

#### Relocation or Use of Public Roads

1. The Operator must address requirements for Section R645-301-521.133 through R645-301-521.133.2.

#### Air Pollution Control Plan

#### Coal Recovery

1. The Operator has not shown that the BLM has approved the coal recovery plan for federal coal. Either a copy of the R2P2 or a letter from the BLM saying that the recovery plan has been approved would solve this deficiency.

#### Subsidence Control Plan

1. The Operator needs to set up a subsidence monitoring program that will be able to detect an angle of draw up to 45°.
2. The sensitivity of the subsidence monitoring program must be stated.
3. The Operator needs to address what the potential effects of subsidence beneath State Highway 191, Willow Creek and the powerlines that parallel those structures could be.
4. The Operator also needs to address the potential for rock fall damage due to escarpment failure.
5. State what mitigation measures will be used in the event of subsidence damage to Highway 191, Willow Creek or the powerlines that parallel those structures.
6. Mitigation due to escarpment failure needs to be addressed.
7. The Operator must present copies of the mitigation agreements with the surface owners in the PAP.
8. Six months prior to mining the Operator must notify the surface owner.

### **Slides and Other Damage**

1. The Operator must include a plan for reporting slides that have the potential for adverse effects on the public, property, health, safety or the environment to the Division by the fastest possible means.
2. A commitment to comply with any remedial measures required by the Division must be included in the PAP.

### **Topsoil and Subsoil**

**R645-301-232.200, -233.100, -233.200 and R645-301-234.100 and R645-301-234.230.**

1. Results of the sampling program (proposed in section 4.2) should be reported in section 3.1 prior to approval of the permit. The results of such a study will enable CPMC to present exact information on the quantity, quality and availability of soil substitute material.
2. Table 4.2-1 should be revised to reflect the actual volume of soil recovered from the refuse removal project and to reflect the results of the site specific field study requested in the deficiencies listed under Soils Resource.
3. Soil Stockpiles must be seeded promptly, allowing 6 months to pass between stockpiling and seeding is too long. Six months will allow the weather to erode the pile and the soil will be hardened and crusted which is not a good environment for germinating seeds. A shorter time period should be specified.

### **Interim Stabilization**

1. The discrepancy between Section 5.3.2.2 and Table 5.3-1 in the amount of seed to be used for interim revegetation needs to be resolved.

### **Fish and Wildlife Protection**

1. Broad, general statements that impacts to wildlife will be minimal are not appropriate except where data confirms these statements. Statements that the vegetation and habitat are of poor quality are probably not correct, and, unless they are substantiated, they should be eliminated from the application.
2. On page 4.3-5 is a statement that the use of construction equipment near the Willow Creek stream channel represents a minor potential risk since a petroleum spill or leak could result in stream contamination and potential toxic effects on fish and macroinvertebrates. This sentence needs to be modified. The latter part of the sentence does not explain why using construction equipment near the stream constitutes a minor risk for oil spill contamination
3. The application says no areas were identified as potential wetland areas, but the applicant intends to realign portions of Willow Creek. Riparian areas are considered wetlands although they may

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not be jurisdictional wetlands regulated by the Army Corps of Engineers. This issue should be clarified.

4. The applicant needs to check its power pole design with the Fish and Wildlife Service. The design presented in the application differs from designs available to the Division.
5. The application needs to give more detail about designs for the conveyor. Although most deer and elk would pass under the conveyor if it is elevated 40 inches, large bucks and bulls may not be able to. The application needs to show where the conveyor would be elevated, how high it would be, and there needs to be some indication of what human activities will happen at those locations.
6. Section 4.3.3.7 says the applicant does not plan to use, store, or generate potentially hazardous or toxic materials. This sentence conflicts with the next sentence which says materials potentially hazardous to wildlife, such as petroleum products, will be within closed areas or containers. These two statements need to agree.
7. The application needs to contain a commitment to periodically evaluate the stream buffer zone and other undisturbed areas and clean coal fines if necessary. It should also contain a threshold depth limit telling when fines would be cleaned. A suggested limit is one inch.
8. The regulations require the applicant to use the best technology currently available to enhance wildlife habitat for both reclamation and operational phases. Because the proposed disturbance area contains critical deer winter range, Wildlife Resources requests mitigation in the form of habitat enhancement at the rate of about one or two acres enhanced for every acre disturbed for the operational portion of the project. The application needs to give some detail of what enhancement measures are planned and a commitment to do it. This could include mention of whatever project is carried out as part of the refuse removal project.

### **Road Systems and Other Transportation Facilities**

1. The Operator needs to classify each road in the Willow Creek area as primary and supply the Division with all required design certifications.
2. The Operator must identify each road on the surface facilities map with a unique identification number.
3. All maps and cross sections for the roads in the Willow Creek Area must be certified.
4. The Operator must state if any fords will be used while the new bridge is being installed.
5. The Operator must state if any low-water crossings will be used when the bridge is constructed.
6. The Operator must show that the road will be constructed of nonacid-and nontoxic-forming materials.

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7. The Operator needs to have certified plans and cross sections for all primary roads that will be in the Willow Creek area.
8. Slope stability analysis showing that the roads have a static safety factor of no less than 1.3 must be included in the PAP.

### **Spoil and Waste Materials**

1. The Operator must explain how any hazardous waste will be handled and disposed of.
2. The PAP must show documentation that the Schoolhouse Canyon refuse area has been approved to accept material from the Willow Creek Mine.
3. The Operator must document in the PAP that the Schoolhouse Canyon facility has been approved to accept refuse material from the Willow Creek site.
4. The Operator must demonstrate that any coal processing waste used in impoundment construction meet the material qualifications.
5. The Operator must demonstrate the stability of any ponds constructed with coal processing waste.
6. The Operator must address the potential for acid mane seepage through the impoundment.
7. The Operator needs to address how coal mine waste fires will be handled. If the procedure is in the MRP of permitted sites then that information should be referenced.
8. The Operator needs to discuss if coal processing waste will be returned to abandoned underground workings.

### **Hydrologic Information**

#### Surface-water Monitoring

1. CPMC must develop a specific surface water monitoring plan for operational mining. This monitoring plan must be developed based on the baseline monitoring data and the PHC. The Division's Water Monitoring directive signed May 23, 1995 can be used for guidance in developing the surface-water monitoring plan.

#### Groundwater Monitoring.

2. Ground-water monitoring will be conducted according to the ground-water monitoring plan and ground-water monitoring data will be submitted every 3 months to the Division. Ground-water monitoring will proceed through mining and continue during reclamation until bond release. Equipment, structures, and other devices used in conjunction with monitoring the quality and

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quantity of ground water onsite and offsite will be properly installed, maintained, and operated and shall be removed by the operator when no longer needed.

3. The statement in the PAP concerning notification when the analysis of any water sample indicates noncompliance with the permit conditions is not adequate. (the operator shall promptly notify the Division and immediately provide for any accelerated or additional monitoring necessary to determine the nature and extent of noncompliance and the results of the noncompliance. Plans and hydrologic information to evaluate and mitigate the noncompliance situation and information relevant to the PHC shall be submitted to the Division as required.)

Acid- and toxic-forming materials and underground development waste.

5. The analysis reports that indicate weathered and oxidized soil, mine waste, and coal refuse and that show no significant acid, alkaline, or toxicity potentials are not found in the PAP.

Transfer of wells.

6. There are currently no plans to transfer wells to another party for further use. The proposed operation plan for transfer of wells is complete and accurate.

Discharges into an underground mine.

7. The discharge will contain solids in excess of effluent limitations for total suspended solids. The Division has previously approved this injection plan including this exceedance of the total suspended solids limitations; however, there is no specific documentation of this approval other than inclusion in the Castle Gate MRP.
8. The plan does not at present appear to have the required approval of the Mine Safety and Health Administration (MSHA).

Gravity discharges from underground mines.

9. The proposed operation plan for gravity discharges from underground mines is complete and accurate.

Stream Buffer Zones.

10. CPMC must show the location of stream buffer zones that will be established within 100 feet of the Willow Creek stream channel. They must show that activities within the 100-foot buffer zone will not cause or contribute to the degradation of water quality or the violation of any effluent limits, and they must describe the methods that will be used to minimize the effects of the stream alteration on the water quality. Primarily, CPMC must show how they will minimize the effects during construction and after construction, prior to stabilization, of the stream buffer zone.

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### Sediment control measures.

11. CPMC must clearly define a sediment control plan for the two segments of Willow Creek that will be realigned. The plan must include the construction phase and postconstruct phase of the realignment.
12. In Exhibit 19, Section 3.10 is a statement that a Small Area Exemption (SAE) has been requested for the runoff from the site of the well that will recover water from the slurry injection system. It isn't clear that such an exemption has been granted.
13. Sediment traps 020 and 030 must be adequately designed as impounding structures. These impoundments must meet the requirements of R645-301-743. CPMC must summarize the design parameters for all sediment control structures including the Portal Collection Sump, sediment ponds and sediment traps in the text of the Drainage and Sediment Control Exhibit, Exhibit 13. Both sediment traps are not necessary to meeting the regulation and could be removed from the PAP.
14. All alternate sediment control areas and there treatment must be clearly shown on a map. The alternate sediment control methods must be adequately designs per R645-301-742.110 by meeting the requirements of the Division's Sediment Control Directive.

### Diversions.

15. All diversions must be designed to convey the appropriate design storms as described in R645-301-742.323 and R645-301-742.333. Most diversion meet or exceed these design specifications except diversions that involve flexible tubing. FET-1 and FET-2 must be designed to convey, at minimum, the 10-year, 6-hour storm event.
16. UD-25 drains into a depression where flow is trapped. This depression must be designed or CPMC must show that water collected in the depression will be minimal and will not result in any environmental or physical hazards.

### Casing and sealing of wells.

17. The proposed operation plan for the casing and sealing of wells is complete and accurate.

### Support Facilities and Utility Installations

#### Utility Installations

#### Signs and Markers

#### Use of Explosives

1. The Operator must commit not to conduct night time blasts except in emergency situations.

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### **Maps, Plans, and Cross Sections of Mining Operations**

1. The Operator needs to cross reference the maps and cross sections with the text.
2. The Operator needs to cross reference the maps and cross sections with the minimum regulatory requirements.

### **RECLAMATION PLAN**

#### **General Requirements**

#### **Postmining Land Uses**

1. The application needs to contain comments from legal and equitable owners of lands in the proposed permit area concerning the postmining land use. It also needs to contain comments from governmental agencies that would have to authorize or initiate the use.
2. The application is required to contain a detailed description of the proposed use, following reclamation, of the land within the proposed permit area, including a discussion of the utility and capacity of the reclaimed land to support a variety of alternative uses, and the relationship of the proposed use to existing land-use policies and plans. This description should particularly relate to the landowner's desires. The plan must explain how the proposed postmining land use is to be achieved and the necessary support activities which may be needed to achieve it. If the postmining land use is considered a change from the premining land use, the application must provide information in compliance with R645-301-413.
3. The application needs to contain comments from legal and equitable owners of lands in the proposed permit area concerning the postmining land use. It also needs to contain comments from governmental agencies that would have to authorize or initiate the use.
4. The application is required to contain a detailed description of the proposed use, following reclamation, of the land within the proposed permit area, including a discussion of the utility and capacity of the reclaimed land to support a variety of alternative uses, and the relationship of the proposed use to existing land-use policies and plans. This description should particularly relate to the landowner's desires. The plan must explain how the proposed postmining land use is to be achieved and the necessary support activities which may be needed to achieve it. If the postmining land use is considered a change from the premining land use, the application must provide information in compliance with R645-301-413.
5. The Operator must demonstrate that there is insufficient spoil to reclaim all the highwalls.

#### **Approximate Original Contour Restoration**

#### **Backfilling and Grading**

The Operator must submit information on slope stability factor calculations.

## **Mine Openings**

### **Topsoil and Subsoil**

#### **R645-301-242 Soil Redistribution and R645-301-244 Soil Stabilization.**

1. More detail in the plan regarding the soil salvage (as requested in deficiencies listed under Operations Topsoil and Subsoil) is required before the Division can approve the 10" cover over the Willow Creek Mine site and the preparation plant as well as the reduction in cover at the Crandall Canyon site.
2. Information in the plan should include a statement concerning the location of information on the planned cover over the Schoolhouse canyon refuse pile.
3. The soil stabilization practices described in each section should not be conflicting.

### **Road Systems and Other Transportation Facilities**

#### **Hydrologic Information**

##### Surface-water protection.

1. The permit application does not specifically address surface water protection, although reclamation protection the operational hydrology section of Chapter 4 has some information that is pertinent to reclamation. CPMC must either address surface water protection in the reclamation section or make references in the reclamation section to necessary information in the operational section.

##### Surface-water Monitoring.

2. The permit application does not specifically describe the reclamation monitoring plan, but does imply that the baseline monitoring will be continued through operation and reclamation of the mine site. CPMC must clarify their intent for surface-water monitoring during the reclamation phase of the mine.

##### Groundwater Monitoring.

3. The statement in the PAP concerning notification when the analysis of any water sample indicates noncompliance with the permit conditions is not adequate. (When the analysis of any ground-water (or surface-water) sample, (not just UPDES samples) indicates noncompliance with the permit conditions, the operator shall promptly notify the Division and immediately provide for any accelerated or additional monitoring necessary to determine the nature and extent of noncompliance and the results of the noncompliance. Plans and hydrologic information to evaluate and mitigate the noncompliance situation and information relevant to the PHC shall be submitted to the Division as required.)

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### Acid- and toxic-forming materials and underground development waste.

4. The analysis reports that indicate weathered and oxidized soil, mine waste, and coal refuse and that show no significant acid, alkaline, or toxicity potentials are not found in the PAP.

### Transfer of wells.

5. There are currently no plans to transfer wells to another party for further use. The proposed reclamation plan for transfer of wells is complete and accurate.

### Discharges into an underground mine.

6. The discharge will contain solids in excess of effluent limitations for total suspended solids. The Division has previously approved this injection plan including this exceedance of the total suspended solids limitations; however, there is no specific documentation of this approval other than inclusion in the Castle Gate MRP.
7. The plan does not at present appear to have the required approval of the Mine Safety and Health Administration (MSHA).

### Gravity discharges from underground mines.

8. The proposed reclamation plan for gravity discharges from underground mines is complete and accurate.

### Stream buffer zone.

9. The permit application does not specifically address reclamation within a 100-foot buffer zone of Willow Creek. This includes the stream alteration. CPMC must address reclamation activities within the stream buffer zone and show that these activities will not cause or contribute to degradation of stream quality.

### Sediment control measures.

10. The permit application does not adequately address sediment control for the reclaimed water tank area. CPMC must provide for some sediment control in the area of the water tank and the road to the water tank after mining is complete.
11. In Exhibit 19, Section 3.10 is a statement that a Small Area Exemption (SAE) has been requested for the runoff from the site of the well that will recover water from the slurry injection system. It isn't clear that such an exemption has been granted.
12. CPMC must either show that Pond 001 is adequate to contain runoff from the 10-year, 24-hour storm event during reclamation, or create a modified design for the reclamation pond. They must include a reclamation time schedule for removal of sediment control measure, and show interim sediment control measures that will be used in each phase of reclamation.

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### Diversions

13. CPMC has not included diversion designs that are specific to reclamation. Drainages will be restructured and drainage areas altered, so the diversions that are left-over from operations may have different sizing requirements. CPMC must create reclamation-specific designs for all diversions that will be retained past mining operations.

### Casing and sealing of wells.

14. The proposed reclamation plan for the casing and sealing of wells is complete and accurate.

### Reclamation timetable.

15. CPMC has not addressed the reclamation of the new facilities on the Castle Gate side. They must include regrading and timetable plans for removing Sediment Pond 003 and other facilities outside of the currently approved Castle Gate permit area.

### Revegetation

1. The applicant intends to drill seed in most areas. Broadcasting is recommended over drilling. However, if the applicant chooses to drill seed, at least three species in the upland permanent reclamation seed mixture, big sage, rubber rabbitbrush, and prostrate summer cyprus, need to be broadcast seeded.
2. In Section 5.3.2.2, the application says all areas to be revegetated on a permanent basis, including the Willow Creek realignment sections, will be drill seeded at a rate of 13.5 pounds PLS per acre. This conflicts with the permanent seed mixes shown in Tables 5.3-2 and 5.3-3. This discrepancy needs to be resolved. Also, under the heading "Woody Species Transplanting," the application mentions several woody species included in the seed mixture that can be effectively transplanted from seed. Included in this list is fringed sage, but fringed sage is not in the seed mixes in Tables 5.3-2 and 5.3-3.
3. The permanent reclamation seed mixtures include seven introduced species. Use of most of these is justified, but it does not appear that intermediate wheatgrass and orchardgrass are both desirable and necessary to achieve the postmining land use. These species either need to be eliminated from the mixture or the applicant needs to include further justification for including them.
4. Bluebunch wheatgrass needs to be included in the permanent seed mixture for upland areas. A recommended rate is two pounds pure live seed per acre (drilled).
5. The applicant needs to adjust the quantities of seed to be planted in upland areas. As proposed, 68% of the seeds would come from just two species, rubber rabbitbrush and sagebrush. The amounts of these species should be reduced and the amounts of other species needs to be increased. In particular, it is suggested that the amount of fourwing saltbush be increased to

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three pounds per acre pure live seed (drilled). Also suggested is the addition of blueleaf aster and yarrow to this mixture.

6. The application needs to clarify how many cuttings and transplants will be used along the stream channel.
7. The applicant should commit to try to eliminate any noxious weed infestation regardless of its size.
8. The applicant intends to use the baseline data method for judging revegetation success, but the data was not collected during a normal precipitation year as defined in the Division's "Vegetation Information Guidelines." Therefore, except for the riparian area, this method cannot be used unless the applicant presents data taken during a normal precipitation year. Other options for revegetation success standards include establishing a reference area or range sites.
9. It appears the applicant proposes to use a weighted average of vegetation cover for all reclaimed areas to compare to the revegetation success standard. This is acceptable for previously disturbed areas but not for areas not previously disturbed by mining.
10. Section 5.3.2.6 of the application says absolute values for cover and production from reclaimed areas will be compared with a confidence interval for the baseline data to determine if the applicant has met revegetation success standards. Since the values for both baseline data and reclaimed area data are from samples, it is necessary to pool the variances to perform a t-test for equality.
11. The application needs to include revegetation success standards for certain parameters in the general requirements, including erosion control, diversity, seasonality, and permanence.
12. The applicant is required to use the best technology currently available to enhance wildlife habitat in the postmining phase of operations. The application discusses methods for restoring the stream channel, but it does not discuss whether this will constitute enhancement. The application does not show how upland areas will be enhanced. If the application does not include enhancement measures, it needs to include a statement showing why enhancement is not practicable.

### **Maps, Plans, and Cross Sections of Reclamation Operations**

1. CPMC must show the final reclamation land configuration for the new facilities proposed in the area of the old Castle Gate facilities.

### **Bonding and Insurance Requirements**

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## ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR Sec. 783., et. al.

### GENERAL

Regulatory Reference: 30 CFR Sec. 783.12; R645-301-411, -301-521, -301-721.

#### Analysis:

The Permit Application Package (PAP) uses text along with maps, cross sections, and plans to describe the lands in the proposed permit area and adjacent areas that may be affected or impacted by the proposed coal mining and reclamation operations; the existing or premining land uses; the baseline ground and surface water resources; and the geologic and climatological information.

Rugged terrain; low precipitation and seasonally harsh weather conditions; thin, marginal soils; limited vegetative cover; restricted water resources; and significant reserves of high quality coal have determined land use in the permit and adjacent areas. Underground coal mining and related activities, the railroad in Price Canyon, PacifiCorp's Carbon Generating Station at the mouth of Willow Creek, scattered oil and gas production, and limited timber harvesting are historic and current commercial uses of land in the permit and adjacent areas. Highways and utilities follow Willow Creek and Price Canyons through the rugged terrain. Undeveloped lands are used for low-intensity grazing, wildlife habitat, and dispersed recreation such as hunting, fishing, and hiking.

The Castle Gate (Willow Creek) cemetery is located within the permit area. There are abandoned townsites but no occupied residential land in the permit area. The nearest residences are in Helper and the adjacent community of Martin, located approximately two miles down Price Canyon from the Carbon Generating Station.

Regional and premining land-use information in Section 3.4, Exhibit 8, and on Maps 9, 10, and 11 includes: land use capability and condition; locations of structures and facilities and surface disturbances from previous mining activities; location and extent of underground workings; existing land uses; land use designations, classifications and zoning restrictions; land use constraints due to environmental factors; and locations of the Castle Gate cemetery and other identified cultural, historic, and paleontological resources.

Section 4.5 contains information on the affected areas and timing of disturbance for the Castle Gate preparation plant, Schoolhouse Canyon refuse disposal area, Castle Gate loadout area, Gravel Canyon soil stockpile area, Crandall Canyon shaft area, and Willow Creek Mine surface facilities. Information on Maps 1, 2, 9, and 18 includes surface and mineral ownership; right of entry; and previous mining and related disturbances.

Existing configuration, conditions, structures, and surface and subsurface facilities are shown on Maps 11 and 18 and Exhibit 20. The pipes carrying water through the proposed permit area from the Price water treatment plant to Price are not shown on any map. Maps 11 and 18 are confusing in that they show both existing and projected surface facilities, contours, etc. There is no map that clearly identifies existing surface facilities and features.

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The baseline hydrologic monitoring plan is in Exhibit 12. Baseline data collected to date (05/02/95) and a description of the hydrogeology of the area are in Section 3.7 of the PAP.

### Findings:

The Permit Application Package contains descriptions, or refers to locations where the descriptions may be found, of the existing, premining environmental resources within the proposed permit area and adjacent areas that may be affected or impacted by the proposed coal mining operation.

R645-301-521.120 - The pipes carrying water through the proposed permit area from the Price water treatment plant to Price are not shown on any map.

R645-301-521.120 - Maps 11 and 18 are confusing in that they show both existing and projected surface facilities, contours, etc.

R645-301-521.120 - There is no map that clearly identifies existing surface facilities and features.

In the table "Permit Section Regulatory Provisions Addressed" in Section 3.6.1.1: 3.6.1.1 is cross referenced to R645-301-610 through 612 - R645-301-611 concerns general requirements for descriptions of the geology and operations, which are covered by reference to subsequent sections of the MRP; however, R645-301-612 concerns certification of cross sections, maps, and plans as described under R645-301-512.100. There is nothing in 3.6.1.1 nor in the rest of section 3.6 addressing certification of cross sections, maps, and plans. Certification is covered in 4.5.1.8., but there is no reference to that section in 3.6.1.1.

3.6.1.2 is cross referenced to R645-301-130,140, and 624 - however R645-301-140 concerns map scales and maps and plans used to distinguish among each of the phases of the coal mining and reclamation operation - specifically between pre- and post-SMCRA operations. There is nothing in 3.6.1.2 addressing these subjects.

3.6.2.3 is cross referenced to R645-301-634.210 and 310 - it should be R645-301-624.210 and 310.

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# IDENTIFICATION OF INTERESTS, VIOLATION INFORMATION, AND RIGHT OF ENTRY INFORMATION

Regulatory Reference: UCA R645-301-112; R645-301-113; R645-301-114

### Analysis:

#### Identification of Interests

Cyprus Plateau Mining Corporation (hereafter referred to as "Cyprus") submitted this mining and reclamation permit application. Cyprus is a wholly-owned subsidiary of, in ascending order, Cyprus Western Coal Company, Cyprus Amax Coal Company, Amax Energy, Inc., and Cyprus Amax Minerals Company. Cyprus, as the applicant, is authorized to do business in Utah.

The application shows the applicant's address, telephone number, and employer identification number. Cyprus will be responsible for payment of the abandoned mine land reclamation fees. The resident agent is CT Corporation System of Salt Lake City, Utah. The main MSHA number will be 42-02113; some facilities will have separate MSHA numbers.

Figure 2.1-1 is an organizational chart for Cyprus Amax Minerals Company. Exhibit 1 contains lists of operations affiliated with the applicant and with G. R. Spindler, an officer of Amax Coal Company. The information in this section of the application is complete.

Table 2.1-1 is a summary of corporate information and shows addresses, telephone numbers, and employer identification numbers for Cyprus Amax Minerals Company, Amax Energy Company, Cyprus Amax Coal Company, Cyprus Western Coal Company, and Cyprus Plateau Mining Corporation. This table also shows the names, most social security numbers, titles, and dates positions were assumed for the officers and directors of these companies.

Surface and mineral ownership information is presented in Section 2.1.2.4 and on Maps 1 and 2. Much of the surface land in the proposed permit area is owned by Blackhawk Coal Company and leased to Cyprus Western Coal Company either directly or through Amax Land Company and Amax Coal Company. Amax Coal Company leases the Castle Gate Preparation Plant and loadout and the Gravel and Crandall Canyon areas from Blackhawk. Cyprus will manage the lands for mining use under operating agreements with Cyprus Western Coal Company and Amax Coal Company.

According to Map 1 and the text, Harry C. and Alda M. Edwards own land contiguous to the proposed permit area, but the application does not include their address. It says the address is not in Carbon County records. It should be provided if it becomes available.

Map 2 shows regional coal ownership. The text has a list of legal and equitable owners of record of the coal to be mined within the proposed permit area. These are Blackhawk Coal Company, Carbon County, the Bureau of Land Management, and the Utah Department of Natural Resources Division of State Lands and Forestry. Owners of coal rights contiguous to the proposed permit area are the Bureau of Land Management, Blackhawk Coal Company, Carbon Count, the State of Utah, Pacificorp, Dennis Bettino et al., Mathis Land, Inc., and Harry and Alda Edwards.

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### Violation Information

Compliance information is presented in Section 2.1.4 and Exhibit 2. Neither the applicant nor any affiliate, subsidiary or persons controlled by or under common control with the applicant has had a federal or state mining permit suspended or revoked in the five years prior to the date of the application, and these entities have not forfeited a mining bond or similar security deposited in lieu of bond.

Exhibit 2 information is in addition to what is required by the regulations and is not considered a deficiency. R645-301-113.300 requires the application to include a list of all violation notices received by the applicant (Cyprus Plateau Mining Company) within three years preceding the date of the application. In Exhibit 1, the only operation listed with the applicant as permittee is the Star Point Mine. The application only needs a complete notice of violation list for this one operation.

R645-301-113.300 also requires a list of all unabated cessation orders and air and water quality violation notices received by the applicant or any operation owned or controlled by either the applicant or any person that owns or controls the applicant. The status of several violation notices in Exhibit 2 is listed as "pending." This includes two violation notices issued by the Division that have been terminated. It is assumed that the various operations are working within required abatement schedules to complete abatement. Any failure to abate cessation orders or similar unabated violation notices should be highlighted.

### Right of Entry

Cyprus's application says right of entry for surface lands and coal extraction is based on operating agreements with Cyprus Western Coal Company and Amax Coal Company. Cyprus Western Coal Company has leased or subleased surface and underground rights from Blackhawk Coal Company under terms of a November 1, 1993 Agreement. Amax Coal Company holds leases for the Castle Gate Preparation Plant and its associated loadout and the Gravel and Crandall Canyon areas. These leases were made with Price River Coal Company and Blackhawk Coal Company in a January 31, 1986, agreement.

Section 2.1.5.1 has legal descriptions for leased areas in the proposed permit area.

The description of Federal Consolidated Lease SL-048442-050115 includes an exception for a partial assignment to Amca Coal Leasing. The exception is for the SW  $\frac{1}{4}$  of Section 1, Township 13 South, Range 10 East. Since Amca Coal Leasing has acquired rights to mine all coal seams in this area, the partial assignment is interpreted to mean that a portion of the lease was assigned to them. This parcel is outside the proposed permit area.

Right of entry information is considered complete and accurate with two exceptions. The application does not give right of entry information for where the Crandall Canyon access road crosses Bureau of Land Management property. This property is within lease SL 029093-046653, and a letter from Cyprus's representative says the lease gives the right to conduct surface operations in addition to underground. This is probably true; federal coal leases normally give the right to develop certain surface support facilities. Although the application mentions this lease held by Amax Coal

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Company, it does not mention the rights claimed by Cyprus or the specific lands to which those rights might apply.

Cyprus does not present right of entry information for two federal leases in the north part of the permit area. The Division cannot allow mining in these areas without right of entry information. Options include requiring Cyprus to excise the proposed leases from the proposed permit area, proceeding with permit review under the assumption that Cyprus may obtain necessary rights before the Division is ready to issue a permit, and conditioning any approval on no mining in these areas until Cyprus has the appropriate right to enter. Section 2.1.2.4 says approval of the lease application for these areas is anticipated during the first quarter of 1996 prior to approval and issuance of the Division's permit. The Division should proceed under the assumption this right of entry will be granted, but if it is not, the Division will need to stipulate the permit or otherwise restrict mining for these proposed federal leases.

For all other areas of the permit area, Cyprus presents information describing the specific lands where they claim right of entry. The application also describes the documents granting the rights to enter and begin mining and reclamation operations.

Not all land described in the application is within the proposed permit area. Some of it is in the Castle Gate permit area. The reason for including these descriptions in this application is unknown. If Cyprus needs to leave descriptions of these areas in the application, they should include a statement that the areas are not within the proposed permit area.

### Findings:

The application is complete and accurate with the following exceptions:

1. The application needs to include right of entry information for the entire proposed permit area. Right of entry information is not considered adequate for the following areas:
  - a. The application does not explain the rights Cyprus claims for where the Crandall Canyon road crosses Bureau of Land Management property. However, it appears Cyprus has the right to enter these areas.
  - d. There are two proposed federal leases in the northern part of the proposed permit area. Cyprus states in correspondence to the Division that they are in the process of obtaining rights to mine these leases, but, until they obtain the right to enter and begin mining and reclamation operations in these areas, the Division cannot approve mining in these areas. The Division should proceed with processing the application on the assumption that Cyprus will obtain right of entry.

## **UNSUITABILITY CLAIMS**

Regulatory Reference: UCA R645-301-115

### **Analysis:**

To the best of the applicant's knowledge, the permit area is not within and does not include any area designated or under current study for designation as unsuitable for mining. No operations are proposed within 300 feet of an occupied dwelling, but portions of the mine surface facilities would be within 100 feet of a public road. The application says this road is State Highway 191, but it is a U. S. Highway.

In compliance with R645-103-234.100 through 400, Cyprus has obtained approval from the Utah Department of Transportation for an encroachment on the highway. On May 11, 1995, a public hearing was held in the Carbon County Courthouse concerning the operations within 100 feet of the public road. The application includes a copy of a letter requesting that the Division hold a public hearing and a copy of the Division's notice. The hearing was attended by Lowell Braxton of the Division who documented it in a Division memorandum. Notice of the public hearing was properly given, and a registered professional reporter made a stenographic record. No comments were made concerning conduct of mining within 100 feet of Highway 191. Based on appropriate notice and lack of adverse public comment, the Division finds that the interests of the public and affected landowners will be protected from the mining activities proposed for within 100 feet of the highway right-of-way.

The Division is unaware of any designation of the area as unsuitable for mining. Through the review and public comment periods, government agencies and the public will have the opportunity to petition that any area be designated as unsuitable.

### **Findings:**

This portion of the application is complete and accurate.

## **PERMIT TERM, INSURANCE, PROOF OF PUBLICATION, FACILITIES OR STRUCTURES USED IN COMMON, FILING FEE, NOTARIZED SIGNATURE**

Regulatory Reference: UCA R645-301-116; R645-301-117; R645-301-118; R645-301-123

### **Analysis:**

#### **Permit Term**

The application is for an initial permit term of five years beginning from the date of permit approval and issuance. It says Cyprus has submitted complete information for the entire anticipated life of the Willow Creek Mine to support future permit renewals.

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In meetings with the Division, Cyprus and its consultant's personnel have indicated that, depending on market and mining conditions, they intend to eventually reopen the Crandall Canyon shafts and mine in this area. Although the plans are tentative, the blanket statement that this application is for the entire anticipated life of the mine is not entirely correct. It would be more accurate to qualify this statement with a comment that Cyprus may seek to include additional areas in the permit area in the future.

### Insurance

The application says Cyprus will obtain and provide the Division with a certificate of insurance prior to initiation of development and mining activities. Based on this commitment, the Division can determine this portion of the application administratively complete, but, before the Division issues a permit, Cyprus will need to submit an insurance certificate or other evidence showing they have met the insurance requirements of R645-301-800.

American Electric Power Company ("AEP") submitted an insurance policy for the area which they formerly permitted, the Willow Creek Mine, INA/007/002. The policy is retroactive to July 1, 1990, and expires July 1, 1996. Companies affording coverage are the United State Fire Insurance Company and Energy Insurance (Bermuda) Ltd. The policy includes general aggregate coverage for \$1,000,000 and \$250,000 for each occurrence. This policy does not meet requirements for a coal mining and reclamation operation, but AEP is not proposing any operations.

### Proof of Publication

The application says a copy of the proposed newspaper advertisement for the permit application is in Exhibit 3. Upon receipt of notification that the Division has determined the permit application to be administratively complete, Cyprus will place the advertisement in the "Sun Advocate" at least once per week for four weeks. A copy of the proof of publication will be provided to the Division after the last date of publication.

Exhibit 3 does not contain a copy of the proposed newspaper advertisement. The application is not required to contain a copy of the newspaper advertisement until after advertising is completed. Until advertising is complete, the statement in Section 2.1.8.2 that a copy of the proposed advertisement is in the application is incorrect.

### Facilities or Structures Used in Common

Cyprus plans to use the Castle Gate Preparation Plant, associated loadout, and may use the Crandall and Gravel Canyon areas to meet potential ventilation and reclamation needs. These areas are included in the approved Castle Gate mining and reclamation plan. Plans for these facilities are included in the Willow Creek application. The application says that, during an interim period following review and approval of the Willow Creek application and during development of the Willow Creek Mine, the shared facilities may be included in and bonded under both the Willow Creek and Castle Gate permits. Cyprus anticipates that a permit revision will be submitted to eliminate the shared facilities from the Castle Gate permit.

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These commitments satisfy the requirements of R645-301-117.300.

### Filing Fee

The Division has on file a copy of the check paid for the filing fee.

### Notarized Signature

The application says the required notarized signature of a responsible Cyprus official that the information in the application is true and correct to the best of the official's information and belief was included in the transmittal which accompanied the permit application submittal. The required statement was included with the transmittal letter and is in the application before the table of contents.

### Findings:

This section of the application is complete and will be accurate after Cyprus includes a copy of the proof of publication in its application. If felt appropriate, Cyprus should modify the statement in Section 2.1.7 where the application says the permit application provides information for all anticipated mining and reclamation operations over the life of the mine.

Before the Division issues a permit, Cyprus will need to submit a certificate of insurance or other evidence of insurance satisfying the requirements of R645-301-800.

When Cyprus has advertised for the permit submission, they will need to submit proof of publication.

## HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.12; R645-301-411.

### Analysis:

Section 3.4.3 contains most cultural and historic resource information. The full report by Sagebrush Archaeological Consultants is in Volume 15 and is marked confidential. Map 11 shows facilities area cultural resources and correlates with the abbreviated information in the text. In Section 3.4.3.4, the application references Map 3-8 for cultural resources information. This appears to be a mistake since Map 8 has biological information and Map 11 has cultural resources information.

The purpose for keeping some cultural resources information confidential is to try to limit vandalism and illegal collecting of artifacts. The application contains information about significant resources the consultant considered significant, and non-confidential portions of the application contain enough detail to locate these sites. Most sites associated with the old mines are widely known, but site 42Cb1001 is a newly-discovered site that is probably not known to most of the local population. Map 11 contains detail of the sites' locations, and it should be considered confidential. Also, the application

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contains enough information in the text that a person could probably locate the sites. Location detail in the non-confidential portions of the application needs to be limited.

Three cultural resource areas were previously identified, and these were reclaimed as part of the Abandoned Mines Reclamation Program work in the area in 1990. Two additional sites were located as part of the work done for the Willow Creek Mine. One of these consists of an area with three pictograph panels. The other includes 42 features associated with the Castle Gate Mines and the Castle Gate townsite. Both of these sites were considered potentially eligible for listing in the National Register of Historic Places.

Four new paleontological sites were found, each consisting of one or more trace fossils. These were not considered unique or unusual. However, the consultant recommended that any unusual fossil remains, especially fossil bone materials, encountered during mining be evaluated if possible.

Correspondence from the Division of State History says the background information material is accurate and well done and that their office concurs with the accuracy of the material.

Following the field investigations, site listing forms were prepared and submitted to the State Historic Preservation Office (SHPO). The applicant met with the SHPO to review cultural resource considerations and potential mitigation requirements. The application says the results of this meeting and subsequent discussions were incorporated in the mining and reclamation planning process in order to minimize or mitigate potential mining related impact.

Although the application describes some coordination efforts with the Division of State History, it does not show how cultural resources will be protected or how potential effects will be mitigated. It appears most potential effects are being avoided simply by not proposing disturbance in critical areas. October 24, 1995, correspondence to the Division from State History says the writer believes a determination of No Adverse Effect can be reached if sensitive treatment of the mine property is considered during the opening of the mine. It also says the Castle Gate explosion would be a focus of their concern, and it recommends that this area not be reused.

Site 42Cb1001 is within the proposed disturbed area, but it does not appear this area will be disturbed. The closest disturbance to this site is the conveyor and a steep cut adjacent to the conveyor. It appears the cut slope forms about a 20-foot difference in elevation between the conveyor and the site. For this reason, there would probably be no damage to the pictographs from coal fines originating on the conveyor.

Although the applicant does not propose to disturb the pictographs, they are contained within the proposed disturbed area. Therefore, the Division should stipulate that they not be disturbed without specific consent from the Division and from State History.

The only part of site 42Cb1000 about which State History expressed concern is the area of the Castle Gate explosion. The explosion occurred in the Castle Gate No. 2 Mine. State History is concerned about the mine portal and feels this is the most important portion of site 42Cb1000. They believe it definitely needs to be protected, but the applicant does not propose to disturb this area.

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The application needs to contain evidence of clearances from the Division of State History. The October 24, 1995, letter from State History should be included in the application. This combined with statements that the two major areas of concern would not be disturbed should be adequate.

### Findings:

With the following exceptions, the applicant has complied with these portions of the regulations:

1. The application references Map 3-8 for cultural resources information. It appears this should be a reference to Map 11.
2. Map 11 and some of the cultural resources information in the text of the plan should be considered confidential. These materials contain enough detail for a person to easily locate the significant cultural resources sites identified in the application.
3. The application need to contain evidence of clearances from the Division of State History.

The Division should stipulate that site 42Cb1001 not be disturbed without specific approval from the Division and the Division of State History.

## CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.18; R645-301-724.

### Analysis:

Climatological information is found in Sections 3.7.1.4, and 3.7.4. Information specific to temperatures, precipitation and wind is located in Sections 3.7.4.1, 3.7.4.2, and 3.7.4.3, respectively. More climatological information is found on Page 3.7-28, Section 3.7.3.1. Table 3.7-7 is the summary of climatological data.

Average monthly temperatures are listed in Table 3.7-7. The frost free period ranges from 60 to 120 days, depending on elevation and exposure. Temperatures can change rapidly when fast moving storm fronts pass. Annual precipitation is 14.8 inches. Rainfall frequently comes in brief, high-intensity storms. Average monthly precipitation is lowest in June, 0.65-inches, and highest in September, 1.86-inches.

Table EXDS-5 and Table 3.7-13 provide return periods for short duration storms at three stations near the permit area. The final duration-frequency values for the permit area were derived by taking the simple mean of the three stations with record.

Prevailing summer wind are from the West and Northwest, usually blowing less than 20 mile per hour. Winter wind tend to be more variable, blowing frequently from the Northeast. Diurnal flow tend to be upslope in the daytime and downslope at night.

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### Findings:

CPMC has include sufficient climatological information to make the necessary determinations about hydrologic designs and air quality.

## VEGETATION RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.19; R645-301-320.

### Analysis:

Section 3-2 contains the results of vegetation surveys done for the proposed Willow Creek Mine. Three plant community types were surveyed for this study: 1) Disturbed Plant Community; 2) Reclaimed Plant Community; and 3) Riparian Plant Community.

Total vegetation cover in the disturbed plant community was 26.72%. Ground cover, including vegetation cover and litter, was 46.92%. Dominant plants included Indian ricegrass, downy brome, Salina wild rye, and rubber rabbitbrush. Relative cover by species commonly classified as weeds was 15.4%.

The Reclaimed Plant Community had 28.73% vegetation cover and 48.13% ground cover. Dominant species included pubescent wheatgrass, western wheatgrass, kochia, yellow sweet clover, prostrate kochia, rubber rabbitbrush, and fourwing Saltbush. Relative cover from plants usually classified as weeds was 19.2%.

Sampling methods used for the riparian area were different from those used for the other areas. These methods allow the percentage to be greater than 100%. Four layers of the canopy were measured separately. The total cover from these layers was 70.43%. Nearly half of this total was from coyote willow and redbud. Other important species included Fremont cottonwood, narrowleaf cottonwood, and yellow sweet clover.

For the requirements of R645-301-321, the application's vegetation information is considered adequate for the areas included in sampling. However, the information is not complete and does not meet the requirements for using the data as a revegetation success standard.

A few areas were not originally (before the application was submitted) proposed to be disturbed, and vegetation was not sampled in these areas in 1994. It is understood these areas have now been sampled and that the data is forthcoming.

As discussed under "Revegetation," vegetation in most of the proposed disturbed area was not sampled in a normal precipitation year as defined in the Division's "Vegetation Information Guidelines." Therefore, the data are not considered adequate for use as a baseline revegetation success standard.

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Until the Willow Creek refuse removal project disturbed a substantial part of the proposed disturbed area of the Willow Creek Mine, the applicant could have resampled in 1995 to get data for a baseline success standard. The only other options are to use the reference area or range site method. If one of these is used, Cyprus will need to include baseline vegetation information for the site to which the reclaimed area would be compared.

### Findings:

Vegetation information is considered adequate with the following exceptions:

1. The applicant needs to include baseline vegetation information for all areas proposed to be disturbed.
2. The applicant has proposed to use the baseline method for the revegetation success standard, but the baseline information in the plan was not gathered during a "normal precipitation year" as defined in the "Vegetation Information Guidelines." Also, since much of the previously disturbed area has been redisturbed, it is impossible to gather this information for these areas. If the applicant decides to use a reference area or range site, the application would need to include baseline vegetation information for this area.

## FISH AND WILDLIFE RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.21; R645-301-322.

### Analysis:

Comments concerning this section of the application are preliminary. The Division is required to consult with the Division of Wildlife Resources about wildlife information requirements, and Wildlife Resources has not had time to complete their review.

### Fish and Wildlife

Fish and wildlife information is in Section 3.3. Section 3.3.2.1 is a "habitat evaluation for proposed permit area and adjacent areas." This section contains general comments about the habitat of the area, Wildlife Resources' habitat classifications, and the relative importance of certain habitat types.

Section 3.3.2.1 contains generalizations and opinions not necessarily supported by data and which may be irrelevant to the application. For example, a footnote on page 3.3-6 discusses Wildlife Resources' rating system for the importance of wildlife habitat. The applicant is apparently attempting to characterize the importance of the proposed disturbed area as being minimal and discusses the failings of the system. While the system does have problems, including some of those discussed in the footnote, the application gives no data showing which areas may not fit the definitions in the Wildlife Resources system.

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This section (and another in the fish and wildlife protection portion of the application) attempts to characterize previously disturbed areas as having minimal value to wildlife. Again, the application does not support these conclusions with data. In fact, the area supports deer winter range and has provided habitat for raptors and other birds. It probably provides habitat for other species as well, not just "occasional rodent species." Also, Section 3.4.2.2 says full-scale reclamation in areas with more recent mining activity has resulted in effective vegetation reestablishment and general restoration of many of the premining habitat values.

If included in the application, these kinds of statements need to be supported with data. While the proposed disturbed area may not have as much value as other areas, its relatively gentle terrain and proximity to Willow Creek give it a lot of value in spite of the highway and power plant. The value for habitat could probably be enhanced in reclamation by providing greater cover and by enhancing the quality of vegetation, particularly in areas not reclaimed by the Division's Abandoned Mines Reclamation Program (AMR).

About 312 species of vertebrate wildlife could exist within the proposed permit area. Of these, 56 are known to live in the area, 21 are likely inhabitants, 97 could occur in the area but may be just transients, and 138 are unlikely to be in the permit area based on known range or habitat preference.

The application says comprehensive site-specific wildlife baseline studies are not required based on applicable Division and Wildlife Resources guidelines and conversations with representatives of these agencies. These studies may not be required, but R645-301-322 says the scope and level of detail of wildlife information is to be determined by the Division based on consultations with State and federal agencies with responsibilities for fish and wildlife and will be sufficient to design the protection and enhancement plan required under R645-301-333. After Wildlife Resources has had an opportunity to review the application, the Division will probably need to require certain baseline information, but the extent of these requirements is not yet known.

Three amphibian species are considered potential residents of the mine plan area. Of these, the tiger salamander is the only species classified as having high interest to the State.

Three reptiles are known, based on observations, to exist in the proposed permit area, but eleven species are considered potential inhabitants. Two high interest species may be in the proposed permit area, the milk snake and the collared lizard. The application discusses habitat where these species are normally found.

Site reconnaissance surveys in 1994 found 40 bird species although 104 species are considered potential inhabitants of the proposed permit area. Several raptor species are known or believed to nest in the area, and raptor surveys have been done in various parts of the proposed permit area intermittently since 1979. Map 7 shows known nest sites. Six golden eagle nests are within one-half mile of the proposed surface facilities. Future verification of nesting activity will occur prior to construction in 1996/1997, and appropriate mitigation measures will be implemented in consultation with the Division and Wildlife Resources.

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The application discusses habitat requirements for thirteen other bird species. The reasons for singling out some of these species is unknown. Some of the thirteen are not known to occur in the West Tavaputs Plateau and are unlikely to inhabit the mine plan area. Discussions about these species should be eliminated from the plan unless they are relevant.

In Section 4.3.3.4, the application says that where full extraction mining is conducted beneath exposed cliff faces, field reconnaissance will be completed for mining areas at least two years prior to mining to evaluate the presence of any sensitive species such as canyon sweetvetch or golden eagle nests. If sensitive species are found in areas having the potential for significant subsidence-related impacts, a mitigation plan will be formulated in consultation with appropriate State and federal agencies. The plans may include leaving buffer zones of coal, obtaining take permits for golden eagle nests, or other plans.

It is extremely unlikely subsidence would affect canyon sweetvetch. This species does not normally grow on cliffs such as could potentially fail during subsidence. Even in the unlikely event there were subsidence cracks in the area of some plants, they would probably not be damaged.

Eagle nests have been lost as a result of subsidence, and the plans to check potential habitat for nesting activity in advance of mining are appropriate. Where the application only gives the examples of golden eagles and canyon sweetvetch, it is assumed there will be checks for other cliff-dwelling species.

In addition to cliffs, subsidence has the potential of affecting trees and tree-nesting raptors. The plateau has areas where these species nest, and these areas should be checked in addition to the cliffs.

The application uses the term "sensitive species" in referring to canyon sweetvetch and golden eagles. This term is used by the Bureau of Land Management and Forest Service to refer to specific groups of uncommon species, often candidate threatened or endangered species. Canyon sweetvetch is actually on the list for these agencies, but golden eagles are not. The applicant should consider using a different term.

Fifty mammal species are classified as potential residents of the proposed permit area. Of these, ten have been observed in the area. Seventeen species of high interest to the State are known, likely, or possible residents of the area.

As in discussions of other groups of vertebrates, the application gives some information about the life histories of certain mammal species. Again, the reason for giving this information about some of the species is not known. Some are unlikely to be in the proposed permit area, and some are not even known to inhabit the West Tavaputs Plateau. The application is required to be "concise," and there appears to be no reason for including some of this information.

According to the application, nearly all of the proposed permit area contains critical elk winter range. Most of the proposed permit area also has either high priority or critical deer winter range. Several other mammal species are known or suspected to inhabit the area, but the application does not show important habitat for these species.

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The Division of Wildlife Resources considers the proposed surface facilities area to be marginal critical deer winter range. The area may not produce as much forage as adjacent undisturbed areas, but because of the terrain, water availability, and other factors, deer tend to congregate there. This use should be identified in the application.

Fish surveys were conducted in Willow Creek in October 1994 and June 1995. Willow Creek is considered a class 4 fishery with low recreational fishing potential. The application says the portion of Willow Creek in the proposed mine area has poor spawning habitat and that this section of the stream is used more as a migration route for spawning fish. The only game species found in the electroshocking surveys was rainbow trout.

The Price River has a greater diversity of fish, but it is still considered a class 4 fishery. Most game fish found in a 1987 electroshocking study in Helper in 1987 were rainbow trout, but there were some cutthroat and brown trout,

Non-game fish species in Willow Creek are speckled dace and mountain sucker. Section 3.3.3.1 and Table 3.3-2 show results from 1994 and 1995 surveys including numbers of each species found. Wildlife Resources has collected nine species of fish from the Price River downstream of its confluence with Willow Creek.

Tables 3.3-3 through 3.3-9 have results of October 1994 macroinvertebrate sampling in Willow Creek. According to the application both the numbers of individuals and the numbers of taxa found at each sampling site were considered relatively low. Diversity values ranged from 1.15 to 1.66 at lower sites and 1.78 to 2.31 at upper sites. The application says values less than two are considered to indicate a possible stressed macroinvertebrate community.

### **Threatened and Endangered Species**

The application describes the applicant's and others' efforts to locate threatened, endangered, and candidate species. In 1989, the AMR program requested information about what species could be affected by their project in the area of the proposed mine, and they were given a list of six listed and three candidate species. The application says Cedar Creek Associates will request from the Fish and Wildlife Service an updated list of species potentially occurring the proposed permit area.

The application says, based on current listings and information from Wildlife Resources, there is potential for thirteen candidate and five listed terrestrial wildlife species to occur in the proposed permit area. Of the five listed species, only two, the peregrine falcon and bald eagle, have much likelihood of being the area. No peregrine falcon nests or resident falcons are known to exist in the vicinity of the proposed permit area.

Bald eagle critical wintering areas exist a few miles southwest of the proposed permit area, but there are no known high priority concentration areas or critical roost trees actually in the area.

There is potential habitat for two candidate fish species in Willow Creek. These are the roundtail chub and the leatherside chub. The application says these species occurred historically in the Price River and its tributaries, but neither has been observed recently in Willow Creek. However,

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leatherside chub has been collected recently in the Price River upstream of the Willow Creek confluence.

Six other listed or candidate species could potentially occur in the Price River below the confluence with Willow Creek, but most of these live primarily in the Green River.

Threatened, endangered, and sensitive plant species are discussed in Section 3.2.3. In 1989 correspondence with AMR, the Fish and Wildlife Service mentioned two sensitive plant species that could occur in the area. These are canyon sweetvetch (*Hedysarum occidentale* var. *canone*) and Creutzfeldt catseye (*Cryptantha creutzfeldtii*). Neither species was found by AMR biologists.

The applicant spent several days in August 1994 looking for canyon sweetvetch, but no plants were found in the project area. Two populations were found in the mouth of Cordingly Canyon about one-half mile south of the proposed permit area. The application says it is possible that additional plants occur in the proposed permit area but not in areas currently proposed for disturbance.

According to the *Utah Endangered, Threatened and Sensitive Plant Field Guide*, Creutzfeldt catseye grows in shadscale and mat atriplex communities on the Mancos Shale Formation between 5250 and 6495 feet elevation. Portions of the proposed disturbed area are barely within this elevational range; however, the area does not have the right kind of habitat for this species. Also, according to Bob Thompson of the U. S. Forest Service, he has seen no plants even in what he considers potential habitat in the Helper area. He has searched and found no plants west of Price.

The Division should be receiving comments from the Fish and Wildlife Service about this project. If they identify additional species of potential concern, the applicant may need to gather more information. Until those comments are received, this portion of the application can be considered technically adequate.

### Findings:

For the present, this portion of the application is considered complete and accurate with the following exceptions:

1. Section 3.3.2.1 contains generalizations and opinions not necessarily supported by data and which may be irrelevant to the application. The applicant is apparently trying to show the value of the area to wildlife is minimal. These types of statements need to either be supported with data or eliminated from the application.
2. The application says comprehensive site-specific wildlife baseline studies are not required based on applicable Division and Wildlife Resources guidelines and conversations with representatives of these agencies. This statement should be modified. The extent of wildlife informational requirements is not yet known. R645-301-322 says the scope and level of detail of wildlife information is to be determined by the Division based on consultations with State and federal agencies with responsibilities for fish and wildlife. These State and federal agencies have not yet

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provided their comments to the Division. Further baseline information could be needed.

3. The applicant has committed to check cliff areas for "sensitive species," such as canyon sweetvetch and golden eagles, in advance of mining that could cause subsidence. In addition, the applicant should check areas with potential habitat for tree-nesting birds of special interest, such as raptors.
4. The application discusses habitat requirements for some bird and mammal species that are not known to occur in the West Tavaputs Plateau and that are unlikely to inhabit the mine plan area. Discussions about these species should be eliminated from the plan unless they are relevant.
5. The Division of Wildlife Resources considers the proposed surface facilities area to be marginal critical deer winter range. The area may not produce as much forage as adjacent undisturbed areas, but because of the terrain, water availability, and other factors, deer tend to congregate there. This use should be identified in the application

## SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.21, 817.200(c); R645-301-411, -301-233.

### Analysis:

Volume 2: Section 3.1 Soils Information  
Section 3.2 Vegetation Information  
Table 3.2-2 Previous and Proposed New Disturbance by Vegetation Type  
Section 3.6 Geological Information  
Section 3.6.3 Coal and Overburden/Interburden Characteristics

### Volume 9: Exhibit 5:

Profile Descriptions of Soils Encountered at the Willow Creek Mine  
Facilities Area  
Soil Mapping Unit Descriptions of Soils in the Willow Creek Mine  
Permit Area  
Prime Farmlands  
Soil Sample Analysis Data  
Roof and Floor Analyses

Volume 9: Exhibit 7 Documentation of Existing Site Conditions

Volume 10: Exhibit 11 Geotechnical Investigations

Map 4 Facilities Area Soils Map

## Map 3 Regional Soils Map

### Exhibit 8.3 Made Land (Volume 13A)

This site is at an elevation of 6200' and on a southeastern facing slope. Fourteen to 18 inches of water falls annually. Vegetation is noted on Map #4 (but no key is provided in the legend). Most of the disturbance is in *Artemesia tridentata* spp *tridentata* (big sagebrush) and *Elymus salinus* (saline wildrye) vegetation. The site has been a repository for coal refuse from 1938 - 1972 and in 1990 was the burial site of approximately 400,000 yd<sup>3</sup> of refuse in an AMR reclamation project (AMR\007\907 to 912). (CPMC has incorrectly listed the AMR reclamation project date as Fall of 1989 in section 3.2.) The site is not Prime Farmland as shown in Ex 5, Volume 9.

Section 3.1 of the text is largely devoted to discussion of soil, refuse and roof and floor samples taken by various mine operations in the Castle Gate Mine area over the last two decades. Unfortunately, the laboratory analyses are not all included with the discussion in Ex 5. Those that are included are poorly organized. It is difficult for the reader to follow the discussion without the laboratory analyses.

Map 4, Facilities Area Soils Map, does not have all of the samples referred to in the text (see plate 3.1-5 and 3.1-6) in its legend or designated on the map. Some soil samples are partially identified on the map (i.e. samples WC 2, 8, 9, 11, 12 and 2 refuse samples from 1994 could not be located.) There are no recent (post-reclamation) disturbed pad area sampling sites noted on this map and there is no evidence of the recent site specific soil survey (referred to at the top of page 3.1-7) on the map. Geotechnical survey information found in Exhibit 11 of Volume 10 is not referred to, but does provide the best information regarding the present conditions at the Willow Creek Mine site.

Exhibit 8-3 from the Castle Gate Mine plan is referred to on page 3.1-9 (second to the last line). This exhibit and its corresponding soil samples could not be found in exhibit 13A of the plan or in any other location. Made Land #2 and Pits #6 - 10 are also referred to and discussed. Since the Castle Gate Mine plan will be replaced by the Willow Creek Mine, and since these and other soil samples from the Castle Gate Mine plan are critical to the discussion in section 3.1; it is recommended that soils analyses (from Crandall Canyon, the Schoolhouse refuse pile and the preparation plant) and the accompanying soils map be placed in an exhibit of the Willow Creek Mine Plan for present and future reference.

Exhibit 5 is titled "Profile Descriptions of Soils encountered at the Willow Creek Mine Facilities Area." Actually, the profile descriptions found within this exhibit are excerpted from the Soil Conservation Service soil survey of Carbon County and are located at great distances from the mine site. For example the Winetti Series soil typical pedon (pg. Ex 5-12) is located 2.5 miles north of the Sunnyside Mine in Sec 20, T14S, R14E. These pedon locations are not located on any mine plan map (of course). In some instances information is included in this exhibit that isn't applicable in even a general sense, i.e. the Winetti Variant.

One site specific pedon discussed in the text was sampled in 1979 by Price River Coal Co. (PRCC) in the vicinity of the Willow Creek mine (location not shown on Map 4). Page 3.1-9 and

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3.1-10 describe these pits, although the labeling of Pit #4 has been omitted from the text. Pit #4 represents the cut side of the fill bench. Pit #4 has an A1, B2t, and B2ca horizon. These soil horizons have textures from loamy very fine sand (0 - 2") , gravelly very fine sandy loam (2 - 5"), and gravelly very fine sandy loam (5 - 10") over bedrock at ten inches. The consistency of the soil was nonsticky and nonplastic in all cases and the pH was very neutral in all horizons: 7.6, 7.5, and 7.6, respectively.

Pit #5 describes the fill soil (disturbed soil) which was on the pad prior to reclamation of the site by AMR. Pit #5 was dug in an area barren of vegetation. (One might speculate as to why there was no vegetation.) Horizons were determined based on coarse fragment content and color. The upper twenty four inches has 60 percent gravels and stones. Coarse fragment size and amount increases with depth to 70% cobbles at 35 inches and 60% boulders at 96 inches. Clay content also increases with depth, from 35 to 96 inches being described as a very bouldery clay soil.

Three samples from 0 - 6 and 6 - 18 inch depth were taken of this disturbed soil in 1988 by Kent Crofts (Intermountain Environmental, IME). Field notes were recorded, but not included in Exhibit 5. Soil samples were analyzed by the Book Cliffs laboratories, but no samples were found in Ex. 5 from Book Cliffs lab. Sample reports which correspond to this date and which were analyzed by ACZ were found. (In a discussion with Jerry Nettleton of Terra Matrix, I discovered that the BookCliffs Lab became ACZ.) This source of confusion could be eliminated from the text.

The Pit #5 disturbed soil sample analyses convey that the soil has a neutral pH of 7.2 to 7.5; the EC ranged from 0.5 to 3.6 mmhos/cm, saturation percentage ranged from 26 to 33%; the SAR was calculated to be from 0.4 to 1.2; Boron was 2.2 ppm or less; Se was 0.03 ppm or less; all forms of sulfur were extremely low and neutralization potential was less than 10% or less than 10 T of CaCO<sub>3</sub> per 1000 Tons of overburden. The texture of this disturbed soil was sandy loam or loam. The particle size of the material ranged from gravelly to very gravelly with one report of 15% cobbles at the 6 - 18" increment. The "pedon" description (discussed above) confirms that coarse fragments larger than stones did not exist in the top 24" of disturbed soil.

Although the soils described were removed from the site during burial of the Panther Mine coal refuse; similar soils were likely replaced upon the graded refuse in the 1991 AMR reclamation of the site. Exhibit 7, Documentation of Existing Site Conditions was searched for further information, but this exhibit was missing from the mine plan. No photographs documenting conditions at the site could be found in the mine plan. No field sampling has been conducted to determine the optimum soil salvage depth, although a plan to sample these soils in the future is discussed in Section 4.2. (And should be underway, as the soils are being removed from the refuse at this writing.)

Of the 6.8 additional acres to be disturbed at the Willow Creek Mine site, most of the acreage to be impacted is in the Shupert-Winetti complex with lesser disturbance to the Travessilla - Rock Outcrop - Gerst Complex and the Midford Family - Pod Association. The mine plan places most of new disturbance in areas of Winetti series soils based upon a comparison between profile descriptions conducted by PRCC in 1979 for the Castle Gate Mine and the SCS description of the Winetti Series (see page 3.1-14). However, the representative profile of Pit #4 for the Willow Creek mine site does not fit the description of the Winetti Series. The soils in the Pit profile are more developed. They have a zone of clay accumulation in the B horizon and no mention is made of cobbles or boulders in

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the A, or B horizons. The pH throughout the profile is much less alkaline than in the Winetti series. Other soils indicated in the vicinity of the Willow Creek Mine site (as shown on Map 4) are the Pathead - Curecanti Family Association. The Curecanti soils are very deep and have pH values around 6.5. The Pathead soils are stony and cobbly with an alkaline pH. Neither description fits the profile of Pit #4.

For the above reasons, the disposition of the disturbed soils within the various series as stated on page 3.1-13 seems to be in error. This supposition should be further supported with field studies or deleted from the plan. A determination of the most likely Willow Creek disturbed area soils classification is critical to the mine operators contention that waste rock and other materials with high coarse fragments are suitable substitute topsoil material. This contention is not supported by either the Pit #4 or Pit #5 profile. The representative soil does, however, contain large amounts of gravels in the upper 24 inches.

Forage production values are reported for SCS mapping units 63, 72, 107 and 121 (see pg 3.1-14). Map 4 shows the Willow Creek Mine site to be in the area of Soil types 107 and 72 which have productivity rates of 1000 - 2000 lbs/ac/yr and 1000 - 1400 ls/ac/yr, respectively.

The mine water tank disturbance will be in SCS mapping unit 121 (mostly the Travesilla series) and mapping unit 63 (mostly the Podo soils). Typical pedons for these series are found in Ex. 5 (not site specific). No field sampling has been conducted to confirm the soil type or to determine the potential for soil salvage.

Streambank samples were analyzed in 1989 by ACZ laboratories for Blackhawk Coal Co. (BCC). These stream locations had 25 to 53% coarse fragments and textures ranging from clay loam to sandy loam. These soil samples are identified on the map as Physical Soil Sample Locations, June 1989. In 1994, the stream was revisited by Cypress Plateau to delineate wetlands. The stream soils were classified as Typic Fluvaquents (sic). This classification was not shown on Map 4. Some, but not all of the sampling sites from this effort are shown on Map 4. Field notes were not found in Ex 5.

Also in 1989, three sediment pond samples were taken and describe the nature of the run-off from the mine pad. Of note were elevated nitrate nitrogen levels which probably account for the higher than normal EC values and which would be harmful to plant growth.

The buried refuse was sampled in 1994. Locations of the samples (94-12-1R and 94-12-2R) are not indicated on Map 4 and sample analyses could not be found in Ex. 5. The location of these analyses may be in Ex. 11, Geotechnical Investigations. If this is the case, that fact should be included in the discussion of the samples.

### Findings:

The plan can not be considered technically adequate with regard to a description of the existing soils resource. The mining and reclamation application is not in compliance with the requirements of 30 CFR 783.21 and 30 CFR 817.200.

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The permittee must provide the following, prior to approval, in accordance with the requirements of:

**R645-301-222 Soil Survey.** The application must include an organized, clear and concise description of the premining soils resource, including a map delineating the different soils, soil identification and description.

The text implies greater understanding of the Willow Creek Mine site soils resource than the provided documentation can confirm. A site specific investigation of the soils prior to disturbance is warranted to establish present conditions of the soils in the 6.8 acres of new disturbance. This information and the results of the proposed sampling (pg 4.2-5) prior to removal of the refuse cover material should be disclosed within section 3.1. An isopach map of the removal depth for the undisturbed sites and the disturbed regolith should be sketched to identify those areas where soil will not be salvaged and to ensure that all suitable cover material is identified for salvage. This is very important considering that 6.8 acres of disturbance will be added to the site, but not all of those acres will contribute additional topsoil for reclamation.

The information presented in the plan is taken from many different sources and could be presented in a more orderly fashion. For example, all soil sampling locations discussed in the text should be included in the map legend and located on the map. All notations on the map should be in the legend. All soil analyses discussed in section 3.1 should be included in Ex. 5. Exhibit 5 could be prefaced by a table of contents for easy reference. Exhibit 7, Documentation of Existing Site Conditions, should be completed.

Castle Gate Mine Plan soils information (found in chapter 8 of the Castle Gate Mine Plan and its appendix) should be included as an exhibit, since this chapter provides a complete description of the Crandall Canyon, Preparation Plant and Refuse soils and analyses.

Please read the analysis section for further information on deficiencies in the text and map presentation.

### LAND-USE RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.22; R645-301-411.

#### Analysis:

##### Current Uses

Land uses of the proposed permit area are discussed in Section 3.4.2. The application references Map 3-9 and Map 9 for regional land use information, and Map 3-10 for previous mining activity. Maps 3-9 and 3-10 could not be located. It appears these should be called Maps 9 and 10.

According to the application, the primary constraints relative to the condition and capability of lands within the proposed permit area and adjacent areas to support various land uses are the rugged

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terrain of the area, the lack of significant precipitation, and the lack of available water for irrigation or stock on a large portion of the area. The topography is composed primarily of high plateaus intersected by deep drainages with steep-walled canyons and high rocky cliffs.

Topography and resource constraints limit land uses on the plateaus to wildlife habitat, low intensity grazing, undeveloped recreation, and scattered timber production. These areas have limited access because of the surrounding rugged terrain and harsh climatic conditions during part of the year. Soils on the plateaus are generally more developed than in the canyons, and higher precipitation and lower runoff because of the gentler terrain allow growth of some conifers.

Land use is even more limited in the narrow canyons and on ridgelines. In many areas, access is extremely difficult except in the very bottoms of some canyons. Reasonably feasible land uses are wildlife habitat, low intensity grazing, and occasional undeveloped recreational use. The potential for alternative postmining land uses is limited by shallow, poorly-developed soils with low water holding capacity, and a lack of surface or ground water sources.

Extensive historical mining and related activities have occurred in the Price River and lower Willow Creek valleys in the permit area. Several other canyons have dirt roads but are otherwise nearly undisturbed. Existing and potential uses in the valley bottom areas include mining, transportation, wildlife habitat, grazing, and undeveloped recreation.

In Section 3.4.2.2, the application describes existing land uses within the proposed permit area. These are divided into the categories in R645-100-200 and further subdivided. The primary uses listed are industrial/commercial, undeveloped lands, and forestry. Under industrial/commercial, the application includes underground coal mining, scattered oil and gas production, transportation and utilities, and electrical power generation. Under undeveloped lands, the application includes low intensity grazing, fish and wildlife habitat, and dispersed recreation. The only forestry use shown is limited timber production. Grazing and wildlife habitat are the dominant uses for undeveloped lands, and mining is the main industrial use.

According to the application, small cattle and sheep grazing operations utilize some of the high plateau areas on a seasonal basis. Typical stocking rates are about eight acres per animal unit month. There will be no surface disturbances on areas used for grazing.

A wide variety of fish and wildlife species use the area. In areas where more recent mining has occurred, such as the proposed surface facilities area, reclamation efforts over portions of the areas have resulted in effective vegetative reestablishment and general restoration of many of the premining habitat values.

Based on information in the application, it appears the land use in much of the proposed permit area is wildlife habitat and grazing and may not be, as the application states, undeveloped land. The difference between undeveloped land and land managed for wildlife habitat and grazing is difficult to define, however. The question is one of degree of management. Most of the area consists of critical elk winter range and critical and high value deer winter range. These habitats are considered vital to maintenance of local elk and deer populations, and, to the degree possible, the Division of Wildlife Resources is concerned about managing these lands for wildlife habitat. However, there may be little

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management on private lands. The amount of management the areas receive for grazing is difficult to determine based on the information in the application. It is probably limited to adjusting stocking rates and trying to maintain water supplies although there might be some vegetation manipulation on Bureau of Land Management lands.

When the Division released the performance bond for the former Willow Creek Mine (007/002), the land use was light industrial. The landowner and former permittee leased the area for this use. This use needs to be identified in the application. The application should also show whether this lease is still in effect.

To determine current land uses and decide which land use classifications are appropriate under the regulations, the Division needs comments from landowners. The applicant is required to include in the application copies of comments concerning the proposed postmining land use by the legal or equitable owners of record of the surface of the proposed permit area and Utah and local government agencies which would have to initiate, implement, approve, or authorize the proposed use of the land following reclamation. The application does not contain these comments. When the applicant seeks them, they should request comments concerning the premining land use as well.

The permit and adjacent areas are zoned by the Carbon County Planning Department as mining and grazing or critical environmental. The critical environmental designation is for areas above 7000 feet elevation and includes grazing, wildlife habitat, and some recreation activities. The application says the designated land use classifications and related zoning restrictions are consistent with both existing land uses and proposed mining activities.

The proposed permit area includes no public parks, components of either the National River or Trail Systems, renewable resource lands, areas designated unsuitable for mining, or other restricted use areas. It is assumed the application refers to the Wild and Scenic Rivers System where it says there are no components of the National River System in the proposed permit area.

It appears Section 3.4.2.4 is referring to unsuitability criteria when it says there are no renewable resource lands in the proposed permit area or adjacent areas. This needs to be clarified. The proposed permit area does contain renewable resource lands, but it probably does not contain areas that contribute significantly to the long-range productivity of water supply or of food or fiber products including aquifers and aquifer recharge areas. The significance criterion is used to designate areas unsuitable for coal mining and reclamation activities.

### **Previous Mining Activity**

The earliest recorded mining activity in the area was the development of the Castle Gate No. 1 Mine in 1888. Extensive mine development and operations continued in the area through World War II, but mining gradually decreased until the last of the Castle Gate Mines closed in 1972.

Essentially all of the previous historical mining operations have been conventional room and pillar mines extracting coal reserves from one or more of the known coal seams in the Blackhawk Formation. Table 3.4-1 summarizes available information on previous historical mining operations,

including mine names, seams mined, period of mining, and mining methods. Map 10 shows the extent of underground and known surface operations.

Section 5.3.1.2 indicates the mine surface facilities area and the Castle Gate Preparation Plant were in all probability undeveloped lands utilized for wildlife habitat prior to the introduction of mining. This statement is probably correct since it is assumed there was little wildlife management in the area before 1888. There may have been some limited grazing, however.

The information in the portion of the application describing previous mining activity fulfills regulatory requirements.

**Findings:**

With the following exceptions, this portion of the application is considered complete and accurate:

1. The application references Maps 3-9 and 3-10, but these maps could not be located in the application.
2. The application needs further information about the current land uses of the proposed permit area. In particular, the applicant should include landowner comments about current uses so it can be determined if certain areas are undeveloped land or if they can be classified as wildlife habitat or grazing lands.
3. The application needs to describe the industrial use in the area of the formerly-permitted Willow Creek Mine. This use may have been terminated.

**ALLUVIAL VALLEY FLOORS**

Regulatory Reference: 30 CFR Sec. 785.19; R645-302-320.

**Analysis:**

Volume 3 Section 3.7.6      Evaluation of Potential Impacts on Alluvial Valley Floors  
Section 7.11   Operations on Alluvial Valley Floors

The permit application refers to a decision document by the Division of Oil Gas and Mining (DOGM) in 1982. At that time, a multi-disciplinary team studied the vicinity of the Castle Gate Preparation Plant. The team determined that the site was in an alluvial valley, but that there were no effects on the soils or water quality by the adjacent mining activity. This document is reprinted in Exhibit 10.

The Price River is impacted by the power plant; the Dept of Transportation road salt storage facility; highway activity and abandoned coal refuse piles along the river banks. Both the Willow Creek Mine site and the Castle Gate Preparation Plant have remained idle for most of the last decade.

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### Findings:

The plan is considered technically adequate with regard to the Alluvial Valley discussion.

## GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.22; R645-301-623, -301-724.

### Analysis:

Descriptions of the stratigraphy and lithology of strata from the Mancos Shale up to the North Horn Formation are in Section 3.6.1.3. Section 3.6.2.2 contains more detailed descriptions of strata from the Aberdeen Sandstone, the strata/aquifer immediately below the lowest coal seam to be mined, up through the coal bearing strata of the Blackhawk Formation. Characteristics of the overburden, interburden, and coal are described in Section 3.6.3. Regional hydrostratigraphy, including the Flagstaff Limestone, is discussed in Section 3.7.2.1. Structural geology is discussed in Section 3.6.2.1. Alluvial/colluvial, perched, stored mine water, and regional aquifer systems occur in the permit and adjacent areas. These systems and hydraulic characteristics based on aquifer testing are described in Section 3.7.2.2. Ground water movement is generally limited by low transmissivities and lack of secondary permeability, and recharge is limited due to low precipitation rates, brief high intensity runoff, and steep outcrop exposures. Ground water occurrences in bore holes and in the mines are discussed in Section 3.6.2.3. No potentiometric surface map has been made.

Most of the 179 bore holes drilled on or around the permit area since the beginning of the century and prior to 1994 were cored from near-surface to total depth. Detailed logs from these bore holes were used to construct the cross sections (Maps 13A-13D) and isopachs (Maps 14A-14E). However data from the historical drilling and exploratory programs varied considerably in completeness and uniformity. There are few geophysical logs, incomplete cutting logs, generalized core descriptions, very few coal analyses, and little or no information on material physical characteristics.

The primary purpose of the 1994 drilling program was completion of ground water monitoring wells. Ground water was intercepted in each of these bore holes. In addition, a full data collection and analysis program provided valuable information to address existing data deficiencies. The 1994 program produced eleven coal and forty roof and floor spot core samples with complete core descriptions and photographs plus:

- Collection and description of cuttings during rotary drilling
- Documentation of penetration rates using a geograph and notation of drilling conditions
- Notation of any water or gas encountered in the drillholes and measurement of discharge flow rates
- Geophysical logging of drillholes
- Laboratory analysis of coal core samples

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- Suitability analysis of roof and floor samples for each coal seam.

Exhibit 9 contains completion reports, cutting logs with information on ground water occurrences, and core logs for W94-5-1, W94-12-1, and W94-33-1; analysis reports for the roof and floor cores from W94-5-1, W94-12-1, and W94-33-1 plus W94-31-1; and coal analysis reports for W94-5-1 and W94-33-1.

An additional four roof and floor samples for smaller non-minable seams were obtained from a geotechnical hole drilled in 1994 near the proposed portal area, for a total of 44 roof and floor rock samples collected in 1994.

Other information on chemical and physical properties of the coals and adjacent strata comes from a variety of sources dating back to 1979. Chemical characteristics of coal and other materials to be disturbed in the Willow Creek Mine are discussed in Section 3.6.3.2. Cyprus Plateau Mining Corporation (CPMC) evaluations of all available chemical analyses indicate that the sampled materials are not potentially acid- or toxic-forming.

Of the forty core samples of roof and floor rock collected in 1994, three had acid-base potentials below -5 tons  $\text{CaCO}_3$ /1,000 tons of material, the minimum acceptable under the Division's Guidelines for the Management of Topsoil and Overburden, but the average value was 45.91.

Although the average SAR value from the 44 rock and roof core samples was 14.14, numerous samples of soil, mine waste, and coal refuse already at the surface (Soils - Section 3.1.2.3) indicate there is no significant potential for sodium toxicity relative to revegetation.

Boron levels from the forty rock and roof core samples averaged 1.29 mg/kg but two samples exceeded 5 mg/kg and are therefore "unacceptable" under the UDOGM guidelines. Selenium levels from the forty rock and roof core samples averaged 0.04 mg/kg but three samples exceeded 0.1 mg/kg, the UDOGM guideline's suitability limit. The manner in which waste materials are typically handled during mining will most likely result in the smaller volumes of unacceptable materials being mixed with larger volumes of acceptable materials and the resulting buffering or dilution will probably leave material that falls within acceptable values. On page 3.6-27 is a statement that where mine waste rock or coal refuse materials are placed in surface stockpiles, testing these materials for suitability may be appropriate as part of the reclamation program.

Coal extraction thickness will range from 5 to 13 feet and projected maximum subsidence is therefore 3.5 to 9.1 feet, based on the assumption that the surface will subside up to 70% of the thickness of the extracted coal. Nature, depth, and thickness of the coal seams and overlying strata are described in Section 3.6.2 and physical properties of the coal and roof and floor materials are described in Section 3.6.3. Overburden will be greater than 700 feet in most areas mined and massive sandstone units lie between the coal seams and the surface, so subsidence can be expected to be less than the assumed maximum.

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### Findings:

The permit application includes geologic information in sufficient detail to assist in determining all potentially acid- or toxic-forming strata down to and including the stratum immediately below the coal seam to be mined; determining whether reclamation as required by R645-301 and R645-302 can be accomplished; and preparing the subsidence control plan.

The application includes geologic information in sufficient detail to assist in determining the probable hydrologic consequences of the operation upon the quality and quantity of surface and ground water in the permit and adjacent areas, including the extent to which surface and ground water monitoring is necessary; and determining whether reclamation as required by the R645 Rules can be accomplished and whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area.

The Division has not determined it to be necessary to require the collection, analysis, and description of additional geologic information to protect the hydrologic balance, to minimize or prevent subsidence, or to meet the performance standards.

CPMC has not requested that the Division waive in whole or in part the requirements of the borehole information or analysis required of this section.

Following is a summary of deficiencies in this and related sections of the PAP.

No potentiometric surface map has been made.

The statement on p. 3.6-13 concerning well W94-31-1, "Water in-flow was suspected at 62 feet with loss at the fractures at 19 feet." is unclear, indicating, among other possibilities, either that water is flowing into the bore hole at 62 feet, flowing up the bore hole, and flowing into fractures at 19 feet; or that drilling mud was lost at 19 feet as drilling progressed downward. The hole completion report and cuttings log in Exhibit 9 provide no information on this.

It is unclear whether or not W93-33-1 on Map 12 is the same as W94-33-1 on cross section A-A'- Map 13A (and B331-1 & -1A on Map 15 and W94-33-1 & -1A on page 3.6-13)?

W94-31-1 is designated as BW311 on Map 15, not B311 as stated on page 3.6-13.

The monitoring well at Castle Gate and labeled BW36 on Map 15 is not mentioned in the text on page 3.6-13. It is unclear whether or not BW36 is the same as CG045 on Map 12.

It is unclear whether or not "1994SITE" on Map 12 the same as B51 on Map 15 (and W94-5-1 in the text on page 3.6-13).

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In the statement concerning W94-5-1 on p. 3.6-13, "... 5-7 gpm at 325 feet (Aberdeen Sandstone). One day after pump tests were completed, the water level was measured at over 310 feet deep; over 45 feet below the top of the Aberdeen Sandstone indicating a recharge rate of about 0.25 gpm." the relationships between the top of the Aberdeen Sandstone, the water level before the test, the water level during the test, and the water level after the test are unclear: is there an artesian head in this sandstone, and in the context does "... over 310 feet deep; over 45 feet below the top of the Aberdeen Sandstone ..." mean deeper or shallower than 310 feet.

It is unclear whether either "DH001" or "W94?201" on Map 12 the same as B121 on Map 15 (and W94-12-1 in the text on page 3.6-13).

It is unclear if "MC049" (?) on Map 12 the same as B311 on Map 15 (and W94-31-1 in the text on page 3.6-13).

It is not clear that the large (approximately 550') apparent artesian head in Well B331 is a real indication of the static water level in the regional aquifer.

In the statement concerning W94-5-1 on p. 3.6-13, "... 5-7 gpm at 325 feet (Aberdeen Sandstone). One day after pump tests were completed, the water level was measured at over 310 feet deep; over 45 feet below the top of the Aberdeen Sandstone indicating a recharge rate of about 0.25 gpm." the relationships between the top of the Aberdeen Sandstone, the water level before the test, the water level during the test, and the water level after the test are unclear: is there an artesian head in this sandstone, and in the context does "... over 310 feet deep; over 45 feet below the top of the Aberdeen Sandstone ..." mean deeper or shallower than 310 feet.

## HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-720.

### Analysis:

#### Sampling and analysis.

Sampling and analysis for environmental resource information is covered in Exhibit 12 and Sections 3.7.2.4 and 3.7.3.4. These sections are titled Ground Water Quality and Surface Water Quality, respectively. Both sections discuss the type of data that is available from previous sampling projects and the sampling that was undertaken as part of this permitting project. All monitoring locations are shown on Figure 2 of Appendix 12.

Field measure including surface water flow, groundwater depth, temperature, pH, electrical conductivity, and dissolved oxygen will be collected according to methods described in section 3.4 of Appendix 12. Flow will be measured according to one of several methods, including using weirs and flow meter measurements as described in U.S. Geological Survey, water Supply Paper 2175.

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Over the preparation and mining periods of the mine water samples for chemical analysis will be taken from springs, streams and wells as described in Section 3.5 of Appendix 12. Dip samples will be periodically taken from springs and streams for chemical analysis. Three monitoring wells have been installed to depths of 400 feet, 1000 feet, and 1800 feet which had chemical samples taken when they are drilled. Because of the great depth and associated costs, these wells will only be used to define the water surface elevation after their construction. Sample water taken for analysis of dissolved cations and trace elements will be filtered and preserved in the field. Duplicate samples will be taken and analyzed in the laboratory and field equipment will be decontaminated as part of the quality control/quality assurance plan.

CPMC's Baseline Hydrologic Monitoring Plan for the Willow Creek Mine is Exhibit 12 of the PAP. Collection of baseline data began in June 1994.

A comprehensive seep and spring survey resulted in the establishment of 11 spring/seep monitoring locations. The occurrence of ground water and hydraulic characteristics of the aquifers are to be determined through testing and monitoring of 8 wells. Flow and quality of all springs and seeps and ground water wells will be monitored. Monitoring stations are listed in Table 3.7-1 and their locations are shown on the Regional Hydrology Map (Map 15). During 1994 and early 1995 four additional springs/seeps were added, and during 1995 two additional groundwater monitoring wells are planned in conjunction with supplemental exploration drilling.

Information characterizing the ground water flow regime and hydraulic parameters of the regional aquifer comes from wells MC-205, MC-206, and MC-207 located in the western coal reserves area and wells B51, B331, B331A, and B121 recently installed in the Willow Creek Mine area as part of the Baseline Hydrologic Monitoring Plan. The locations of wells B51, B331, B331A, and B121 are shown on the Regional Hydrology Map (Map 15).

The purpose of the plan is to collect and evaluate baseline hydrologic data specific to the Willow Creek Mine. Data collected under the plan will be used to characterize existing ground water flows, water quality conditions, and any seasonal variations in these characteristics, and to evaluate potential impacts to these resources from mining and reclamation activities. Additionally, baseline hydrologic data will be compared to regional data and data from adjacent areas to evaluate spatial and temporal relationships.

Applicable ground water quality standards are summarized in Table 3.7-5 for comparison to water quality data from the site. Ground water monitoring locations where average concentrations of an analyte exceed a water quality standard for at least one use category are presented in Table 3.7-6.

Water quality parameters include field measurements for pH, specific conductance, and temperature, and laboratory measurements for general water characteristics such as total dissolved solids, nutrients, major ions, and trace metals. Available water quality information is summarized in Table 3.7-4. Ground water quality data are presented in Exhibit 10, Hydrologic Information. Available ground water quality data for wells B51, B121, B331, and B331A are presented in Figure 3.7-3.

Ground water quality samples will be collected, labeled and transported to a qualified analytical laboratory for analyses. Proper sample collection, preservation, handling, and storage methods will be

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utilized at all times to preserve the integrity of the samples and ensure validity of analysis results. Water quality samples will be analyzed for the specific parameters listed on Table 3.7-9 and Table 3A of Exhibit 12, and sampling frequency is listed in Table 2 of Exhibit 12. All water monitoring analysis results will be recorded, reviewed to identify potential problems or trends, and filed at the mine so as to be available for future inspection and review. In addition, CPMC will file copies of both field data and laboratory analysis sheets on a quarterly basis with the UDOGM. At the end of each annual water year, CPMC will tabulate all water monitoring data for the year, review the data with respect to changes in groundwater hydrology systems, and provide a summary Annual Hydrology Report in compliance with the UDOGM schedule.

Approximately one year of baseline hydrologic data for most stations were available at the time of the draft technical adequacy review of this permit application. Monitoring to establish baseline conditions will continue with updated analyses and discussions submitted to UDOGM before permit approval.

### **Baseline information -- Ground Water**

A discussion of regional ground water conditions is provided in Section 3.7. Ground water resources are found in shallow alluvial/colluvial valley-fill deposits along drainages; in perched, thin, laterally discontinuous strata in the Blackhawk, Price River, North Horn, and Flagstaff Formations; ground water which has accumulated over time in extensive existing underground mine workings; and in a regional Blackhawk-Star Point-Mancos aquifer.

Ground water rights are held on numerous small springs or seeps, wells in alluvium/colluvium in drainages, shallow wells that intercept perched drainages, and ground water that is discharged into or stored in mines. Water rights are marked on Map 17 and summarized in Exhibit 10. Large volume ground water use in the region is for municipal water, power generation, and irrigation. This water is primarily from the alluvial/colluvial aquifer along the Price River. However, there are several wells in Emma Park, the flatter area north of the permit area, that have rights to large volumes of ground water. These wells probably produce water from the Flagstaff and North Horn Formations. Small volume use from all sources is primarily for stock watering.

No potentiometric surface map has been made. CPMC asserts that no consistent, uniform, stable potentiometric surface exists in the permit area because of the extensive underground disturbance from historic mining, the discontinuous nature of the perched aquifers, the relatively low permeability of the rock units overlying the regional aquifer, and slow recharge/discharge capabilities. Because of these factors CPMC has requested an exemption from any requirement to create a potentiometric surface map and cross sections depicting regional aquifer water levels across the permit area. However, hydrographs of available water level elevations for wells B51, B331, B331A, and B121 are shown on Figure 3.7-1 show short term stability of the potentiometric surface(s). With additional data to be provided by the two monitoring wells installed in 1995, data should be sufficient to map the potentiometric surface.

Locations of fifteen boreholes that were drilled in 1994 in the alluvial/colluvial aquifers along Willow Creek and the Price River are not shown on Map 16, and bore hole logs are not in Exhibit 9. Locations are marked on Figure 2 in Exhibit 11 and bore hole logs are also in Exhibit 11. Bore holes TH-02 and TH-17 were completed as piezometers, and locations are on Figure 2 of Exhibit 11 but not on Map 15.

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Wells completed in the alluvial/colluvial deposits along the Price River can reportedly yield up to 500 gpm at a sustained rate. Ground water movement in the perched and regional aquifers is limited by low transmissivities, lack of secondary permeability, and limited recharge due to arid conditions and limited outcrop exposure of potential recharge zones.

Flows and water levels for seeps, springs, and wells that are monitored by CPMC for baseline information are summarized in Table 3.7-4 of the PAP. Field data sheets are in Exhibit 10.

Area ground water is typically a weak calcium sulfate or sodium sulfate type. Exhibit 10 contains water analysis reports for September 1994 through March 1995 for the four wells drilled in 1994 and for other ground and surface water sampling sites being monitored by CPMC. Exhibit 10 also contains summaries of analysis results, some dating back to 1977, for ground water samples collected by PRCC and CGCC from mines, springs and seeps, and various bore holes. Water quality data are summarized in Table 3.7-4.

In ground water samples, field measured pH values range from 7.6 to 9.3 indicating neutral to moderately alkaline conditions typical of the arid western United States.

Electrical conductivity (EC) ranges from 1,200 to 3,350  $\mu$ mhos/cm. Total Dissolved Solids (TDS) values range from 1,270 to 2,450 mg/l, and elevated TDS values correlate directly with high EC values. CPMC relates the observed variability in TDS and EC values to the highly variable lithologic composition of area bedrock. Lower TDS and EC are generally associated with alluvial/colluvial and perched ground water sources and more permeable sandstones with limited cementation and few soluble components. Higher TDS and EC are associated with relatively deep regional sources, permeable marine sediments, or more highly consolidated marine shales and fine-grained siltstones: low permeabilities result in longer residence times, and greater concentrations of salts and other soluble materials result in greater potential for dissolution and salt loading.

Concentrations of dissolved and total iron range from <0.01 to 0.39 and 0.17 to 15.7 mg/L, respectively. Cements that bind the sedimentary grains in many lithologic units in this area commonly include iron compounds, so it is reasonably assumed that the observed iron concentrations are related to such natural sources.

Concentrations of magnesium range from 19 to 140 mg/L, which are consistent with natural concentrations in sedimentary sequences in the region.

Oil and grease concentrations for the four 1994 wells range from 1 to 6 mg/L. These values are at or slightly above the detection limit and may indicate residue from the construction and installation of the monitoring wells. However, during the 1992 - 1993 evaluation of the coal reserves, two to three inch thick skims of natural crude oil were found floating on ponded water in both the C Seam works and in the East Mains of the Kenilworth Seam. A sample was collected but no analyses were completed. The oil is apparently seeping up out of the thin interbedded sandstones, siltstones, and mudstones which form the immediate floor in these areas. Oil has been reported to drip from roof strata at other sites in both the K and A Seams, particularly in the eastern extent of the mining. Oil seeps have also been reported from the Castle Gate property west of the Price River. The oil and grease detected in the four wells may therefore represent natural crude oil from the Blackhawk Formation.

There is some potential that ground water and surface water quality in the permit and adjacent areas may be affected by a coalbed methane degassification project located north of the lease and

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adjacent areas. The Cockrell Oil Company is extracting water from approximately 25 coalbed methane wells in the Blackhawk Formation to desorb methane from the coal matrix. Water removed from the Blackhawk Formation comes primarily from the Aberdeen sandstone. Following extraction from the wells, the methane is removed and the remaining water stream is treated by reverse osmosis and evaporation to reduce TDS and volume, respectively. The remaining water, "concejtrate" in Cockrell's terminology, is injected into the Price River Formation. Injected water may increase the discharge rate from springs and seeps downgradient of the degassification project, quality of spring and seep discharges may be degraded by the injected concentrate, and quality of water in the Price River may eventually be affected. Additionally, concentrate injected into the Price River formation may encroach on the permit area and the resulting degradation of ground water quality due to the coalbed methane project could be misinterpreted as being related to Willow Creek mining activities.

### **Baseline information -- Surface Water**

Surface water baseline information is found in Section 3.7.3. Section 3.7.3.1 is the description of the in which surface water exist in the permit and surrounding areas. Section 3.7.3.2 is the list and description of the surface water bodies in the permit area including ponds, lakes, perennial streams, etc. Section 3.7.3.3 talks about the quantities and occurrences of surface water and Part 3.7.3.4 is the surface water-quality information. Figures and tables within these two part reveal the data from monitoring in this permitting project and previous water monitoring projects. Water rights information is presented in Section 3.7.3.5, Exhibit 10 and on Map 17. Section 3.7.3.6 describes how surface water and ground water interact.

The surface water environment is formed by an arid to semi-arid climate, rugged topography, predominately sedimentary rock, and soils formed from sedimentary rocks. Surface water flow usually result from snowmelt and from thunderstorm runoff. Thunderstorm can be very intense over short periods which, combined with the rugged, rocky topography, can result in very large increases in surface water flows. The Price River and Willow Creek are the major, perennial drainages in the permit area. Other perennial drainages within a 2 mile radius of the permit area are Sulphur Canyon, Mathis Canyon, Deep/Buck Canyon, the main stem of Antone Creek. There are several ephemeral drainages in the two mile radius of the permit area. Drainage specific information for many of the permit area drainages is located in Table 3.7-8, Surface Drainage - Watershed Characteristics found on page 3.7-31.

Many data are available on stream flows in the Price Rive and Willow Creek, but there is very little historical data available for the smaller drainages in the permit area. Available surface water flow records are represented in Figures 3.7-4A through 3.7-4I in graphical form.

Several small man-made sedimentation ponds associated with coal mining activities and several stock watering ponds are the only stationary surface water bodies in the permit area. The are no lakes or reservoir. The stock watering ponds are frequently associate with springs.

General water quality information is found in Section 3.7.3.4, Surface Water Quality. Data show that pH is natural to basic, pervious activities have contributed to increase phenols in some samples, natural sulfur springs result in some water having elevated sulfate levels, TSS tends to be elevated during storm runoff, and elevated iron has been found due to natural sources. Table 3.7-10 shows the type of samples taken in multiple sampling projects and Table 3.7-10 is a summary of sampling. Some data show that water quality standards have been exceed prior to mining by CMPC. These data, located in Table 3.7-12, show that nitrates have exceeded the standard of 0.02 mg/L in Willow Creek, Price

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River and Mathis Canyon. Phosphate have exceeded the 0.05 mg/L standard in Willow Creek, Price River, and Sulpher Canyon. Copper has exceeded the standard of 0.01 mg/L in Willow Creek, and Crandall Canyon. Phenols have exceeded a 0.01 mg/L standard in Willow Creek, Price River and Sulpher Canyon. Finally, Crandall Canyon sampling has exceeded the zinc standard of 0.05 mg/L. All water quality standards are located in Table 3.7-5. Figures 3.7-6A through 3.7-9I were included in the permit application to show the relationship between stream flow and the concentration of an assortment of water quality constituents. A statement on page 3.7-52 says that "Specific conductivity, total dissolved solids (TDS), and sulfate concentrations all appear to decrease during high-flow conditions and increase during low-flow conditions." They go on to say, "Iron concentrations appear to be flow independent. Concentrations tend to increase with higher flows and decrease under low flow conditions." This statement is inaccurate because, the data show that there is a relationship between flow and iron concentration.

Beneficial uses of water in the permit area are domestic water supply, industrial, and limited agricultural. Price City water treatment plant is located on the Price River just above the permit area, but some of the tributary are within the permit area. Price River water is used in limited irrigation project down stream. Surface water ownership information is provided in Exhibit 10 and shown on Map 17.

Surface water monitoring points 492, BN131, and B3N (Surface and Ground Water Analysis Results - Exhibit 10) cannot be located on Map 15, and it is unclear whether they are samples from the Willow Creek project or from another project/area, similar to the "Nuck Woodward", etc. samples. It is not clear whether or not B3N the same as BN3 on Map 15.

### **Baseline cumulative impact area information**

A CHIA (Cumulative Hydrologic Impacts Assessment) is being done for the proposed Willow Creek Mine. Hydrologic and geologic information necessary to assess the probable cumulative hydrologic impacts of the proposed operation and all anticipated mining on surface- and ground-water systems in the cumulative impact area has been obtained from appropriate federal or state agencies and provided by the applicant. No adverse impacts on surface- and ground-water systems are anticipated from the proposed operations.

### **Survey of Renewable Resource Lands.**

Renewable Resource lands information is included in Section 3.7.5. Part 3.7.5.1 on page 3.7-91 identifies the occurrence of aquifers and recharge areas within the permit and adjacent areas. Part 3.7.5.2 on page 3.7-92 defines the potential for disruption of aquifers or changes in recharge due to subsidence. The permit application says, "the area does not provide significant recharge to any regional ground water aquifers and is relatively more important as a watershed area for area surface drainages. There has been no significant historical nor any recent agricultural activity within the permit or adjacent areas and the USDA-SCS has issued a negative determination for prime farmlands for the area as discussed and documented in Section 3.1.3, Prime Farmlands."

### **Alluvial Valley Floors.**

Section 3.7.6 on page 3.7-92 addresses the potential impacts to alluvial valley floors. This section cites a study undertaken by the Division in 1982 as part of permitting the Castle Gate mine

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which found that mining in the study area would not affect the alluvial valley floors that are present. This study is presented in Exhibit 10.

### Modeling

Cyprus' plans and methodology for hydrologic modeling are stated in Section 3.7.8 on page 3.7-94. Cyprus will model runoff calculations, Part 3.7.8.1, and precipitation events used for runoff calculations, Part 3.7.8.2. Calculations for these models is located in Exhibit 13. Cyprus does not plan to create any ground water models.

Modeling techniques, interpolation, or statistical techniques have not been used as part of the ground water baseline information in the proposed permit.

### Alternative Water Source Information

Alternative water source information is located in Section 3.7.9 beginning on page 3.7.96. Part 3.7.9.1 covers the potential impacts on surface and ground water sources, and Part 3.7.9.2 provides information on alternate water sources.

### Probable Hydrologic Consequences

To accurately characterize the existing surface and ground water environments and to assess the probable hydrologic consequences of the planned mining and related activities, CPMC reviewed and evaluated all available information on baseline hydrologic conditions as presented and described in Section 3.7 of the PAP. CPMC then considered potential hydrologic impacts that could occur as a result of the planned mining and related activities based on the operation and reclamation plans presented in Sections 4.0 and 5.0. Both direct and indirect mining related impacts were identified and evaluated. The effectiveness of operational protection and control measures and reclamation activities in mitigating potential impacts were considered. The following summarizes the probable hydrologic consequences of the planned Willow Creek mining and related activities as determined by CPMC.

#### Ground Water Consequences

CPMC's planned mining, processing, and related activities have the potential to cause localized and temporary impacts to ground water. These probable ground water hydrologic consequences include:

- Alterations of ground water flow patterns
- Drainage of seeps/springs
- Alterations of recharge/storage/discharge relationships
- Increases in concentrations of TDS and certain individual chemical constituents

Mining related probable hydrologic consequences for ground water resources in the Willow Creek permit area will be limited by the lack of significant ground water recharge, a thick sequence of low permeability bedrock between the coal seams to be mined and the ground surface, the general lack of significant regional ground water movement due the absence of well defined regional aquifers, and limited beneficial ground water use in the permit and adjacent areas.

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Alterations to Ground Water Flow Patterns - Historic coal mining in the area has produced extensive underground mine workings. In areas where those workings intercept ground water systems or connect to them through fractures the abandoned mine workings serve as sinks in the ground water systems. Seepage into the mines is extremely slow but inflows have gradually accumulated in significant quantities in the underground workings. In the western coal reserves area, mine inflows appear to be greatest where extensive retreat mining has produced substantial subsidence. However, regardless of subsidence conditions or mining method, the overall inflow rate is low, ranging from less than 5 gpm up to a maximum of about 35 gpm. Mine inflow monitoring by Price River Coal Company indicated inflow rates of 2.9, 12, 30, and 30 gpm for the Aberdeen, Utah Fuels No. 1, Royal, and Kenilworth mines, respectively. Similar monitoring by Castle Gate Coal Company for the No. 3 and No. 5 Mines resulted in measured inflow rates of 33 gpm (0.04 gpm/acre) and 3.5 gpm (0.015 gpm/acre).

The total volume of ground water storage in the old mine workings in the eastern coal reserves is unknown, although it is probably substantial. Water accumulates predominantly in the down-dip workings. Most abandoned mine workings in the area have been sealed, and there are few known instances of mine water being discharged from old workings. Generally, the volume of ground water stored in old mine workings increases until the local ground water system establishes equilibrium between inflow and outflow as recharge into the aquifer or as discharge to the surface.

Ground water flow patterns will be altered further as the Willow Creek Mine opens new underground workings. As the new mine workings are dewatered the potentiometric surface in the immediate vicinity will be lowered and a cone of depression created, and additional ground water will be deflected toward the mine workings. Mine inflow rates in the eastern coal reserves are expected to be similar to those observed in the western coal reserves. Based on an average recharge rate to ground water of 0.44 inches per year and an area of approximately 9 square miles of existing mine workings, the amount of ground water intercepted annually by the mine is estimated to be 131 gpm (0.3 cfs). At the end of operations for the Willow Creek Mine, assuming that the area mined is 19.8 square miles (i.e., old and new mine workings extending beneath approximately 90% of the permit area), the amount of ground water intercepted annually by the mine is estimated to be 183 gpm (0.4 cfs). If average yield per acre of 0.023 gpm per acre is used, the volume is 470 acre-feet per year or approximately 290 gpm. This amount of water is stated as being relatively small compared to the overall flow of the regional ground water system, although the criteria used to make such a determination are not given in the PAP.

Depression of the potentiometric surface near the mine is expected to be both minor and localized due to the relatively low permeability of the stratigraphic units. Additionally, ground water in overlying perched aquifers may leak downward along subsidence fractures, resulting in partial or full drainage of the perched aquifers that may in turn affect the discharge of springs and seeps. However, impacts to perched aquifers and associated springs and seeps are not expected to be significant because the perched aquifers are very limited in areal extent, areas potentially affected by subsidence represent a relatively small portion of the permit area, and beneficial use from perched systems within areas to be subsided is limited to a single spring (B41) in the eastern portion of the permit area.

After operations at the Willow Creek Mine cease, the underground workings will gradually fill with water and a stable potentiometric surface will be reestablished, which should be approximately the same as the potentiometric surface that existed prior to mining. Changes in the potentiometric surface are not expected to be significant because the overall hydrologic balance within the ground water basin will not be affected. Reductions in quantity and availability of ground water are expected to be minor, limited in areal extent, and temporary in nature.

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Reductions in ground water flow are not expected to adversely impact ground water use in adjacent areas, such as the municipal water wells of the Price River Water Improvement District in Sec's. 23 and 24, T. 12 S., R. 10 E. because strata that yield water in these areas are hydraulically isolated from the coal seams by a significant thickness of low permeability bedrock and subsidence is not projected to occur near enough to affect these areas.

Drainage of Seeps and Springs - Perched ground water above the Willow Creek mine may drain or seep downward through subsidence fractures. Perched aquifers may be partially or fully dewatered and springs and seeps that discharge from stratigraphic units that contain perched ground water may be affected. Impacts due to subsidence are not expected to be significant because the perched aquifers are limited in areal extent and potential subsidence areas represent a relatively small portion of the total permit area. Subsidence fractures are expected to gradually fill by sloughing, plastic flow, and mineral deposition. Only one identified ground water source, Jack Spring (B41), is within an area where subsidence is projected. CPMC will attempt to minimize subsidence while maximizing recovery of available coal resources by the use of longwall mining methods, maintenance of barrier pillars, limiting extraction in critical areas, and proper mining and roof control design and operations practices. Effective control of subsidence will limit fracturing of overlying strata and the consequent potential for drainage through subsidence fractures.

Drainage of perched ground water aquifers is not anticipated to affect the regional potentiometric surface because the perched systems are isolated from the regional aquifer by low permeability interbedded siltstones and shales. Storage volumes in the isolated perched aquifers are minor compared to the regional system.

If discharge from seeps or springs is documented as having decreased below baseline conditions as a result of mining related activities, CPMC has committed to mitigate those impacts through augmentation of effected water rights, monetary compensation, development of alternative watering facilities such as guzzlers, or other appropriate mitigation measures.

Alterations to Recharge/Storage/Discharge Relationships - CPMC's planned mining, processing, and related activities are not expected to have any significant long-term effect on recharge, storage, or discharge relationships. Recharge occurs primarily along outcrops by infiltration of direct precipitation and runoff. CPMC's operations are limited in areal extent and are not located within any major recharge area. Drainage of ground water presently stored in abandoned mine workings and the surrounding rock will be localized and temporary. Upon closure of the Willow Creek Mine, ground water will again accumulate in the mine workings and ground water storage relationships will be reestablished. There will be localized alterations to ground water flow, and discharges downgradient of the mine may be temporarily reduced until the underground mine workings fill. The quantity of ground water discharge which will be effected is a relatively small percentage of the total volume within the ground water basin, but neither volume has been quantified in the PAP.

Increases in Chemical Constituents - Ground water in both the Willow Creek permit and adjacent areas is a weak calcium-sulfate or sodium-sulfate chemical type. As ground water encounters freshly exposed materials in the mine, oxidation and weathering will cause changes in ground water chemistry including increases in TDS and concentrations of individual chemical constituents. Due to the limited volume of ground water drainage relative to total flows within the ground water basin, minor changes in ground water chemistry and in specific constituents are not expected to significantly effect overall ground water quality or use. Over time these increases will stabilize and then decrease as available soluble chemical

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constituents are depleted and concentrations in mine water and exposed rock reach equilibrium. Gradual flooding of abandoned mine workings will also have a beneficial water quality effect by displacing oxygen and reducing the oxidation potential.

Based on available information, CPMC does not anticipate that the existing coalbed methane degassification project located downgradient of the planned mine workings and outside of the permit area will have any effect on ground water resources within the permit area. The water used to force methane from the recovery wells is of low quality and is reinjected into the Price River Formation following gas recovery. In the unlikely event that ground water impacts extend further than projected by the environmental analysis for the project, water quality impacts could be locally significant within the permit area.

Page 4.7-25 state that ground water resources are limited to: "1) shallow alluvial/colluvial valley fill deposits in area drainages; 2) perched ground water occurring in thin laterally discontinuous sedimentary units associated with the Price River, North Horn, and Flagstaff Formations; 3) ground water which has accumulated over time in extensive existing underground mine workings; and 4) a regional water table aquifer occurring in the deeper portions of the Blackhawk Formation and extending into the underlying Star Point and Mancos Formations." Groundwater movement is limited by low transmissivities and other factors. These limitations should result in relatively low mine inflow rates. Groundwater quality is reflective of the different lithologic composition of the area bedrock units. Baseline data shows that "area ground water is typically a weak calcium sulfate or sodium sulfate type with neutral to moderately alkaline pH, relatively high TDS concentrations and slightly elevated levels of iron." Some perched groundwater supplies are used for stock watering, but surface water is more accessible, and, therefore, more often used.

### Surface water consequences

The Probable Hydrologic Consequences Determination can be found in Section 4.7.4. The baseline conditions are summarized in Section 4.7.4.1. Potential adverse impacts are discussed in Section 4.7.4.2. Presence of acid- and toxic-forming materials is discussed in Section 4.7.4.3. Sediment yield; acidity, total suspended and dissolve solids and individual chemical constituents; changes in stream flow; and ground- and surface-water availability are addressed in Section 4.7.4.2.

There are several perennial drainages located within or adjacent to the permit area listed on page 4.7-25. They are: "1) Price River, the principal drainage in this area; 2) Sulphur Canyon, which is tributary to the Price River near the northern edge of the permit boundary; 3) Willow Creek, which is tributary to the Price River and drains the majority of the permit area; and 4) Summit Creek, which is tributary to Willow Creek upstream of the permit area, but drains the extreme eastern portion of the permit area." Surface water quality is typical of arid regions with chemical characteristics such as "calcium bicarbonate, calcium sulfate, and sodium bicarbonate water types with neutral to moderately alkaline pH, high TDS and TSS values, and elevated sulfate, iron, and phenols."

Cyprus Plateau Mining Corporation (CPMC) has determined on page 4.7-26 that the potential hydrologic consequences for ground water are: 1) Alterations of ground water flow patterns; 2) Drainage of seeps/springs; 3) Alterations of recharge/storage/discharge relationships; and 4) Increases in concentrations of TDS and certain individual chemical constituents. However, the effect of these consequences "will be limited by the lack of significant ground water recharge in the area, the existence of a thick sequence of low permeability bedrock layers between the coal seams to be mined and the

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ground surface, the general lack of significant regional ground water movement due the absence of well-defined regional aquifers, and very limited beneficial ground water use in the permit and adjacent areas."

CPMC has determined on page 4.7-28 that the potential hydrologic consequences for surface water are: 1) Temporary increases in runoff from surface disturbance areas; 2) Minor reductions in surface flows and alteration of surface flow patterns due to operation of sedimentation structures and flow reductions due to mine water supply withdrawals; 3) Changes in surface water chemistry; and 4) Increases in the levels of TDS, TSS, and certain individual chemical constituents. However, the effects of these consequences "will be limited by the relatively small surface disturbance area, and will be effectively mitigated by operation of the drainage and sediment control system and ultimate reclamation of mine disturbance areas."

Removal of vegetation and other disturbances "will reduce infiltration potential and evapotranspiration due to elimination of vegetation and will increase surface runoff and erosion potential." CPMC will divert undisturbed drainage around disturbed areas and grade disturbances such that removed vegetation will not greatly increase the amount of erosion. CPMC will further decrease the effects of increased runoff by minimizing the amount of surface disturbance area and implementing a drainage and sediment control plan (Exhibit 13). Prompt reclamation after completion of mining operation will insure time limited effects of increased runoff rates.

Reductions in surface flows and alteration of surface flow patterns will likely occur due to operations of sediment structures and mine water supply withdrawals. Sedimentation ponds will collect water during periods of runoff resulting from large storm events and snow melt. CPMC says that retention of water in the ponds followed by slow release "will actually represent a positive impact, potentially extending the period of active flow" in ephemeral and intermitted areas. They go on to say that perennial drainages will only be impacted when runoff is retained in low-flow periods. Any runoff retained will be a small percentage of normal flows. CPMC does not consider the amount of water lost to evaporation from within the sediment ponds that would not be lost if allowed to flow naturally into their respective drainages; however, the sediment ponds are designed to detain water no longer than 3.4 days.

CPMC will withdrawal water from the Price River for mine water supply. CPMC holds active senior water rights for the water that they will withdrawal; however, they are responsible for and recognize the concern to flow depletion. Plans will be put into place to recycle water used in mining operations to limit the need to withdrawal water from the Price River. CPMC does not include in this PHC any information about how much water will be withdrawn from the Price River.

Mining activities at the Willow Creek Mine may cause some changes in surface water chemistry by exposing surficial materials to runoff. CPMC says that "the most probable potential change in runoff water chemistry would be a shift from a strong calcium bicarbonate type toward a sodium sulfate type due to the weathering and leaching of exposed surface materials." The proposed surface drainage and sediment control plan will protect the surface materials by limiting the exposure of these material to surface runoff. Examination of the materials that will be expose show that they are not likely to be acid and toxic forming in nature; therefore, limited exposure with will result in a low potential for significant changes in surface water chemistry.

Increased exposure of materials to water is also a potential cause of changes in the levels of TDS and other individual chemical constituents. The potential for erosion to increase in devegetated

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disturbed areas will increase the potential for increase sediment load, TSS, in storm and snowmelt runoff. CPMC predicts that mining activities will not cause changes in pH, but "TDS, TSS, and sulfate levels may increase slightly in the disturbed area runoff."

### Findings:

The information about the baseline hydrologic monitoring plan is accurate and fulfills the requirements of the regulations. Cyprus Plateau Mining Corporation (CPMC) must perform all mining activities according the current edition of 'Standard Methods for the Examination of Water and Wastewater' or the methodology in 40 CFR Parts 136 and 434.

The PHC is incomplete and inaccurate in some areas. First, the section on surface water consequences does not give specific information about how the disturbed area will be minimized. (See page 4.7-28, paragraph 4.) The PHC does not cover the stream alteration proposed for Willow Creek which should be specifically covered under surface water consequences. There is no information about the quantity water withdrawn from the Price River. Page 4.7-29 in the PHC speaks of surficial materials, but the source of this material is not clear from this information. (See page 4.7-30, also.)

### Ground-water information.

The name, location, and description of streams, existing wells, springs, and other surface and ground water resources are given. Ownership and location for rights to surface and ground water are given. The PAP contains insufficient information on ground water quality and quantity to demonstrate seasonal variation and usage, but an additional years data should be available before final approval. Ground water quality descriptions include baseline information on total dissolved solids or specific conductance corrected to 25 degrees C, pH, total iron, and total manganese and additional water quality parameters. Ground water quantity descriptions include water levels for monitoring wells and flow rates for seeps and springs. Alkalinity has been determined for most water samples. Acidity has not been measured, but the potential for acid drainage from the proposed mining operation is minimal.

### Groundwater information.

Ground water baseline information is complete and accurate except for the following:

There is no map of the potentiometric surface.

Water rights for springs and ponds in Sec's. 23 and 24, T. 12 S., R. 10 E. are marked on Map 17 but the municipal water wells and water rights of the Price River Water Improvement District in the same area are not shown.

PacifiCorp's UGW well in Sec. 35, T. 12 S., R. 9 E. is also not marked on Map 17.

Locations of fifteen boreholes that were drilled in 1994 in the alluvial/colluvial aquifers along Willow Creek and the Price River are shown on Map 2 of Exhibit 11 but not shown on Map 16, and bore hole logs are not in Exhibit 9.

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Drill holes MC-205 and MC-206; springs MC-207, B-32, and B-33; and mine water sample locations BM-25, BM-26, BM-27, and BM-28 (Table 3.7-4) are not shown on Map 15. It is not clear whether or not B-001 is the same as 001 on Map 15.

Spring B321 is identified as "Willow Creek Spring" in Table 3.7-4 but as "Sulphur Spring" on Map 15.

### Surface-water information.

Surface water monitoring points 492, BN131, and B3N (Surface and Ground Water Analysis Results - Exhibit 10) cannot be located on Map 15, and it is unclear whether they are samples from the Willow Creek project or from another project/area, similar to the "Nuck Woodward", etc. samples.

It is not clear whether or not B3N the same as BN3 on Map 15.

## MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

### Analysis:

The Operator provided maps in the PAP that deal with the mine operations. There is no cross reference between the text and the map appendices. To avoid confusion the Operator should list in the operational section of the PAP the maps required by Section R645-301-521.111, 521.112, 521.121, 521.122, 521.123, 521.124, 521.132, 521.141, 521.150, 521.151, 521.152, 521.190. The Operator must also say that those maps and cross sections have been prepared by, or under the direction of, and certified by a qualified, registered professional engineer, a professional geologist, or authorized land surveyors, with assistance from experts in related fields and updated periodically as required by the Division.

### Subsurface Water Resource Maps

Occurrences of subsurface water within and adjacent to the permit area are shown on Maps 15 and 16.

### Surface Water Resource Maps

Lakes, streams, ponds, and springs within and adjacent to the proposed permit area are shown on Maps 15 and 16.

### Monitoring Station Map

Ground-water and surface-water monitoring stations are shown on Figure 2 in Exhibit 12 and Map 15 in Volume 15.

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### Well Maps

Wells within and near the permit area are shown on Map 15 in Volume 6. Elevations (to the nearest 40 feet) and locations of test borings are also shown on Map 12 of the PAP and Map 2 of Exhibit 11. The location of one gas well is shown on Map 15. There are other gas wells in the region, namely wells located northeast of the permit area that were installed to extract gas from the coal seams. More exact locations for these wells are not mentioned in the PAP, so it is left to the reader to assume whether or not they are within the area covered on the PAP maps.

### Contour Maps

Maps 4, 6 and 8 show the premining topography in the facilities areas. Maps 3, 5 and 7 show the regional topography.

### Coal Resource and Geologic Information Maps

Surface geology for the region is shown on Map 12, a certified map. Elevations (to the nearest 40 feet) and locations of test borings are also shown on Map 12. The crop lines for the coal seams are shown on Maps 14-A to 14-E. Dip and strike of the Aberdeen Sandstone can be deduced from information on Map 14-E, but strike and dip of major beds and coal seams are not explicitly portrayed on this or any other map. Locations of the fifteen test borings of the alluvial/colluvial aquifers associated with Price River and Willow Creek are on Map 2 of Exhibit 11, Geotechnical Investigations.

### Water Quality

Elevations (to the nearest forty feet) and locations of monitoring stations used to gather data on water quality and quantity are on certified Map 15, Regional Hydrology Map.

### Subsurface Water Resource Maps

Geologic Cross Sections AA' to FF', Drawings (Maps) 13A to 13D, provide one piece of information on the location and extent of subsurface water within the proposed permit or adjacent areas. There is no map of the potentiometric surface for the regional or other aquifers, and seasonal differences of head (if any) have not been portrayed.

### Findings:

The Operator did not include cross references for all the required maps and cross sections. Without this information it is difficult to determine if the PAP meets the minimum regulatory requirements. Thus, the PAP does not meet the requirements for being clear and concise. A statement that all maps listed in Section R645-301-521.111, 521.112, 521.121, 521.122, 521.123, 521.124, 521.132, 521.141, 521.150, 521.151, 521.152, 521.190 have been certified must be included in the text of the PAP.

CPMC has not shown the permit boundary on any maps. The permit boundary should be delineated on all maps in which the boundary lies.  
Coal Resource and Geologic Information Maps

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Stratigraphy and structure of the proposed permit and adjacent areas are portrayed on maps and cross sections. Cross Sections, maps, and plans show elevations and locations of test borings. Coal crop lines and information on the nature, depth, and thickness of the coal seams and overburden and underburden are shown on maps and cross sections. Strike and dip are not shown explicitly on any map. Maps show one gas well within the proposed permit area and adjacent area, but there is no information on its depth.

### Monitoring Sampling Location Maps

Elevations (to the nearest 40 feet) and locations of test borings are also shown on Map 12.

### Subsurface Water Resource Maps

The location and extent of subsurface water and seasonal differences of head (if any) within the proposed permit area are not portrayed on maps (potentiometric surface) or cross sections. Maps show elevations and locations of monitoring stations used to gather baseline data on the quality and quantity of ground water, and location of water wells.

### Well Maps

Locations of the one gas well within the proposed permit area and water wells in the permit area and adjacent areas are shown on maps and plans in the PAP. Wells that extract gas from the coal seams are located near the proposed permit area, but their locations in relation to the proposed permit area are not shown on any map or clearly indicated in the text of the PAP.

## OPERATION PLAN

### GENERAL REQUIREMENTS

Regulatory Reference: 30 CFR Sec. 784.2, 784.11, R645-301-523

#### Analysis:

The Operator provided a general operational plan in the PAP. The specific of the plan will be discussed in the following subsection.

#### Findings:

The Operator has met the minimum regulatory requirements.

### EXISTING STRUCTURES

Regulatory Reference: 30 CFR Sec. 784.12; R645-301-526.

#### Analysis:

As described in Section 3.4.4, Previous Mining Activity, extensive historic mining activity has occurred throughout the proposed permit area with resulting development of underground mine workings in many areas and disturbance of limited surface areas for mine portals; coal and waste stockpiles; coal handling, processing, and loadout facilities; and mine support facilities. In Castle Gate, surface disturbance included residential and commercial development tied to the historic mining operations. Both mining related underground and surface disturbance are shown and labeled on the Previous Mining Activity Map (Map 10).

The Operator needs to state in the PAP if there are any existing structures in the Willow Creek area that will be used in the mining operations. If the Operator plans on using existing structures then a detailed description of the facility must be included in the PAP. One purpose of this section is to document pre-existing disturbances and structures at the mine site. If those structures or facilities are not used for mining activities then the Operator will not be required to reclaim them.

#### Findings:

The Operator did not address all the requirements of this section. To avoid confusion during final reclamation the Operator should state what existing structures and facilities will not be used for mining. Pre-existing structures not used for mining and reclamation will not be exempt from reclamation requirements.

## **RELOCATION OR USE OF PUBLIC ROADS**

Regulatory Reference: 30 CFR Sec. 784.18; R645-301-521, -301-526.

### **Analysis:**

Information on the relocation or use of public roads is listed in Section 4.5.1.2. The Operator failed to state, in this section, if any coal mining or reclamation activities will occur within 100 feet of the right-of-way line of any public road, except where mining access of haul roads joins that right-of-way; or a public road will be relocated.

### **Findings:**

The Operator has not addressed the minimum requirements for Section R645-301-521.133 through R645-301-521.133.2.

## **AIR POLLUTION CONTROL PLAN**

Regulatory Reference: 30 CFR Sec. 784.26, 817.95; R645-301-244.

### **Analysis:**

Air quality information is presented in Sections 3.5 and 4.4. These sections contain information about air quality in the general area and about methods to be used to control emissions. Exhibit 4 contains a copy of the Notice of Intent submitted to the Division of Air Quality.

The Division of Air Quality is the primary regulatory authority for this regulation and will be responsible for reviewing the applicant's commitments. The applicant will need to obtain an approval order before beginning construction. However, for the present, the applicant has complied with the requirements of these regulations.

### **Findings:**

For the present, the applicant has complied with the requirements of these regulations. Before beginning construction, the applicant will need to obtain an approval order from the Division of Air Quality.

## **COAL RECOVERY**

Regulatory Reference: 30 CFR Sec. 817.59; R645-301-522.

### **Analysis:**

Maximum resource recovery has always been and will continue to be one of CPMC's primary objectives in compliance with applicable USDI-BLM regulations and as a matter of sound resource management and efficient mining and economic practice. Conservation and maximum utilization of the available coal resource will involve mining to the minimum practical seam thickness, maximizing

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overall coal recovery consistent with sound engineering and mining practices. Resource conservation and protection have been addressed in some detail in the Resource Recovery and Protection Plans previously submitted to and approved by the USDI-BLM as part of the Blackhawk Logical Mining Unit Report in April 1992.

The Operator needs to include a copy of the approved Resource Recovery and Protection Plan (R2P2) or a letter from the BLM saying that they have approved the coal recovery program.

### Findings:

The Operator has not shown that the BLM has approved the coal recovery plan for federal coal. A copy of the R2P2 or a letter from the BLM saying that the recovery plan has been approved would solve this deficiency.

## SUBSIDENCE CONTROL PLAN

Regulatory Reference: 30 CFR Sec. 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

### Renewable Resources Survey

#### Analysis:

The Operator identified the following as structures or areas as renewable resource lands that could be affected by mining related subsidence. The structures and renewable resource lands identified in the subsidence survey are:

- High plateau areas and ridgelines that have the potential for low-intensity seasonal grazing
- Limited recharge areas generally associated with the relatively flat high plateaus and exposed ridgelines, and small basins where runoff or snow accumulations may provide supplemental ground water recharge
- State Highway 191
- Willow Creek
- Several power transmission lines that cross the proposed permit area
- Several unimproved dirt roads
- Several fence lines

The Division agrees with the Operator's findings that subsidence could damage structures and renewable resource lands. According to R645-525.100 if the Division determines that the potential exists for subsidence to damage structures or renewable resource lands then the PAP must have a subsidence control plan. A copy of the subsidence control plan was submitted to the Division in the PAP and will be evaluated in the following section of the technical assessment.

**Findings:**

The Operator has met the minimum regulatory requirements for this section.

**Subsidence Control Plan**

*Component (1)*

*A description of the method of coal removal, such as longwall mining, room-and-pillar removal, hydraulic mining, or other extraction methods, including the size, sequence, and timing for the development of underground workings.*

**Analysis:**

CPMC currently projects an annual production rate of 0.3 to 6.0 million tons of coal from the Willow Creek Mine over the 20 year mine life. Annual production may fluctuate dependent on changes in coal market conditions and other factors. A relatively rapid build-up in production to the full production capacity of 6.0 million tons of coal per year will occur over a period of approximately 4 years.

Mine development involves excavation and construction of the underground openings, or entries, required to access the minable coal reserves, provide for efficient production of those reserves, facilitate haulage of both coal and mine waste, and provide for effective ventilation of the mine workings. Development activities will include development of mine portals, main entries, sub-mains, slopes and rises, and longwall panels. All mine development activities including both development methods and actual physical dimensions of development entries have been designed to provide for long-term stability during active mining operations and to effect full compliance with all applicable regulatory provisions.

CPMC plans to utilize the longwall mining method as the primary coal production technique. There are, however, certain areas where longwall mining will not be feasible due to limited seam thickness, the configuration of the remaining coal reserves (inadequate width or length to justify the costs associated with longwall development and set-up), geologic conditions, or potential subsidence concerns. In these areas, conventional room and pillar mining methods will be utilized with continuous miners, shuttle cars, and roof bolters as the primary production equipment.

The Division has determined that the Operator described the methods of coal removal, the projected amount of coal mined, and the sequence and timing for the development of underground workings. The minimum regulatory requirements have been met.

**Findings:**

The Operator has met the minimum regulatory requirements.

*Component (2)*

*A map of underground workings which describes the location and extent of areas in which planned-subsidence mining methods will be used and which includes all areas where measures will be taken to prevent or minimize subsidence and subsidence related damage and where appropriate, to correct subsidence-related material damage.*

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### Analysis:

Map 19A to Map 19D show the location of the mine workings and projected subsidence for each seam. Map 20, Subsidence Monitoring Plan, shows the areas of planned subsidence for the entire project.

### Findings:

The minimum regulatory requirements have been met.

#### *Component (3)*

*A description of the physical conditions, such as depth of cover, seam thickness, and lithology, which affect the likelihood or extent of subsidence and subsidence-related damage.*

### Analysis:

Coal extraction thickness will range from approximately 5 to 13 feet resulting in potential maximum subsidence of 3.5 to 9.1 feet assuming the projected maximum subsidence rate of 0.7 times extraction thickness. It is important to note that this is the maximum potential subsidence with full extraction. In reality, practical operational limitations on coal extraction, increased mining depth, and the massive sandstones previously discussed will probably result in actual subsidence which is considerably less than this maximum value. Given that most of the proposed mining will occur at depths of 700 to over 2,000 feet, averaging approximately 1,800 feet and the occurrence of several relatively massive high-strength sandstone units in the overlying stratigraphic sequence which will probably limit vertical deformation, surface subsidence is expected to be minimal.

Given that most of the proposed mining will occur at depths of 700 to over 2,000 feet, averaging approximately 1,800 feet and the occurrence of several relatively massive high-strength sandstone units in the overlying stratigraphic sequence which will probably limit vertical deformation, surface subsidence is expected to be minimal. Use of the proposed longwall mining method inherently provides the greatest amount of control over the area and rate of subsidence. Associated subsidence is typically uniform consistent with a relatively uniform coal recovery thickness and occurs progressively with panel extraction minimizing potential differential settlement. Experience indicates that approximately 90 percent of longwall related subsidence occurs within 2 to 3 years following completion of mining.

Exhibit 11 contains a report by Agapito Associates, Inc. entitled "Measures for Controlling Subsidence from Movable Coal Seams in the Willow Creek Area". The study examines the geologic and geotechnical environment, subsidence parameters and stability evaluations.

The Division has examined the information about the lithology, topography and mining activities that will affect subsidence. The Division has determined that there is enough information to support the Operator's claims about subsidence. The Operator's claims about the extent of subsidence are consistent with other subsidence studies in the Utah and Colorado coal fields.

### Findings:

The Operator has met the minimum regulatory requirements.

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### *Component (4)*

*A description of monitoring, if any, needed to determine the commencement and degree of subsidence so that, when appropriate, other measures can be taken to prevent, reduce, or correct material damage.*

### **Analysis:**

Once development and mining operations begin, CPMC will implement an ongoing subsidence monitoring program to determine when mining related subsidence commences and the amount of actual surface subsidence. This information will be reviewed and evaluated to determine the accuracy of the original subsidence projections. The subsidence monitoring data will also be the basis for any appropriate modifications in mining plans, mine sequencing, or ground control measures in order to minimize or provide for controlled surface subsidence. By providing for ongoing review and evaluation of actual subsidence response, CPMC can make any design or operational adjustments necessary to prevent significant subsidence related material damage or diminution of use. The proposed subsidence monitoring plan has been developed in compliance with applicable regulatory provisions of Rules R645-301-525.140 and 632, and will include periodic visual observations, field surveys of permanent subsidence monuments, review and evaluation of monitoring field data, and development of summary tables showing any changes in elevation or horizontal position (for sensitive structures only) of the subsidence monuments and subsidence profiles.

The periodic visual observations will be conducted on at least an annual basis and will involve a visual field inspection of potential subsidence areas for any visible evidence of subsidence including surface cracks, slumping, displacement, structural damage, or other observable changes. Any observed evidence of potential subsidence related surface impacts will be noted on a field report form and the location of any documented observations will be tied to existing subsidence monuments to the extent reasonably feasible.

Subsidence monuments will be established in each potential subsidence area before any subsidence actually occurs in that area, normally during the summer prior to initiation of mining. The timing for installation of monitoring points will be determined by projecting the angle of draw from the line of mining advance based on the following formula:

$$\text{Distance} = \text{Overburden} (\tan 22\frac{1}{2}^\circ)$$

The timing for placing the monitoring stations assumes that the angle of draw will be 22.5°. The 22.5° is the average angle of draw for Utah and Colorado coal mines, while the range is from -9° to over 45°. Monuments must be in place to detect an angle of draw of at least 45°.

### **Findings:**

The Operator needs to set up a subsidence monitoring program that will be able to detect an angle of draw up to 45°. The sensitivity of the subsidence monitoring program needs to be stated.

### *Component (5)*

*Except for those areas where planned subsidence is projected to be used, a detailed description of the subsidence control measures that will be taken to prevent or minimize subsidence and subsidence-related damage, including, but not limited to: backstowing or backfilling of voids;*

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*leaving support pillars of coal; leaving areas in which no coal is removed, including a description of the overlying area to be protected by leaving the coal in place; and, taking measures on the surface to prevent material damage or lessening of the value or reasonably foreseeable use of the surface.*

### Analysis:

Subsidence control for the corridor containing the highway and creek will be provided by a barrier pillar extending under this corridor. The barrier pillar is defined by the angle of draw extending from the limit of any mining areas adjacent to the highway/creek corridor as shown on the Mine Plan Maps (Maps 19A through 19D) and, with the exception of the K Seam main entry crossing, no mining will occur within this defined boundary. The K Seam main entry crossing has been designed based on specific recommendations presented in the Agapito Report which is included in Exhibit 11, Geotechnical Investigations. The K Seam main entries will be developed at a depth of approximately 900 feet beneath Willow Creek as 20 foot wide entries with 70 x 100 foot pillars. This configuration will result in an effective extraction ratio of only 37.5 percent, there will be no retreat mining in this area, and the coal remaining in the support pillars will provide for effective long-term stability to prevent subsidence of overlying areas.

The Operator provided protection to Highway 191 and Willow Creek by excluding those areas from planned subsidence. Mining beneath the structures will be limited to main entry in the K seam. That entry is needed for access to coal east of the highway/road corridor.

### Findings:

The Operator has met the minimum regulatory requirements.

#### *Component (6)*

*A description of the anticipated effects of planned subsidence, if any.*

### Analysis:

**Low-Intensity Seasonal Grazing Areas** - Some of the relatively flat high plateau and broad upper ridge line areas in the northwest portion of the proposed permit area are utilized on a seasonal basis for low-intensity cattle ranching and sheep grazing. Use is limited by the generally rugged terrain, arid conditions, and lack of significant ground water resources for stock watering. Due to the natural dip of the coal seams, these areas are near the effective cover limit for proposed mining operations and correspond to cover thicknesses of 1,800 feet or more. Given effective cover depths and the proposed ground control measures noted above, potential subsidence in these areas should be limited and is not expected to result in any significant diminution of the existing grazing use.

**Limited Recharge Areas** - Ground water recharge in the area is limited by the arid climate, rugged terrain, and relatively low permeability of most of the geologic units. Effective ground water recharge occurs only where potential water bearing members outcrop on the relatively flat high plateau areas, on exposed ridgelines, and in small basins where runoff or snow accumulations may provide supplemental ground water recharge and in these areas limited outcrop exposures preclude significant recharge. As discussed in Section 3.7.2.2, Ground Water Aquifers, transmission of the minimal recharge

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that does occur to either perched aquifers or the regional water table aquifer is effectively limited by the low overall permeability of the overlying stratigraphic units. The regional water table aquifer is not generally utilized for water supply due to its relative depth and low water storage and transmission capacity and perched aquifers are typically of such limited extent that use is limited to occasional small volume stock watering from the few developed springs and seeps that exist in the area as shown on the Regional Hydrology Map (Map 15). There are no ground water supply wells within the area of potential subsidence which would be affected by mining related subsidence.

**Unimproved Dirt Roads** - Several unimproved dirt roads exist in the area as shown on the Subsidence Control Plan Map (Map 20). These roads have limited access, are not maintained on a regular basis, and are generally used only by private property owners in the area for grazing or other occasional access

**Fence lines** - Several fence lines exist within the area of potential subsidence as shown on the Subsidence Monitoring Plan Map (Map 20). The existing fence lines are typically three-wire barbed fences strung on wooden posts which are utilized to delineate and confine livestock use to specific areas. It is anticipated that potential subsidence related impacts on existing fence lines will be minimal and will be limited to isolated instances of fence wire being broken or separated from the supporting posts.

**State Highway 191 and Willow Creek** - State Highway 191 parallels Willow Creek, bisecting the proposed permit area along a diagonal corridor running from southwest to northeast. Both the highway, as a major structure, and the creek, as an important resource value, will be protected from potential mining related subsidence effects. CPMC does not plan to develop either longwall panels or room and pillar sections under the highway and creek, but will drive main entries in the K Seam under the highway/creek corridor to access minable K, C, and A Seam reserves to the south and east.

Subsidence control for the corridor containing the highway and creek will be provided by a barrier pillar extending under this corridor. The barrier pillar is defined by the angle of draw extending from the limit of any mining areas adjacent to the highway/creek corridor as shown on the Mine Plan Maps (Maps 19A through 19D), and with the exception of the K Seam main entry crossing, no mining will occur within this defined boundary. The K Seam main entry crossing has been designed based on specific recommendations presented in the Agapito Report which is included in Exhibit 11, Geotechnical Investigations. The K Seam main entries will be developed at a depth of approximately 900 feet beneath Willow Creek as 20 foot wide entries with 70 x 100 foot pillars. This configuration will result in an effective extraction ratio of only 37.5 percent, there will be no retreat mining in this area, and the coal remaining in the support pillars will provide for effective long-term stability to prevent subsidence of overlying areas.

The power poles in Barn Canyon will not be damaged by subsidence since the Operator will either make arrangements to move the lines outside the subsidence area or not mine the coal under Barn Canyon.

The Operator assumes that State Highway 191, Willow Creek and the powerlines that parallel them are in a protected corridors that will not be affected by subsidence. The assumption is based on the 22.5° angle of draw, which is the average angle of draw for Utah and Colorado. It is possible that the angle could be much larger than 22.5° and subsidence would occur in the corridor. In such an event the stream, highway or powerlines could be damaged. The Operator needs to address this situation.

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In the report by Agapito Associates, Inc. the possibility of rock fall due to escarpment failure is discussed. The Operator needs to address how any rock fall damage will be mitigated.

### Findings:

The Operator has addressed most of the anticipated effects of planned subsidence. There are a few mitigation issues that still need to be addressed. (See the Deficiencies section for details.)

#### *Component (7)*

*A description of the measures to be taken to mitigate or remedy any subsidence-related material damage to, or diminution in value or reasonably foreseeable use of the land, or structures or facilities to the extent required under State law.*

### Analysis:

In the unlikely event that subsidence damage was to occur in the low-intensity seasonal grazing areas, it would most likely be in the form of surface cracks which could pose a hazard to livestock or in interruption of any perched ground water sources supplying water for stock watering purposes. If this occurred, CPMC would implement appropriate remedial measures. Generally, the areas which are grazed are not susceptible to surface cracking since developed soils exist in these areas which would inherently buffer any tensile stresses; however, if any significant surface cracking were to occur remediation would involve fencing any areas that pose a potential hazard to livestock, limited surface grading or plowing, and reseeded to fill the cracks, minimize erosion and reestablish vegetation. As appropriate and with documentation of any actual loss, CPMC will compensate the surface land owner/grazing lessee for any direct livestock losses and any significant loss of use resulting from mining related subsidence. CPMC currently, and will continue to, monitors all known springs and seeps in the area during the period of active mining operations. If ongoing monitoring results in a determination that mining has resulted in reduction or changes in the flow or quality of a stock watering source which will significantly diminish potential grazing use, remediation may involve replacement or augmentation of any affected water rights, monetary compensation, development of alternative watering facilities such as guzzlers, or a negotiated agreement with the affected surface owner/grazing lessee providing for substitution or replacement of grazing areas.

The potential subsidence effects on the unimproved roads should be limited, and are not expected to result in any significant diminution of existing road conditions or access. In the unlikely event that subsidence were to result in surface cracks which could affect road conditions or use, remediation would involve limited surface grading to fill and eliminate the cracks and to provide a smooth, passable road surface.

Mitigation of damage to fence lines will consist of repairing or replacing of any damaged fencing or posts.

The Operator needs to address subsidence mitigation in the unlikely event that subsidence was to damage Highway 191, Willow Creek or the powerlines. Damage due to escarpment failure needs to be addressed.

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### Findings:

The Operator has addressed most of the mitigation issues. There are still a few mitigation issues that have not been adequately addressed. (See the Deficiencies section for details.)

#### *Component (8)*

*Other information specified by the Division as necessary to demonstrate that the operation will be conducted in accordance with the performance standards for subsidence control.*

### Analysis:

The Operator must obtain an agreement with the Utah Department of Transportation (UDOT) to mine beneath State Highway 191. The agreement is needed to insure that the public is protected from the potential effects of subsidence on a public road. The Operator must also agree to notify UDOT six months prior to any mining under state highways.

### Findings:

The Operator needs to obtain an agreement with UDOT to mine underneath any state highway. No less than six months prior to mining underneath a state highway the Operator will notify UDOT in writing of the planned mining activity.

### Performance standards for subsidence control

### Analysis:

The Operator has committed to repair or replace any material damage caused by subsidence. The Operator does not show any public buildings and facilities, churches, schools, and hospitals; or impoundments with a storage capacity of 20 acre-feet or more or bodies of water with a volume of 20 acre-feet or more with in the area of planned subsidence. When the Operator determined the areas planned subsidence he assumed that the angle of draw would be 22.5° and no subsidence will occur in the corridor beneath Willow Creek. The angle of draw is based on the average angle of draw in Utah and Colorado. While that assumption may be the best estimate for the angle of draw it is possible the angle of draw could be much larger and affect Willow Creek, the powerlines and the state highway.

The Division usually accepts the 22.5° angle of draw until field measurements demonstrate that another angle should be used. There is no reason for the Division to reject the 22.5° at this time. However, if subsidence monitoring data indicates that subsidence could occur outside of the approved subsidence control areas then the Operator must modify the mining plans so that subsidence only occurs in the approved areas. Should subsidence cause damage to State Highway 191, powerlines, or Willow Creek the Operator must commit to repair the damage.

### Findings:

The Operator has met the minimum regulatory performance standards for subsidence.

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### Notification

#### Analysis:

Prior to initiation of mine development or other mining activities which could result in potential surface subsidence, CPMC will notify the affected surface landowners as well as the owners or Operators of any potentially affected utilities or structures. Notification will occur at least 6 months prior to initiation of the mining activities and will consist of a written notice identifying the area(s) of proposed mining, the schedule for when mining will occur, and the location(s) where a copy of the subsidence control plan is available for public review. In order to protect the rights of the owners or Operators of specific structures and lands which could potentially be affected by mining related subsidence, CPMC is either proceeding with, or has obtained, subsidence agreements giving CPMC the right to undermine the subject lands or structures provided that any subsidence related impacts are properly mitigated. Where appropriate, subsidence agreements will be secured prior to initiation of any mining related activities which may potentially affect the structure or lands covered by the agreements. Existing subsidence agreements are included in Exhibit 16, Subsidence Information, and copies of any agreements obtained in the future will be provide to UDOGM for insertion in this exhibit. The following summarizes the need for, and status of, any subsidence agreements for mining and related operations:

**Surface Landowners** - Subsidence agreements have been obtained from the private property owners of surface lands within potential subsidence areas as indicated by comparison of the Surface Ownership Map (Map 1), and the Subsidence Monitoring Plan Map (Map 20). These agreements document CPMC's right to undermine the private property holdings addressed by the agreements provided that any subsidence related material damage is effectively mitigated. Mitigation may include, but is not limited to purchase of affected lands, substitution or replacement of grazing areas, monetary compensation, or repair of any surface damage.

#### Water Rights

Subsidence agreements have been obtained from owners of water rights that lie within potential subsidence areas as indicated by comparison of the Water Rights Map (Map 17), and the Subsidence Monitoring Plan Map (Map 20). The agreements document CPMC's right to mine beneath the surface or ground water source associated with the water right(s) and CPMC's commitment to mitigate any subsidence related impacts. Mitigation may include, but is not limited to purchasing the water right, replacement or augmentation of any affected water rights, monetary compensation, development of alternative watering facilities such as guzzlers, construction of retention ponds, and substitution or replacement of grazing areas. There are no domestic drinking water sources within the proposed mining and potential associated subsidence areas.

#### Highway 191 and Willow Creek

Areas beneath State Highway 191 and Willow Creek were extensively mined in Sections 31 and 32, T12S, R10E, as shown on the Previous Mining Activities Map (Map 10). The historic mining in this area consisted of extensive development mining with retention of support pillars in most areas, although retreat mining with pillar recovery is known to have occurred in two areas, one area directly beneath and the other very close to the highway and creek. There is no evidence that the historic mining resulted in any significant surface subsidence impacts to either the highway or the creek. Given this directly applicable historic mining precedent and CPMC's

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plans to retain a barrier pillar beneath the highway/creek corridor and limit extraction in the K Seam main entry crossing, no significant subsidence is anticipated and subsidence agreements with UDOT for the highway are not considered necessary.

### **Powerlines**

Although no subsidence impacts to electrical transmission lines are anticipated, in order to protect PacifiCorp's interests CPMC is also proceeding with negotiation of a subsidence agreement which will be secured before initiating any mining activity which could affect the existing power lines. The agreement will give CPMC the right to undermine or mine in the vicinity of the power lines provided that any subsidence related impacts are appropriately mitigated.

### **R645-301-525.300 states:**

*Public Notice of Proposed Mining. At least six months prior to mining, or within that period if approved by the Division, the underground mine Operator will mail a notification to all owners and occupants of surface property and structures above the underground workings. The notification will include, at a minimum, identification of specific areas in which mining will take place, dates that specific areas will be undermined, and the location or locations where the Operator's subsidence control plan may be examined.*

The Operator states that he has an agreement with the water owner that allows mining underneath Willow Creek. In the event that the water rights are damaged the Operator agrees to make restitution. Copies of the agreement are mentioned in the PAP but there is no specific reference. A reference to the water rights agreement needs to be included in the subsidence text.

There are no exemptions in R645-301-525.300 that would allow the Operator to mine under the Willow Creek corridor without first notifying the UDOT and PacificCorp. Notification must be given even if no subsidence is anticipated. A subsidence agreement between the Operator and the UDOT is needed.

### **Findings:**

The Operator needs to show the agreement with the water users that allows mining beneath Willow Creek.

## **SLIDES AND OTHER DAMAGE**

Regulatory Reference: 30 CFR Sec. 817.99; R645-301-515.

### **Analysis:**

Certain situations involving accidents, emergencies, or unforeseen circumstances may require immediate or timely reporting to provide for appropriate coordination of required control and

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mitigation measures. Under applicable regulatory requirements, these situations are specifically identified as including the following:

- Slides which may have potential adverse effects on public health and safety, property, or the environment
- Impoundment hazards
- Accidental release of potentially hazardous or toxic materials including petroleum products
- Temporary cessation of mining operations

Reporting and emergency measures for potential slides are specifically addressed in Section 4.6, Geologic Protection; for impoundment hazards and accidental releases of potentially hazardous or toxic materials in Section 4.7, Hydrologic Resource Protection; and for temporary cessation of mining operations in Section 4.5.2.5, Temporary Cessation.

Section 4.6, Geologic Protection, does not contain reporting and emergency measures of slides which may have a potential adverse effect on public, property, health, safety or the environment.

### Findings:

The Operator did not address the requirements to notify the Division in case of a slide or to comply with the remedial measures that the Division might require.

## TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-232, -301-233, -301-234, -301-242, -301-243.

### Analysis:

- Volume 3: Section 4.2 Soil Handling Plans
- Section 4.5 Engineering Design and Operating Plans
- Table 4.5-1 Summary of Mining Related Disturbance (acreages)
- Table 5.3-1 Temporary Seed Mixture
- Map 18 Mine Surface Facilities
- Map 22 Mine Surface Facilities Area Premining/Postmining Cross-Sections
- Exhibit 11 Geotechnical Investigations

The Willow Creek Mine site will cover 55.8 acres (see Table 4.5-1) and 6.8 acres of that will be new disturbance to the area (see Table 3.2-2). Disturbed soils which are presently covering the site will be salvaged and stored for final cover over the site. The pad is formed by waste rock, refuse, and coal as well as disturbed soils and regolith. In Section 3.1 a comparison of the materials likely to be encountered in the removal of soils from the pad is presented. The Division recognizes that some contamination of the soil stockpile by coally materials is inevitable and will not present a reclamation hazard. **However, it must be made clear that the Division does not approve of the use of waste**

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**rock, refuse or coal as a substitute soil material.** Waste rock and refuse must be sampled for acid and toxic forming materials and covered as required.

The comparisons presented in Table 3.1-2 illustrate that coal refuse lacks adequate pH and texture (50% of the time). That, combined with a high percentage of coarse fragments, massive structure, lower available water holding capacity, some increased salts (EC) and dark color (increasing the temperature in the germinating and rooting zone) make it a hostile environment for reclamation. Coal mine refuse is prone to acidification as it oxidizes. Waste piles in the area have become quite acidic (pH 3.0) with time (see the Trash Canyon site in the AMR Monument Project file AMR\007\927 Fall 1995 for further information. Trash canyon is across Highway 6 from the power generating plant.)

Recent reclamation efforts to direct seed and transplant into refuse and coal have failed miserably and success has come only by covering the waste.<sup>1</sup> Should CPMC being willing to undertake greenhouse and field trials to determine adequate revegetation techniques and plant materials for roof and floor, interburden and coal refuse, then the Division would be supportive of such an effort. However, the information presented thus far in the plan is a haphazard statistical comparison that can not be considered valid, i.e. the number of samples in the populations being compared by the "t" test of the means was widely varying from 2 to 40 samples in some cases. It was not convincing to the Division.

Prior to removal of disturbed soils from the site, a composite samples will be taken from 0 - 18' at 500 foot intervals along the length of the site (pg 4.2-5). The Division calculates that there will be a minimum of 8 samples taken. The samples will be analyzed according to the Division guidelines for Topsoil/Overburden. (Please follow Table #6 for the substitute topsoil evaluation.)

Topsoil salvage volumes are recorded in Table 4.2-1. Soil will be salvage from 12 to 18 inches in depth from the disturbed site at the Willow Creek mine site. Undisturbed areas will have 6-8 inches of soil salvaged. (The text indicates up to 18 inches from disturbed areas and up to three feet of soil may be salvaged from undisturbed areas.) It is not clear how the salvage depths presented in the table were determined, since no site specific survey information has been presented. It is assumed, however, that the Geotechnical investigations (Ex 11) were critical to development of the soil salvage plan. Drilling locations TH3 and TH5 in the location of the AMR reclamation clearly show that 24 inches of cover overlies the refuse. The approval for removal of the refuse to the Schoolhouse refuse pile clearly requires recovery of all 24 inches. Therefore, the yardage estimated in Table 4.2-1 will likely be revised after removal of the refuse.

Some locations will not have soil salvaged. These locations are identified in Table 4.2-1 as the Water Tank Area (1.0 acre), and the Office Trailer area (3.1 acres) other areas with limited depth or high rock content will also be avoided. No site specific study or information has been presented to identify the extent of these areas. The Division is unclear as to why the water tank area will be exempt from topsoil salvage.

Soil from all horizons will go into a common stockpile. Stockpile side slopes will be 3h:1v or less. The soil will be protected from erosion by grading and upgradient berms. Stockpiles will be

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<sup>1</sup> Conversation with Chris Rohrer 9/28/95, concerning Abandoned Mine Reclamation Program attempts at direct seeding and transplanting into abandoned coal mine waste piles in Huntington Canyon, Sego Canyon, and the Byron Howard Mine.

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seeded with a temporary vegetation mix as described in Table 5.3-1. Seeding may not occur for 6 months.

One stockpile is shown on Map 4 for the Willow Creek site. It will hold 75,700 yd<sup>3</sup> of soil.

Riparian areas will have soil salvaged to a depth of 24 inches this material will not be placed in the stockpile. It will be directly placed on the stream re-alignment site.

### Findings:

The plan can not be considered technically adequate with regard to a description of soil handling plans. The mining and reclamation application is not in compliance with the requirements of 30 CFR 817.22.

The permittee must provide the following, prior to approval, in accordance with the requirements of:

**R645-301-232.200, -233.100, -233.200 and R645-301-234.100 and R645-301-234.230.**

Results of the sampling program (proposed in section 4.2) should be reported in section 3.1 prior to approval of the permit. The results of such a study will enable CPMC to present exact information on the quantity, quality and availability of soil substitute material.

Table 4.2-1 should be revised to reflect the actual volume of soil recovered from the refuse removal project and to reflect the results of the site specific field study requested in the deficiencies listed under Soils Resource.

Soil Stockpiles must be seeded promptly, allowing 6 months to pass between stockpiling and seeding is too long. Six months will allow the weather to erode the pile and the soil will be hardened and crusted which is not a good environment for germinating seeds. A shorter time period should be specified.

## INTERIM STABILIZATION

Regulatory Reference: R645-301-331

### Analysis:

Requirements of this regulation are addressed primarily in Section 5.3.2.3. Table 5.3-1 is a temporary seed mixture comprised of four introduced and two native species. Most of these species are rhizomatous or spread above ground to effectively protect soil from erosion. The amount of seed the applicant plans to use is minimal. The *Interagency Forage and Conservation Planting Guide for Utah* recommends drill seeding at a rate of 25 to 75 seeds per square foot and broadcast seeding at a rate of 50-100 seeds per square feet. If the applicant uses the mix as shown, they would drill seed at the rate of 29 seeds per square foot or broadcast at the rate of 58 per square foot. While these are within the recommended rates, a 50% increase in the amount of seed would better assure interim revegetation.

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In Section 5.3.2.2 under the heading "Seeding," the application says the temporary seed mixture will be drill seeded at a rate of 14.0 pounds of pure live seed (PLS) per acre. According to Table 5.3-1, the temporary seed mixture would be drill seeded at a rate of 11.0 pounds PLS per acre. This discrepancy needs to be resolved.

The application says the planting time for most areas is in the fall, but prompt revegetation of small disturbances may be desirable to minimize erosion potential. In these cases, revegetation could occur at any time if site and climatic conditions are reasonable. Fall is recognized as the best time to seed in this area of Utah, but spring and early August planting may also be successful depending on the weather. If the applicant seeds at times other than the fall, there is a risk of needing to prepare the surface again and to reseed.

The application does not specifically say what other revegetation methods will be used on interim revegetation sites. However, because it does not differentiate, it is assumed the applicant will use the same methods for both final and interim revegetation. These techniques are discussed under "Revegetation."

### Findings:

With the following exception, the applicant has complied with the requirements of this section:

1. The discrepancy between Section 5.3.2.2 and Table 5.3-1 in the amount of seed to be used for interim revegetation needs to be resolved.

It is recommended the applicant increase the amount of seed for interim revegetation by 50%. Revegetation techniques other than the species mixture and timing of planting are discussed under "Revegetation."

## FISH AND WILDLIFE PROTECTION

Regulatory Reference: R645-301-333

### Analysis:

#### Potential Effects and General Comments

Section 4.3.2.1 of the application includes a list of potential effects on fish and wildlife. These include disturbance of 55.8 acres of land together with displacement of wildlife from the mine area, direct mortality of non-mobile wildlife, indirect disturbance from increased human activity, a potential for losses from electrocution and traffic-related mortality, the potential for altering vegetation in subsided areas, and possible disruption of water sources due to interruption of ground water flow.

The third paragraph in this section of the application characterizes adverse impacts as being negligible. The paragraph says the proposed disturbance areas have poor vegetation and habitat conditions. It also says, ". . . vegetative reestablishment has not reached the level necessary to provide beneficial habitat values for any wildlife other than rodents and possibly songbirds."

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The applicant has not provided data to substantiate these statements, and they conflict with Section 3.4.2.2 which says there is effective vegetation reestablishment and general restoration of many of the premining habitat values in more recently mined areas. Even if rodents and songbirds were the only groups of animals directly affected, disturbing the area would also affect predators using these animals as a prey base. Although the amount of vegetative cover in the proposed disturbed area is not as great as in undisturbed areas, the vegetation in reclaimed areas is generally more palatable and has greater nutritional value for wildlife than vegetation in undisturbed areas. Division of Wildlife Resources personnel indicate the area proposed for disturbance is used extensively by wintering deer, and Division personnel have observed numerous deer in the AMR areas. The area has good structural diversity. Many of the rocks have whitewash indicating they are used as perches by raptors.

Broad, general statements that impacts will be minimal are not appropriate except where data substantiates these statements. In most cases, it is best to simply present data and back up generalized statements with comparisons made to other areas or in literature sources. For example, the macroinvertebrate study says a diversity index of less than two indicates a stressed community, and it gives a literature citation. This type of comparison is proper. Also, the applicant could quote qualified sources, such as the Division of Wildlife Resources, to classify habitat conditions.

The application says displacement of mobile wildlife due to development of the surface facilities will largely affect only those species and individual animals which utilize this area. It says terrestrial wildlife use appears to be limited to a few rodent species and a limited number of bats and birds. As discussed above, the area is also used fairly extensively by deer. Although the proposed disturbed area is classified as critical elk winter range, the actual critical range for elk is on the plateau rather than in the surface facilities area.

According to the application, the greatest potential for significant territorial impacts would be associated with displacement of large raptors during the nesting season. Six golden eagle nests are within one-half mile of the proposed surface facilities area, and some have been tended or used within the past few years. Construction during crucial periods could disrupt nesting activities.

Potential effects to aquatic species include increased sedimentation, especially during construction, temporary loss of habitat during realignment of the stream, and possible changes in water quality and flow rates. The length of the creek, and thus the length of the riparian area, would be shortened from about 1210 to 1100 feet.

Although the applicant considered prevailing wind directions when locating the coal stockpiles, some windborn coal fines will probably enter the creek. The conveyor system will be covered to minimize dispersion of coal fines, and all transfer points will be partially or fully enclosed. Most sections of the conveyor will be at least 200 feet from the stream, but a few will be within 150-180 feet.

On page 4.3-5 is the statement, "The use of construction equipment near the Willow Creek stream channel represents a minor potential risk since a petroleum spill or leak could result in stream contamination and potential toxic effects on fish and macroinvertebrates." The latter part of this sentence does not explain why using construction equipment near the stream constitutes a minor risk for oil spill contamination.

Maximum anticipated water withdrawals from the Price River will be limited to 730-acre feet annually. These withdrawals would be based on existing water rights, and the application indicates the

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applicant does not believe this should be considered a new depletion subject to mitigation requirements for threatened and endangered fish of the Upper Colorado River. This determination will be made by the Fish and Wildlife Service. Based on previous discussions with the Fish and Wildlife Service, the new mine would constitute enough of a change in use that mitigation would be necessary.

The application says disturbances to the creek, including removal of a series of five man-made pools below the culvert crossing, would be mitigated by building designed channel segments with essentially the same hydrologic and geomorphic characteristics as the existing stream segments. The realigned sections will incorporate specific designs resulting in overall enhancement of aquatic habitat values and increases in the extent of riparian vegetation. The application gives some details of the designs, including approximate pool and riffle locations, meander locations along with placement of large rocks on the outsides of meanders, and revegetation plans.

Work in the stream will be done during low flows and will include alternative sediment control to keep excavated material out of the creek and to control runoff from the disturbed areas. A series of silt fences will be installed to catch sediment in the new channel after it is first opened. New stream crossings will be seeded with a quick-growing temporary seed mix and mulched or protected with synthetic slope stabilization materials.

In Section 4.3.3.2, the application says no areas were identified as potential wetland areas by the baseline field surveys of surface disturbance areas. The application continues by discussing realignment of the stream. Riparian areas are considered to be wetlands, but the application apparently distinguishes between jurisdictional wetlands regulated by the Corps of Engineers and stream alteration permits issued by the State Division of Water Rights. This should be clarified in the application.

### Protection Measures

In Section 4.3.3.5, the application says the applicant will design and construct mine-related power transmission lines as shown in Figure 4.3-1 and in accordance with various Department of the Interior, Department of Agriculture, and Rural Electrification Association guidelines. The applicant needs to check its designs with the Fish and Wildlife Service. The power pole configuration shown in Figure 4.3-1 differs from recommended designs available to the Division.

The application says in Section 4.3.3.6 that site-specific evaluation of the facilities area by a professional biologist resulted in the conclusion that the proposed conveyor location at the base of the natural canyon walls does not represent a barrier to large animal movements since such movements would typically involve more favorable access routes. Although sides of the canyons are not generally used for major migrations, big game use them for foraging and for daily movements, such as to the creek. The conveyor is a potential obstacle. However, the conveyor was designed with a minimum clearance of 40 inches. Several sections of the conveyor will be elevated more than 40 inches.

Literature sources indicate most deer and elk have no problem going under conveyors elevated at least one meter. Large bucks and bulls may need the conveyor to be elevated as much as ten feet. The plan needs more detail about what sections of the conveyor will be elevated more than 40 inches, how much these sections will be elevated, and about what activities will be occurring in these areas. If elevated sections are in areas where there is a lot of human activity, deer and elk will avoid crossing in these areas. The Division is seeking more information from Wildlife Resources about what designs are needed and about whether the conveyor might restrict big game movements.

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Section 4.3.3.7 says the applicant does not plan to use, store, or generate potentially hazardous or toxic materials. This sentence conflicts with the next sentence which says materials potentially hazardous to wildlife, such as petroleum products, will be within closed areas or containers.

With the exception of a small sump near the portals, no open ponds will contain potentially hazardous substances. The sump will collect drainage from the portal and shop areas and could contain petroleum waste. Petroleum residue accumulating in the sump will be collected and transported off-site or disposed of with other oily wastes.

The application needs to contain a commitment to periodically evaluate the stream buffer zone and other undisturbed areas and clean coal fines if necessary. It should also contain a threshold depth limit telling when fines would be cleaned. A suggested limit is one inch.

Equipment use and operations in stream buffer zones will be restricted to the construction activities required for placement of bridge abutments, replacement of the culvert crossing, and stream channel realignment. No fuel or lubricants will be stored within the buffer zone, and fueling and lubrication of equipment will not occur in the immediate vicinity of Willow Creek. A full length berm will separate operating areas from the stream channel.

The application says in Section 4.3.4.2 that the permit area does not provide suitable nesting habitat for bald eagles but that there is some potential for golden eagle nesting. Cyprus will either not initiate new activities within one-half mile of active golden eagles nests during the spring breeding season, or it will, in consultation with the Division and Wildlife Resources, initiate appropriate mitigation measures. Observed golden eagle nesting activity within the permit area will be reported to Wildlife Resources. Cyprus will conduct periodic raptor surveys in areas of concern if proposed mining activities have significant potential to adversely affect raptor breeding.

Three golden eagle nests are in Eagle Canyon, and three are in Castle Canyon. Construction activities within one-half mile of nest sites, particularly when the nests are within line of site of the activities, are normally restricted to a period outside the nesting season, approximately February 15 to July 15. Cyprus intends to install water tanks near the mouth of Castle Canyon and does not anticipate having a conflict with the nesting season. However, fans would be installed near the mouth of Eagle Canyon, and it is anticipated this will take about six months. This construction schedule could conflict with the nesting season for any birds nesting in Eagle Canyon.

To resolve this problem, officials from Cyprus met with the Fish and Wildlife Service. They agreed that Cyprus would evaluate visibility of the proposed facilities from the nests, check the elevation difference, evaluate the possibility of scheduling some construction outside the nesting periods, look at the potential for obtaining take permits and using nesting deterrents, and propose a plan for addressing the nests in the mining and reclamation plan application. In addition, after a firm construction schedule is established, mitigation plans will be developed in consultation with the Division, Wildlife Resources, and the Fish and Wildlife Service before beginning construction. These commitments satisfy regulatory requirements.

During operations, significant wildlife observations from the permit area will be reported to Wildlife Resources. Personnel will be instructed to report accidental wildlife mortality or eagle sightings to the mine environmental coordinator. If mining activities have significant potential to adversely affect raptor breeding, the applicant will perform periodic raptor monitoring surveys.

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Aquatic monitoring will continue for two years after construction of the realigned portion of Willow Creek. Benthic macroinvertebrates and fish will be sampled in one location in each relocated portion, and this will be compared to data from a reference location.

Aquatic monitoring will probably need to continue beyond the first two years to show if the mine is adversely affecting the stream. Even though the applicant will continue to take water samples, the stream biology will be affected by factors other than those measured in quarterly water samples. This needs to be discussed with Wildlife Resources to decide exactly what commitment is needed.

### Enhancement

The application does not describe how the applicant will achieve enhancement of fish, wildlife, and related environment values. The application says mobile wildlife will be displaced from the disturbed area, but it does not say how adjacent areas will be able to support these additional animals.

The mining and reclamation plan for the Willow Creek refuse removal project says wildlife habitat impacts will be mitigated using methods agreed upon by the applicant and Wildlife Resources. A final mitigation plan will be submitted to the Division before the project is completed.

The regulations require the applicant to use the best technology currently available to enhance wildlife habitat for both reclamation and operational phases. Habitat enhancement opportunities are available both near the site and off-site, such as at the Gordon Creek Wildlife Management Unit. Because the proposed disturbance area contains critical deer winter range, Wildlife Resources requests mitigation in the form of habitat enhancement at the rate of about one or two acres enhanced for every acre disturbed for the operational portion of the project. The application needs to give some detail of what enhancement measures are planned and a commitment to do it. This could include mention of whatever project is carried out as part of the refuse removal project.

### Findings:

This portion of the application is considered complete and accurate with the following exceptions:

1. Broad, general statements that impacts to wildlife will be minimal are not appropriate except where data confirms these statements. Statements that the vegetation and habitat are of poor quality are probably not correct, and, unless they are substantiated, they should be eliminated from the application.
2. On page 4.3-5 is a statement that the use of construction equipment near the Willow Creek stream channel represents a minor potential risk since a petroleum spill or leak could result in stream contamination and potential toxic effects on fish and macroinvertebrates. This sentence needs to be modified. The latter part of the sentence does not explain why using construction equipment near the stream constitutes a minor risk for oil spill contamination.
3. The application says no areas were identified as potential wetland areas, but the applicant intends to realign portions of Willow Creek. Riparian areas are considered wetlands.

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although they may not be jurisdictional wetlands regulated by the Army Corps of Engineers. This issue should be clarified.

4. The applicant needs to check its power pole design with the Fish and Wildlife Service. The design presented in the application differs from designs available to the Division.
5. The application needs to give more detail about designs for the conveyor. Although most deer and elk would pass under the conveyor if it is elevated 40 inches, large bucks and bulls may not be able to. The application needs to show where the conveyor would be elevated, how high it would be, and there needs to be some indication of what human activities will happen at those locations.
6. Section 4.3.3.7 says the applicant does not plan to use, store, or generate potentially hazardous or toxic materials. This sentence conflicts with the next sentence which says materials potentially hazardous to wildlife, such as petroleum products, will be within closed areas or containers. These two statements need to agree.
7. The application needs to contain a commitment to periodically evaluate the stream buffer zone and other undisturbed areas and clean coal fines if necessary. It should also contain a threshold depth limit telling when fines would be cleaned. A suggested limit is one inch.
8. The regulations require the applicant to use the best technology currently available to enhance wildlife habitat for both reclamation and operational phases. Because the proposed disturbance area contains critical deer winter range, Wildlife Resources requests mitigation in the form of habitat enhancement at the rate of about one or two acres enhanced for every acre disturbed for the operational portion of the project. The application needs to give some detail of what enhancement measures are planned and a commitment to do it. This could include mention of whatever project is carried out as part of the refuse removal project.

When the Division receives comments from Wildlife Resources, the applicant will probably need to make additional changes to the application.

Although the proposed disturbed area is not on federal property, portions of the proposed permit area have Bureau of Land Management land. Therefore, the Division will need to receive concurrence from the Fish and Wildlife Service. Although the Division does not anticipate adverse effects to threatened, endangered or sensitive species in the immediate area, the Fish and Wildlife Service may determine water depletions from the mine to have potential adverse effects on threatened and endangered fish of the Upper Colorado River. If so, the applicant will need to pay a mitigation fee.

## **ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES**

Regulatory Reference: 30 CFR Sec. 784.24, 817.150, 817.151; R645-301-521, -301-527, -301-534, -301-732.

### **Road classification system**

#### **Analysis:**

In conjunction with the proposed mining and related operations CPMC will construct, operate and maintain a number of new roads and will operate and maintain several existing roads. Both new and existing roads will be utilized to access existing and proposed facilities and for transportation of personnel, equipment, and supplies. All roads are classified as either primary or ancillary roads. The primary road classification includes any road used for transporting coal or spoil, roads which are used frequently for periods exceeding 6 months, and roads which will be retained to support the postmining land use. The ancillary road category includes all roads other than primary roads. Given that both coal and mine development waste will be transported by conveyor, the only road to be utilized for transportation of mine waste or coal processing waste will be Road PR-4 from the Castle Gate Preparation Plant to the Schoolhouse Canyon coal refuse stockpile. There are, however, several other roads which will be utilized on a frequent, long-term basis to support the proposed mining and related operations. Existing and proposed roads which will be used in conjunction with the proposed mining and related operations include the following:

#### **Proposed Roads in Willow Creek Facilities Area**

- PR-1 Primary mine access road for the proposed surface facilities area
- PR-2 Primary mine access road to the Willow Creek run-of-mine coal stockpile area
- AR-1 Ancillary access road to the mine water and fire-fighting reserve tank installation
- AR-2 Ancillary access road to the mine ventilation fan area
- AR-3 Ancillary access road to Sedimentation Pond 001 and Conveyor SC-4
- AR-4 Ancillary access road to the Willow Creek soil/substitute stockpile and explosive storage area

#### **Existing Roads in Castle Gate Preparation Plant and Loadout Areas**

- PR-3 Primary access road for the preparation plant and loadout areas
- PR-4 Primary access road to the Schoolhouse canyon coal refuse facility
- AR-5 Ancillary access road to the west end of Rock Tunnel No. 2 and the transfer point between Conveyors SC-5 and SC-6
- AR-6 Ancillary access road to the truck dump grizzly

#### **Existing Road in Gravel Canyon Soil Stockpile Area**

- AR-7 Ancillary access road to the Gravel Canyon soil stockpile

#### **Existing Road in Crandall Canyon Facilities Area**

- AR-8 Ancillary access road to Crandall Canyon facilities area

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All existing and proposed roads are shown on the Mine Surface Facilities Map (Map 18) and in Exhibit 20, Crandall Canyon Operations Plans.

The Operator has listed and classified all the proposed and existing roads. The Division accepts the classification for all existing roads, but does not accept the classification of any of the proposed ancillary roads. The proposed ancillary roads for the Willow Creek area need to be reclassified as primary roads.

### Findings:

The Division has determined that all new roads in the Willow Creek area are primary and need to be classified as such by the Operator.

### Plans and drawings

#### *Component (1)*

*Include a map, appropriate cross sections, design drawings, and specifications for road widths, gradients, surfacing materials, cuts, fill embankments, culverts, bridges, drainage ditches, low-water crossings, and drainage structures;*

### Analysis Component (1):

Map 18, Mine Surface Facilities, shows the location of the primary and ancillary roads in the Willow Creek area. All primary roads are assigned the identification number 67, while ancillary roads are given the number 68. Each primary road should be identified by a unique number. Since all ancillary roads will be classified as primary they must also be reidentified on the maps.

Cross sections for the primary roads are shown in Figure 4.5-9. The cross sections show the road widths, gradients and surfacing materials.

The Operator states that road PR-1 will be built to much different specifications than the other primary roads. Two cross sections for typical road designs should be included in the PAP, one for road PR-1 and one for the other roads. Since the roads that were originally classified as ancillary have a different configuration than the other primary roads a separate cross section should be used to describe those roads. Neither of the two cross sections was certified.

The Operator has stated in the PAP that:

*Primary roads have been or will be located and constructed to the extent operationally feasible in the most stable areas available and outside of the channel of intermittent or perennial streams. Road design and construction plans will prevent damage to public or private property; minimize the potential for downstream flooding or sedimentation; reflect consideration of the size of vehicles which will be using the road, traffic volume, and normal speeds; and to the extent possible, using the best technology currently available, minimize adverse impacts on fish, wildlife and related environmental values. All roads have been designed to provide for effective drainage, long-term stability, and safe vehicle operations under varying weather conditions. Design and construction of*

*all primary roads will be certified by a qualified Registered Professional Engineer as meeting these criteria.*

*Design and construction practices for specific roads will be dependent primarily on site conditions and the nature and frequency of anticipated use. The primary mine access road (PR-1) will provide access to most of the mine surface facilities and will be utilized for transportation of personnel, equipment, and supplies. Because it will handle a relatively heavy traffic volume and must provide safe operating conditions year-round, Road PR-1 will be a paved asphalt road with all-weather travel surface. The other primary roads will also be utilized on a year-round basis but the associated traffic levels will be significantly lower so these roads have been designed and either are or will be constructed with an adequate compacted road base and gravel or similar durable granular surfacing. The ancillary roads will be used on a periodic or intermittent basis with relatively low traffic volumes and use will typically be year-round. These roads either have been or will be constructed with a graded road base and limited compaction, and will typically be surfaced with granular overburden material, although gravel may be used where appropriate to minimize maintenance requirements and improve access conditions.*

*Road construction will involve cut and fill earthwork operations using tractor scrapers, tracked dozers, and motor graders. Cut and fill slopes will be established at maximum grades of 2.5H:1V except in rock where slopes may be as steep as 0.5H:1V dependent on the characteristics of the rock. Typical road construction practices, road configuration, and dimensions for the two road classifications are illustrated by Figures 4.5-9 and 4.5-10, Typical Primary Road Configuration, and Typical Ancillary Road Configuration, respectively. Road gradients will vary from flat to a maximum of approximately 10 percent and any required road embankments will be constructed and compacted in a controlled manner to provide a minimum static factor of safety of 1.3. All road cut and fill slopes will be revegetated as soon as reasonably practical following construction using the temporary revegetation seed mixture to stabilize the slopes and minimize erosion potential. Road surfaces will be graded or crowned to prevent accumulations of water on the road surface and adequately sized ditches and culverts will be installed and maintained to effectively carry road and other disturbed area drainage. Adequate cover will be provided over all culvert crossings to prevent damage or collapse of the culverts and culverts have been designed and will be installed to prevent plugging, erosion at the culvert inlet or outlet, and any drainage over the road surface. The locations of all proposed ditches are shown on the Drainage and Sediment Control Plan Maps, (Maps 23A through 23F) and ditch designs are included in Exhibit 13, Drainage and Sediment Control Plan.*

### **Findings:**

The Operator has not identified each road on Map 18 with a unique number. Map 18 must be revised so that each road has a unique identification number.

Since the roads in the Willow Creek area, that the Operator had originally classified as ancillary, have been determined by the Division to be primary roads all designs and maps and cross sections for those roads must be certified.

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The Operator did not certify the cross sections for the primary roads.

*Component (2)*

*Contain the drawings and specifications of each proposed road that is located in the channel of an intermittent or perennial stream, as necessary for approval of the road by the Division;*

**Analysis Component (2):**

From the plan it appears that no permanent roads will be located in an intermittent or perennial stream.

**Findings :**

The Operator has met the minimum regulatory requirements.

*Component (3)*

*Contain the drawings and specifications for each proposed ford of perennial or intermittent streams that is used as a temporary route, as necessary for approval of the ford by the Division;*

**Analysis Component (3):**

The Operator needs to include drawings and specifications for any ford that will be used while the new bridges are being constructed.

**Findings :**

The Operator did not address this item.

*Component (4)*

*Contain a description of measures to be taken to obtain approval of the Division for alteration or relocation of a natural stream channel;*

**Analysis Component (4):**

Road PR-1, Willow Creek Stream Buffer Area and Stream Protection Berm, Main Road Culvert Crossing, and Main Access Road Bridge - The main mine access road (Road PR-1) will cross Willow Creek in two locations and will parallel the creek for almost the entire length of the proposed surface facilities area. Because construction of this road will involve crossing, alteration, and relocation of portions of a natural drainageway, specific UDOGM approvals under applicable provisions of Rules R645-301-527.220 and 742.412. It should be noted that much of the Willow Creek channel through the proposed mine surface facilities area has previously been relocated and modified and so does not represent a natural undisturbed stream channel. Where Road PR-1 parallels Willow Creek, a stream protection berm approximately three feet high with 3H:1V side slopes will be constructed along the edge of the road or any associated roadside ditch on the side nearest the stream. This berm will provide a means of physically separating the proposed mining and related activities from the stream and will serve as one edge of a restricted access stream buffer zone.

The Division has given tentative approval for the stream alteration. There are no outstanding engineering issues involved with the stream relocation.

**Findings :**

The Operator has met the minimum regulatory requirements.

*Component (5)*

*Contain the drawings and specifications for each low-water crossing of perennial or intermittent stream channels so that the Division can maximize the protection of the stream; and,*

**Analysis Component (5):**

The Operator needs to describe what if any low-water crossings will be used when the bridges are constructed.

**Findings :**

The Operator did not address this section.

*Component (6)*

*Describe the plans to remove and reclaim each road that would not be retained under an approved postmining land use, and the schedule for this removal and reclamation.*

**Analysis Component (6):**

Certain roads within the mine facilities area will continue to provide access to specific areas during both reclamation and the extended liability period, although most roads will be removed and reclaimed during final site reclamation. Generally, the primary access roads will be removed and reclaimed in two phases. The first phase will involve ripping of these roads and removal of the associated road surfacing materials. This phase will occur in conjunction with facility demolition and removal and the surfacing materials removed will be placed in the designated solid waste disposal areas as previously discussed. The second phase of road removal for primary roads and removal and reclamation of all other roads will be sequenced to coincide with backfilling and grading of the areas that the roads either provide access to or pass through. When roads are no longer needed, they will be removed and the associated disturbance areas will be regraded and reclaimed.

Road reclamation will generally involve the use of tracked dozers to rip the road surface and grade any surfacing material into piles which will normally be recovered by wheel loader and either hauled directly or loaded into trucks for haulage to one of the designated disposal areas. Road surfaces will then be ripped to alleviate any compaction and the road area will be graded to blend with surrounding reclaimed areas. During final grading, any culverts will be removed and transported to a temporary steel debris storage site for either salvage or disposal off-site. Cut/fill areas will be reclaimed by pulling the fill material upslope into the cut and grading any remaining cut slope, the fill material, and disturbed downslope areas to a stable configuration consistent with natural drainage patterns and blending with the surrounding terrain. Any major road cuts will be reclaimed by

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partially backfilling the cut and grading any remaining cut slope exposures so that they are stable as described in the backfilling and grading plan discussion. Any major road fills which would interfere with postmining drainage will be removed and the associated disturbance areas regraded in conjunction with overall site grading activities.

### Findings :

The Operator has met the minimum regulatory requirements.

### Performance Standards

### Analysis:

In the PAP the Operator states:

*Operation and maintenance procedures for all mine roads are designed to provide a smooth operating surface, assure safety, and minimize dust emissions. Road maintenance will involve periodic grading to provide a smooth surface, remove rocks or debris, and maintain effective drainage; repair and resurfacing as necessary; inspection, clean-out, and repair of ditches and drainage structures; and watering or application of surfactants to control dust during dry periods. Generally, speeds on roads and in active operating areas will be limited to 25 miles per hour by posted speed limits both as a safety consideration and to minimize dust emissions from unpaved roads. In the unlikely event that any road is damaged by a catastrophic event such as an earthquake or flood, CPMC will make appropriate repairs as soon as reasonably practicable and will limit the use of the road or provide an alternate access if unsafe conditions exist.*

The Operator should include information on how all performance standards, such as the use of nonacid- and nontoxic-forming substances in road surfacing, will be kept.

### Findings:

The Operator failed to demonstrate that the roads will be constructed of nonacid-and nontoxic-forming substances.

## **SPOIL AND WASTE MATERIALS**

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

### **Disposal of noncoal mine wastes**

#### **Analysis:**

Noncoal wastes generated in conjunction with mining and related activities will include, but not be limited to, waste oil and lubricants, garbage, paper waste, machinery parts, tires, cable, wood waste, and other miscellaneous debris. All smaller noncoal solid wastes will be collected and stored in dumpsters or similar closed containers. Larger solid waste materials including such items as used equipment, machinery parts, tires, and cable will be temporarily stored in a designated scrap yard located in the equipment storage area as shown on the Mine Surface Facilities Map (Map 18). Most of the waste oil from the maintenance shop facility will be collected in a waste oil sump and recycled to one of two waste oil storage tanks for use in the shop facility waste oil heater. The waste oil will be mixed with fuel oil only after sampling and analysis to verify that the waste oil meets strict EPA requirements. Waste oil and fuel oil feed rate and mixture will be adjusted as necessary based on waste oil availability and shop heating requirements. Any waste other waste oil and lubricants and any waste oil not meeting the applicable EPA requirements will be collected and stored in either closed drums or in the waste oil storage tank located in the maintenance shop building. Temporary storage areas for waste oil and lubricants will provide full containment to prevent accidental release of petroleum products to the surface drainage system.

A contract disposal service will regularly collect and haul the noncoal solid wastes from the dumpsters to the permitted Carbon County municipal landfill. Dependent on the market for scrap materials, the larger noncoal solid waste and scrap will be collected periodically either by a salvage contractor for salvage and recycling or by a contract disposal firm which will haul these material off-site and dispose of it in a suitable disposal site. Any waste oil, lubricants, or other potentially combustible materials will be collected and either recycled or disposed of by a licensed disposal contractor in accordance with all applicable Utah and EPA regulations. No noncoal wastes will be disposed of on site during active operations except for mining waste generated in the mining process. As described in the previous section, this material will be disposed of in the Schoolhouse Canyon coal refuse stockpile.

#### **Findings:**

The Operator did not address how any hazardous waste materials will be disposed of.

### **Coal Mine Waste**

#### **Analysis:**

Mine development, ongoing mining operations, and ancillary operations such as development of overcasts for mine ventilation and coal haulage will result in production of mine waste including

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waste rock, carbonaceous shale, weathered coal, floor clay, and parting material. Where it is operationally feasible to separate these material from the coal during development and mining, the mine waste will be removed and handled separately from the coal. Where separation is not operationally feasible, mine waste will be handled with the coal and will be removed in the coal preparation plant.

Generally, the same mining equipment and haulage systems used for coal production will be used to remove and handle mine waste. Continuous miners, electric shuttle cars, and LHD scoops will be used to load and haul mine waste to the mine conveyor system. Normally waste haulage will occur on a scheduled waste handling shift when the conveyor belt system will be cleared of coal. Typically, any waste produced during periods other than on a scheduled waste handling shift will be temporarily stockpiled in an inactive area underground for later handling and haulage from the mine. Once the mine waste is placed on a belt at the loading point, it will be transferred to the main haulage belt running from the mine. From the main haulage belt, the mine waste will transfer to the surface coal haulage system which will carry the waste to the primary crusher building.

The surface coal haulage system and preparation plant have been designed to facilitate waste handling. The stacking tube at the run-of-mine coal stockpile can be emptied by a direct feed chute in its base allowing waste to bypass the coal stockpile and feed directly to Conveyor SC-1. In the primary crusher building a flop-gate and diversion chute will allow mine waste to bypass the primary crusher and feed directly to the mine waste temporary stockpile. From this stockpile CPMC will use a wheel loader and rear dump trucks to load and haul the mine waste to the existing permitted Schoolhouse Canyon refuse stockpile. In the refuse stockpile area, mine waste will be handled and placed in essentially the same way as coal refuse material as discussed in the subsequent sub-section titled Coal Processing Waste Handling and Disposal.

The Operator proposes to dispose of coal mine waste in sites already permitted for this activity. To avoid confusion the Operator should show that the Schoolhouse Canyon refuse stockpile has been permitted to accept material from the Willow Creek Mine.

### **Findings:**

The Operator needs to document in the PAP that the Schoolhouse Canyon refuse stockpile has Division approval to accept refuse from the Willow Creek Mine.

## **Refuse Piles**

### **Analysis:**

Refuse will be stored a the existing and permitted Schoolhouse Canyon facility.

### **Findings:**

The Operator has not demonstrated in the PAP that the Schoolhouse Canyon facility has been approved to accept refuse material from the Willow Creek site.

## Impounding Structures

### Analysis:

The Operator's designs for pond construction are:

*Pond construction will follow the regulatory guidelines as outlined in R645-301-533. The initial step in embankment construction is the removal of all organic materials from the foundation area. This will occur in conjunction with topsoil recovery operations as described in Section 4., Engineering Design and Operation Plans. Foundation areas will be graded to achieve maximum 1:1 slopes.*

*On-site borrow materials will be utilized for fill for the construction of pond embankments. Fill material shall be selectively handled to exclude organic material, frozen soils, and other unsuitable materials. Coal processing wasters may be used as embankment fill material*

*Fill materials for pond embankment construction will be placed in horizontally continuous lifts beginning at the base of the structure. In using fin-grained soils, lift thickness should not exceed 12 inches. Material should be compacted to at least 95% of the maximum dry density as defined by the standard Proctor test, with the placement of water content not exceeding the range of -2 to +3% of optimum.*

*At a minimum, the top width of each pond will not be less than 20% of the sum of the height, in feet of the embankment measured at the upstream toe plus 10 feet. The embankment cross sections are shown on the Sedimentation Pond Designs Maps 24, 25 and 26.*

*Design specifications for embankment height provide for a minimum of 1.0 feet freeboard between the top of the embankment and the emergency spillway flow level, and an additional 5% factor of safety to offset any settling which might occur. The 5% settling factor is conservative, because construction plans specify compaction of the horizontally continuous lift embankment fills. The compaction should all but eliminate settling.*

*Tests need to be performed during the construction of pond embankments to determine compliance with moisture-density specifications. At a minimum, one field test for every 2,000 cubic yards of compacted structural fill, with at least one test per lift; one field test for every 200 cubic yards of compacted backfill in trenches or around structures. with at least one test per lift; supplementary laboratory compaction curves for at least every 20 field density tests.*

Coal mine waste is defined as coal processing waste and underground development waste. The Operator has stated that coal processing waste may be used for impoundment construction. In order to use coal processing waste in impoundment construction the Division must give specific approval. The approval must be based on the demonstration that the coal processing waste is suitable material for impoundment construction. The Operator has not demonstrated the suitability of coal

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processing waste for this application. Therefore, coal processing waste cannot be used for impoundment construction until it has been shown to meet design requirements.

The Operator must address the stability of the structure, safety factor for the impoundments and how they were determined. While it is unlikely to occur in Utah the Operator must also discuss the potential for acid mine seepage through the impoundment.

### Findings:

Prior to using coal processing waste for impoundment construction the Operator must first demonstrate the suitability of the material. The Operator must address the stability of the structure and the potential for acid mine seepage through the impoundment.

### Burning and Burned Waste Utilization

#### Analysis:

The Operator stated that:

*Coal piles will be periodically inspected for any excessive oxidation or burning coal and if any is found it will be separated from the main stockpile and extinguished either by burying the coal with dirt or by using a mine water truck to spray the coal with water. Once extinguished, the burned coal will be transported to the temporary mine waste or coal refuse stockpiles for future placement and burial in the Schoolhouse Canyon refuse disposal area.*

#### Findings:

The Operator did not address how coal mine waste fires would be handled. If the procedure is in the MRP of permitted sites then that information should be referenced.

### Return of Coal Processing Waste to Abandoned Underground Workings

#### Analysis:

The Operator did not address this issue.

#### Findings:

The Operator needs to address this section

### Excess Spoil

#### Analysis:

The Operator has stated that:

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*As an underground mining operation, the proposed mining and related activities will not result in generation of spoil materials. In addition, all related surface disturbance required for construction of the necessary surface support facilities has been carefully planned to balance material cuts and fills so that no excess material is generated. Since no excess spoil will be generated as a result of the proposed construction or operations activities, regulatory provisions relating to handling and disposal of excess spoil are not applicable.*

**Findings:**

The Operator has met the minimum regulatory requirements.

**Excess Spoil: Valley Fills/Head-of-Hollow Fills**

**Analysis:**

Valley fills using excess spoil will not be used in this operation.

**Findings:**

The Operator has met the minimum regulatory requirements.

**Excess Spoil: Durable Rock Fills**

**Analysis:**

No durable rock fills have been proposed for this project.

**Findings:**

The Operator has met the minimum regulatory requirements

**Excess Spoil: Preexisting Benches**

**Analysis:**

No excess spoil will be used in connection with preexisting benches.

**Findings:**

The Operator has met the minimum regulatory requirements.

## HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

### Analysis:

Hydrologic resource protection in the operational phase of mining is addressed in Section 4.7, and Exhibits 10, 12, and 13. In Part 4.7.1.1 a cross reference shows the specific location in which each regulation is addressed. Part 4.7.1.2 provides further information on the general hydrologic protection plan. This part outlines general methods that Cyprus Plateau Mining Corporation (CPMC) will use to protect the environment during the operational phase of activity. More specific information is found in later part of Section 4.7. Part 4.7.1.3 is a breakdown of the specific components of the hydrologic protection plan, and Part 4.7.1.4 identifies resources the require special protection measures.

### Surface-water Protection

Surface-water protection measures are addressed in Section 4.7.2.2, page 4.7-7 with other pertinent information found in the introduction to Section 4.7.2 on page 4.7-3. This section contains subsections on removal of vegetation and soil materials from disturbance areas, realignment of the Willow Creek channel, surface placement of coal, mine waste, and coal refuse material, discharge of mine water to surface drainages, mine water supply withdrawals, coal preparation activities, and operation of drainage and sediment control structures.

Vegetation and soil will be removed for the disturbed area to preserve the growth medium. This practice will increase the erosion potential on the materials left exposed. To prevent erosion, flow from the undisturbed areas upslope will be routed around disturbances. CPMC will provide and maintain effective drainage from all disturbed areas that will be included a sediment control network. Specific information about the drainage and sediment control system are found in Section 4.5.2.3. Disturbed areas will be reclaimed when operationally practical to further limit erosion and sediment contribution into the off site drainage.

The Willow Creek channel will be realigned in two reaches to make room for necessary operational facilities. The disturbance associated with the realignment will likely increase total suspended solids (TSS) in the flow of Willow Creek. Measures provided in Section 4.5.2.3 and Exhibit 14 will be used to minimize degradation to water quality caused disturbance. The sediment control plan during construction and operation of the facilities is not well defined in the permit application.

CPMC has addressed the effects that placement of coal, mine waste and coal refuse will have on surface water. Measure, described on page 4.7-9, will be implemented to protect water quality when these materials are stored on the surface. Upgradient drainage will be routed around the refuse storage area. Coal refuse pile ditches are designed to convey the 25-year, 24-hour storm event. Runoff from both the coal refuse pile and coal stockpile will be routed to sediment ponds where the water will be treated before released off the permit area. UPDES permits will be held on these sediment ponds to assure compliance with applicable water quality regulations.

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Discharge of mine water to the surface may become necessary in the life of the mine. This mine water may have elevated TDS concentrations and lower pH levels and will be treated in the surface drainage and sediment control system and Pond 001. Discharges will be minimal and should not greatly affect the surface water quality. Water encountered in the mine will be transferred into abandoned mine workings or temporary storage areas. Some mine water, if found in significant quantities, may be used in place of or as supplement to the operational mine water supply.

A 750,000 gallon water storage tank will be constructed to contain mine processing water. The water will be taken out of the Price River and is included in water rights currently held by CPMC. Water will be recycled in the processes to minimize the amount of water taken from the river. CPMC anticipates using 730 acre-feet of Price River water per year.

Coal preparation activities will have the potential of increasing TSS, TDS and some chemical constituent in the processes. Process water will be recycled in a close, zero discharge, system. The design of the process plant includes measure that will retain accidental process water discharges.

The drainage and sediment control structures proposed by CPMC will be used as the primary mitigation of water quality effects. The drainage and sediment control system is covered in Section 4.7.2.1 of the permit application, and later in this analysis.

### Groundwater Monitoring

Ground-water monitoring will be conducted according to the ground-water monitoring plan. Ground-water monitoring data will be submitted every 3 months to the Division. The statement in the PAP concerning notification when the analysis of any water sample indicates noncompliance with the permit conditions is not adequate. The operator shall promptly notify the Division and immediately provide for any accelerated or additional monitoring necessary to determine the nature and extent of noncompliance and the results of the noncompliance. Plans and hydrologic information to evaluate and mitigate the noncompliance situation and information relevant to the PHC shall be submitted to the Division as required.)

CPMC's Baseline Hydrologic Monitoring Plan for the Willow Creek Mine is Exhibit 12 of the PAP. Collection of baseline data began in June 1994.

Information characterizing the ground water flow regime and hydraulic parameters of the regional aquifer comes from wells MC-205, MC-206, and MC-207, located in the western coal reserves area and B51, B331, B331A, and B121, recently installed in the Willow Creek Mine area as part of the Baseline Hydrologic Monitoring Plan. The locations of wells B51, B331, B331A, and B121 are shown on the Regional Hydrology Map (Map 15).

In order to obtain maximum benefit from exploration drilling efforts and expenditures and more accurately define ground water conditions in the area, CPMC may complete some future exploration drillholes as ground water monitoring wells.

The operational water monitoring plan is summarized in Exhibit 12. It consists of routine monitoring of flow and quality of 12 springs and 3 seeps and water levels in 8 piezometers to evaluate the occurrence of ground water and the hydraulic characteristics of the aquifers. Monitoring stations

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are listed in Table 3.7-1 of the PAP and Table 1 of Exhibit 12. Locations are shown on the Regional Hydrology Map (Map 15).

Water quality parameters include field measurements for pH, specific conductance, and temperature, and laboratory measurements for general water characteristics such as total dissolved solids, nutrients, major ions, and trace metals. Sampling frequency is outlined in Table 2 of Exhibit 12. Ground water quality samples will be analyzed for the specific parameters listed on Table 3.7-9 and Table 3A of Exhibit 12, and sampling frequency is listed in Table 2 of Exhibit 12.

Ground water quality samples will be collected, labeled and transported to a qualified analytical laboratory for analyses. Proper sample collection, preservation, handling, and storage methods will be utilized at all times to preserve the integrity of the samples and ensure validity of analysis results. All water monitoring analysis results will be recorded, reviewed to identify potential problems or trends, and filed at the mine so as to be available for future inspection and review. In addition, CPMC will file copies of both field data and laboratory analysis sheets on a quarterly basis with the UDOGM. At the end of each annual water year, CPMC will tabulate all water monitoring data for the year, review the data with respect to changes in groundwater hydrology systems, and provide a summary Annual Hydrology Report in compliance with the UDOGM schedule.

Baseline monitoring data are to characterize pre-Willow Creek Mine ground water flows, water quality conditions, and any seasonal variations in these characteristics. Additionally, baseline hydrologic data will be compared to regional data and data from adjacent areas to evaluate spatial and temporal relationships. Available water quality information is summarized in Table 3.7-4, Ground Water Quality Summary. Ground water quality data are presented in Exhibit 10, Hydrologic Information. Available ground water quality data for wells B51, B121, B331, and B331A are presented in Figure 3.7-3, Ground Water Quality Hydrographs.

The proposed mining and related operations have been designed and will be operated and maintained to effect full compliance with all applicable Federal, State, and local laws and regulations. Structures and facilities from existing and proposed mining and related surface are not generally compatible with the proposed postmining land use of wildlife habitat and will be removed following completion of mining. Equipment, structures, and other devices used in conjunction with monitoring the quality and quantity of ground water onsite and offsite are not specifically mentioned but would be covered by the general commitments to properly design, maintain, operate, and remove all mining related structures and facilities.

### Surface-Water Monitoring

Surface-water monitoring is covered in Section 4.7.2.3 and Exhibit 12, Hydrologic Monitoring Plan. The locations of monitoring wells are found on Map 16, Regional Hydrology. Groundwater will be analyzed for the parameter found in Table 3.7-9 and Section 3.7. At this time CPMC has only a generalized surface water monitoring plan for the operational mining. They have not yet developed the specific plan.

### Acid- and Toxic-forming Materials

Drainage from acid- and toxic-forming materials and underground development waste into surface water and ground water will be avoided by identifying and burying and/or treating materials

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that may adversely affect water quality or be detrimental to vegetation or to public health and safety if not buried and/or treated. Materials will be stored in a manner that will protect surface water and ground water by preventing erosion, the formation of polluted runoff, and the infiltration of polluted water.

Storage of acid- and toxic-forming materials and underground development waste will be limited to the period until burial and/or treatment first become feasible. Storage will not result in any risk of water pollution or other environmental damage. Storage, burial, or treatment practices will be consistent with other material handling and disposal provisions of the regulations.

Chemical characteristics of coal and other materials to be disturbed in the Willow Creek Mine are discussed in Section 3.6.3.2. Of the 44 core samples of roof and floor rock collected in 1994, there were a few samples that exceeded DOGM Guideline values for SAR, boron, selenium, and acid-base potential. However, values from numerous samples of weathered and oxidized soil, mine waste, and coal refuse that have been at the surface a number of years offer a probably more accurate perspective of potential water quality impacts than analysis results from fresh coal, roof, and floor samples. Weathered mine waste and coal refuse samples show no significant acid, alkaline, or toxicity potentials.

The location of these samples is not given in the PAP.

The manner in which waste materials are typically handled during mining will most likely result in the smaller volumes of unacceptable materials being mixed with larger volumes of acceptable materials and the resulting buffering or dilution leaving material that falls within acceptable values. On page 3.6-27 is a statement that where mine waste rock or coal refuse materials are placed in surface stockpiles, testing these materials for suitability may be appropriate as part of the reclamation program. CPMC commits to handling and disposing of any potentially acid or toxic forming materials encountered or exposed in compliance with the coal mining rules.

Leaching of mine waste and coal refuse materials has the potential to shift the ground water chemical type towards a sodium sulfate water type and may also cause minor increases in concentrations of iron, manganese, and TDS. These potential impacts are expected to be minimized by controlled placement and compaction; effective routing of surface drainage around stockpile areas; establishment of an underdrain system (refuse pile only); grading or regrading of pile surfaces, including the completed refuse pile areas, to provide effective surface drainage including stable postmining diversion channels; topsoil replacement (refuse pile only); reclamation of the completed refuse pile utilized during construction; and reclamation of the coal stockpiles and permanent coal refuse pile, which will also contain mine waste materials.

Stockpile areas will be constructed to provide effective drainage of runoff from stockpile surfaces and infiltration through coal stockpiles. Runoff from stockpile areas will be collected and routed to nearby sedimentation ponds. CPMC will also limit stockpiled coal inventory for operational and environmental reasons, resulting in rapid stockpile turnover and minimal potential for weathering or leaching of coal materials. Infiltration and other effects will be minimized by limiting detention time in the sedimentation structures, by compaction of the pond base during construction, and by accumulation of fine solids at the bottom of the basins. Regular periodic removal of sediment accumulations from the sedimentation ponds will minimize TDS and buildup of chemical constituents.

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It is anticipated that infiltration to the coal refuse pile and subsequent leaching will be minimal given the relatively arid conditions and engineering controls that will be implemented. Rock underdrains will tend to collect the majority of any leachate which does percolate through the pile. Leachate collected in the underdrains is routed in diversion channels to existing sedimentation ponds where it is retained and sampled prior to release to natural drainages. Under the UPDES permit for the existing ponds, any discharge of leachate from the refuse pile or mixed leachate and stormwater is subject to the same discharge effluent standard as normal stormwater discharges from the pond.

Direct mining related ground water impacts will be limited by the lack of significant ground water aquifers, low overall permeability of the effected geologic sequence, relatively slow rate of ground water movement, and the absence of any significant quantities of acid- or toxic-forming materials. If groundwater quality impacts do occur in the coal refuse pile area, they are expected to be limited due to the relatively small areal extent of the refuse pile and the factors previously noted. Any leachate from the coal refuse pile, which is not captured by the underdrain system, will infiltrate to the colluvial/alluvial deposits, mix with groundwater resulting from natural surface infiltration, and discharge to the surface water system. Under these conditions, it is anticipated that the minimal volume of resulting leachate will be significantly diluted by both groundwater and subsequent surface water mixing and will not significantly affect surface water quality. Stratigraphic units which underlie the alluvial/colluvial deposits consist of relatively impermeable siltstones and shales which limit vertical permeability and effectively minimize the potential for ground water impacts to deeper aquifers.

### Water Rights

Information about water rights in the operational mine phase is included in Section 4.7.2.7. Background information is found in Section 3.7.9.1 of the Environmental Resource chapter. Cyprus Plateau Mining Corporation (CPMC) does not expect to impact water rights by the mining activity adversely.

### Transfer of Wells

All exploration drillholes established by CPMC within the Willow Creek permit area will either be sealed following completion of drilling, sampling, and logging or completed as monitoring wells. If a hole is to be utilized for monitoring it will be cased, completed, and developed as a monitoring well consistent with methods described in Section 4.6.2.1 of the PAP. When an existing well is no longer required for ground water monitoring, it will be sealed by filling the borehole or casing with cement to form a plug from the bottom of the hole to at least 20 feet above any zone of completion or water-bearing zone; filling the remainder of the hole to within 20 feet of the ground surface; and filling the remainder of the hole to the ground surface with cement to form a surface plug. A steel fence post will be placed in the center of the surface plug to provide a permanent marker of the location. Methods used to plug and seal boreholes and water monitoring wells will minimize the potential for mixing of surface and ground water sources and will also limit the potential for communication and mixing between various ground water aquifers.

### Discharges into an Underground Mine

Discharges of coal processing waste into an underground mine through an injection well, with recovery of clarified make-up water for the coal preparation plant through another well, have been

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approved by the Division as part of the current Castle Gate Mine MRP. The same slurry discharge-water recovery plan has been incorporated into the Willow Creek PAP. The discharges will minimize disturbance to the hydrologic balance on the permit area, prevent material damage outside the permit area and otherwise eliminate public hazards resulting from underground mining activities by recovering some coal processing water for reuse and by reducing to some small extent the volume of coal mine waste in the refuse pile. When such discharge occurs it will be at a known rate and quality. The discharge will meet effluent limitations for pH. The discharge will contain solids in excess of effluent limitations for total suspended solids; however, the Division has previously approved this injection plan including this exceedance of the total suspended solids limitations. The plan does not at present appear to have the required approval of the Mine Safety and Health Administration (MSHA). Discharges will be limited to water and coal-processing waste. Water from one underground mine will not be diverted into other underground workings.

The current, approved Castle Gate Mine Permit includes provisions for injection of a fine coal refuse slurry, consisting of process water and coal processing waste, into existing abandoned underground mine workings through two existing injection wells near the Castle Gate coal preparation plant. With the exception of process water in the slurry that could be injected through these wells, water will not be diverted or discharged into any underground mine in conjunction with ongoing mining and reclamation operations at the Willow Creek Mine. There does not seem to be any documentation of the Division's approval other than the slurry injection plan being included in the Castle Gate MRP.

Plan details on the construction, operation, and sealing at time of abandonment of the injection wells are provided in Exhibit 19, Castle Gate Information. The proposed operation is a closed system that will not discharge into local surface or ground water resources. The wells are cased to prevent contamination of the Price River alluvial aquifer, and transmissivities of the rocks in the abandoned mines have very low permeabilities. Recovered water will be used at the coal preparation plant. Any water escaping to the surface from the injection well will be routed to a sediment pond, and if discharge into the Price River is necessary it will be through the ponds UPDES discharge point. A Small Area Exemption (SAE) has been requested for the runoff from the recovery well site, but it isn't clear that such an exemption has been granted. New well sites may become necessary as portions of the underground workings are successfully backfilled. Estimated life of the project is 10 years. Solids for the slurry will come from a resin recovery circuit. Analysis results from a slurry sample are in Exhibit 19. Utilization of the slurry injection system will reduce the volume of material at the waste rock disposal site. When the system is in use, water quality samples will be collected quarterly from the injection wellhead and recovery wellhead. Field determinations will include pH, conductivity, and temperature. Laboratory analyses will include TDS, specific conductance, and other parameters listed in Exhibit 19. Injection rate will vary but should match the long term rate at which water will be removed through the recovery well, averaging approximately 150 to 250 gallons per minute. The slurry is estimated to contain 20% to 30% solids and estimated average amount of solid material in the slurry is 20 tons/hour of 60 to 400 mesh (200 average) material and 200 gal/minute of process water. This is in excess of normal effluent limitations. There does not appear to be any MSHA approval for this injection plan.

### **Gravity Discharges.**

There are no indications that the coals to be mined are acid-producing or iron-producing. Mine dewatering flows have been monitored and there is no evidence of any significant potential for development of acidic or toxic drainage as a result of any mine water discharge or resaturation following

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mine abandonment and sealing. 4The Willow Creek mine workings will progress down dip from the outcrop area and mine drainage will be controlled during active operations so there is little or no potential for direct gravity discharge of water from the mine. Upon completion of mining and related activities mine drainage control operations will cease and portions of the mine workings, especially the mine workings farthest down dip, are expected to gradually fill as ground water continuously discharges into the mined-out areas. To prevent any significant discharge from the mine openings following cessation of active mining operations and mine closure, CPMC will seal and backfill the mine portals. Sealing practices are discussed in Section 5.4.2.3, Reclamation Practices, and Section 5.5.2.6, Casing and Sealing of Wells and Mine Openings.

### **Water-Quality Standards and Effluent Limitations**

Water-quality standards and effluent limitations are addressed in Section 4.7.3.12. Water discharged from the permit area will be regulated by Utah Division of Water Quality (DWQ). CPMC will apply for discharge permits for all discharge points and after approval by DWQ these permits will be included in Exhibit 4 of this MRP. CPMC says that "historic and baseline monitoring data indicate no significant potential for water quality degradation as a result of planned mining and related activities." They do not anticipate acid or toxic drainage to result from mining activities.

### **Diversions**

Diversions are addressed in Section 4.7.2.9, 4.7.2.10 and 4.7.3.7, and in Exhibit 13. Diversions are mapped on Maps 26A through 26F. First, Section 4.7.2.9 talks about how and why diversions will be used to protect environmental resources. Second, Section 4.7.3.7 discusses the design criteria used in planning diversions. Finally, Exhibit 12 has the designs and discussion of the designs for each diversion in the drainage and sediment control plan. The first two sections mentioned are general information about the use and the function of diversions. The last provides specific values used in the design.

Many of the undisturbed, particularly in the upper reaches of the main facilities area, are located such that they will be located on steep and rocky slope. It seems that these diversions will have to be cut into bedrock, which will be difficult in construction and reclamation.

### **Stream Buffer Zones**

Stream buffer zones are addressed in Section 4.7.2.6, page 4.7-14 of the permit application package. Cyprus Plateau Mining Corporation (CPMC) is requesting a variance from the 100-foot buffer zone requirement. CPMC does not show on any map the location of the infringed 100-foot buffer zone, nor does Section 4.7.2.6 take into account the stream alteration as part to the activity within the stream buffer zone. There is no evidence given to show that these activities will not cause or contribute to the degradation of water quality or the violation of any effluent limits.

### **Sediment Control Measures**

Sediment control measures are covered in Sections 4.7.3.1, through 4.7.3.3, 4.7.2.8, 4.7.2.11 and 4.7.2.12 and specific designs are in Exhibit 13, Drainage and Erosion Control.

Plan details on the construction, operation, and sealing at time of abandonment of the injection wells are provided in Exhibit 19, Castle Gate Information. The proposed operation is a closed system

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that will not discharge into local surface or ground water resources. The wells are cased to prevent contamination of the Price River alluvial aquifer, and transmissivities of the rocks in the abandoned mines have very low permeabilities. Recovered water will be used at the coal preparation plant. Any water escaping to the surface from the injection well will be routed to a sediment pond, and if discharge into the Price River is necessary it will be through the ponds UPDES discharge point. A Small Area Exemption (SAE) has been requested for the runoff from the recovery well site, but it isn't clear that such an exemption has been granted.

### **Siltation Structures**

Siltation structures are covered under Section 4.7.3.2 and designed in Exhibit 13. The only siltation structures that will be used are sediment ponds (and maybe sediment traps.)

### **Sediment Ponds**

Sediment Ponds are covered under Section 4.7.3.3 and designed in Exhibit 13. These ponds are shown on Map 23A through 23F for ponds within the new development at the Willow Creek facilities. Ponds that are existing at the Castle Gate Facilities and in Crandall Canyon are included in Exhibit 19. Information and designs for the pond spillways are found in Section 4.2 in Exhibit 13, Sediment and Drainage Control.

### **Other Treatment Facilities**

There are no other treatment facilities planned as stated in Section 4.7.3.6.

### **Exempt Areas**

The applicant has requested that three areas be exempt from siltation structures. These exempt areas are named and addressed in Exhibit 13, Section 4.4.3. These areas will not be exempt from sediment control but will have runoff contained or treated by alternate sediment measures.

### **Discharge Structures**

Information about the designs of discharge structures is found in the section on sediment ponds, Section 4.7.3.3.

### **Impoundments**

Impoundments are addressed in Section 4.7.3.4. The only impoundments proposed are the sediment ponds addressed in Section 4.7.3.3 of the application and previously in this analysis.

### **Casing and Sealing of Wells.**

In order to minimize any potential hazards to humans or livestock associated with open exploration holes or boreholes and to prevent potential mixing between ground water aquifers, Rules R645-301-631 and 641 require that all exploration holes and boreholes be cased if used for water monitoring, or permanently sealed if not used for monitoring or if no longer required for ongoing monitoring activities. All exploration boreholes established by CPMC within the Willow Creek permit

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area will either be sealed following completion of drilling, sampling, and logging or completed as monitoring wells. Generally, a determination will be made either prior to or during completion of any exploration hole or borehole of whether or not the hole will be utilized for ground water monitoring. If a borehole is not to be used for monitoring it will be plugged and sealed as soon as drilling, sampling, and logging operations are completed. If a borehole is to be utilized for monitoring it will be cased, completed, and developed as a monitoring well consistent with methods described in Section 4.6.2.1 of the PAP. When no longer needed for monitoring or other use approved by the Division, and unless approved for transfer as a water supply well, on-site monitoring wells will be sealed by filling the borehole or casing with cement to form a plug from the bottom of the hole to at least 20 feet above any zone of completion or water-bearing zone; filling the remainder of the hole to within 20 feet of the ground surface; and filling the remainder of the hole to the ground surface with cement to form a surface plug. A steel fence post will be placed in the center of the surface plug to provide a permanent marker of the location. There is no current plan to transfer monitoring wells to another owner for use as water supply wells or any other use.

### Findings:

CPMC must clearly define a sediment control plan for the two segments of Willow Creek that will be realigned. The plan must include the construction phase and postconstruct phase of the realignment.

All diversions must be designed to convey the appropriate design storms as described in R645-301-742.323 and R645-301-742.333. Most diversion meet or exceed these design specifications except diversions that involve flexible tubing. FET-1 and FET-2 must be designed to convey, at minimum, the 10-year, 6-hour storm event.

UD-25 drains into a depression where flow is trapped. This depression must be designed or CPMC must show that water collected in the depression will be minimal and will not result in any environmental or physical hazards.

Sediment traps 020 and 030 must be adequately designed as impounding structures. These impoundments must meet the requirements of R645-301-743. CPMC must summarize the design parameters for all sediment control structures including the Portal Collection Sump, sediment ponds and sediment traps in the text of the Drainage and Sediment Control Exhibit, Exhibit 13. Both sediment traps are not necessary to meeting the regulation and could be removed from the PAP.

All alternate sediment control areas and there treatment must be clearly shown on a map. The alternate sediment control methods must be adequately designs per R645-301-742.110 by meeting the requirements of the Division's Sediment Control Directive.

CPMC must show the location of stream buffer zones that will be established within 100 feet of the Willow Creek stream channel. They must show that activities within the 100-foot buffer zone will not cause or contribute to the degradation of water quality or the violation of any effluent limits, and they must describe the methods that will be used to minimize the effects of the stream alteration on the water quality. Primarily, CPMC must show how they will minimize the effects during construction and after construction, prior to stabilization, of the stream buffer zone.

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CPMC must develop a specific surface water monitoring plan for operational mining. This monitoring plan must be developed based on the baseline monitoring data and the PHC. The Division's Water Monitoring directive signed May 23, 1995 can be used for guidance in developing the surface-water monitoring plan.

### Groundwater Monitoring.

Ground-water monitoring will be conducted according to the ground-water monitoring plan and ground-water monitoring data will be submitted every 3 months to the Division. Ground-water monitoring will proceed through mining and continue during reclamation until bond release. Equipment, structures, and other devices used in conjunction with monitoring the quality and quantity of ground water onsite and offsite will be properly installed, maintained, and operated and shall be removed by the operator when no longer needed.

The proposed operation plan for ground water monitoring is complete and accurate except for the following deficiency:

The statement in the PAP concerning notification when the analysis of any water sample indicates noncompliance with the permit conditions is not adequate. (the operator shall promptly notify the Division and immediately provide for any accelerated or additional monitoring necessary to determine the nature and extent of noncompliance and the results of the noncompliance. Plans and hydrologic information to evaluate and mitigate the noncompliance situation and information relevant to the PHC shall be submitted to the Division as required.)

### Acid- and toxic-forming materials and underground development waste.

The operation plan for acid- and toxic-forming materials and underground development waste is complete and accurate except for the following deficiency:

The analysis reports that indicate weathered and oxidized soil, mine waste, and coal refuse and that show no significant acid, alkaline, or toxicity potentials are not found in the PAP.

### Transfer of wells.

There are currently no plans to transfer wells to another party for further use. The proposed operation plan for transfer of wells is complete and accurate.

### Discharges into an underground mine.

The proposed operation plan for discharges into an underground mine is complete and accurate except for the following deficiencies:

The discharge will contain solids in excess of effluent limitations for total suspended solids. The Division has previously approved this injection plan including this exceedance of the total suspended solids limitations; however, there is no specific documentation of this approval other than inclusion in the Castle Gate MRP.

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The plan does not at present appear to have the required approval of the Mine Safety and Health Administration (MSHA).

### Gravity discharges from underground mines.

The proposed operation plan for gravity discharges from underground mines is complete and accurate.

### Sediment control measures.

In Exhibit 19, Section 3.10 is a statement that a Small Area Exemption (SAE) has been requested for the runoff from the site of the well that will recover water from the slurry injection system. It isn't clear that such an exemption has been granted.

### Casing and sealing of wells.

The proposed operation plan for the casing and sealing of wells is complete and accurate.

## SUPPORT FACILITIES AND UTILITY INSTALLATIONS

Regulatory Reference: 30 CFR Sec. 784.30, 817.180, 817.181; R645-301-526.

### Analysis:

The Operator has stated:

*The proposed underground mining and related activities will require limited surface support facilities. The facilities to be utilized in conjunction with the proposed operations will include both existing facilities located in the Castle Gate, Gravel Canyon, and Crandall Canyon areas and new facilities to be constructed in the proposed Willow Creek mine surface facilities area. These facilities will provide the necessary infrastructure for effective management and handling of personnel, equipment, materials and supplies, and both coal and mine waste materials, and will include a number of structures specifically designed to control or mitigate potential mining related impacts.*

*Construction of required surface structures and facilities has previously been discussed in Section 4.5.2.2, General Description of Mine Plans, Mining Methods, and Related Design Requirements. The surface structures and facilities will be operated, maintained, and ultimately reclaimed in a manner that prevents or controls erosion and siltation, water pollution, and damage to public or private property; and to the extent possible using the best technology currently available, minimizes damage to fish, wildlife, and related environmental values, and minimizes additional contributions of suspended solids to streamflow or runoff outside the permit area. Any contributions of suspended solids from mine disturbance areas will not exceed applicable effluent limitations under Utah or Federal law.*

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*Required surface facilities are shown and identified on the Mine Surface Facilities Map (Map 18), and include the following specific structures and facilities:*

### Willow Creek Surface Facilities Area

- Willow Creek Realignment Segment 1
- Willow Creek Realignment Segment 2
  
- Portal Area Collection Sump
- Sedimentation Pond 001
- Sedimentation Pond 002
- Willow Creek Soil/Substitute Stockpile
- Primary Road PR-1
- Main Access Road Bridge
- Willow Creek Culvert Crossing
- Primary Road PR-2
- Ancillary Road AR-1
- Ancillary Road AR-2
- Ancillary Road AR-3
- Ancillary Road AR-4
- Ancillary Road AR-5
- Mine Portal Structures
- Mine Ventilation Fans and Associated Structures
- Mine Ventilation Raise
- Rock Dust Storage Tank and Supply System
- Conveyor UG-1
- Run-of-Mine Coal Stacking Tube and Reclaim Tunnel
  
- Conveyor SC-1
- Conveyor SC-2
- Conveyor SC-3
- Conveyor SC-4
- Rock Tunnel No. 1
- Conveyor SC-5
- Rock Tunnel No. 2
- Run-of-Mine Coal Stockpile
- Administration/Bathhouse Facility
- Office Trailer
- Maintenance Shop Facility
- Warehouse Facility
- Tire and Drum Storage Shed
- Equipment Storage Area
- Explosive Storage Area
- Miscellaneous Structures
- Main Substation
- Mine Fan Substation
- Mine Fan Emergency Generator Bldg.
- Propane Storage Tanks - Fan Heaters
- Propane Storage Tanks - Administration/Bathhouse Facility
- Fire-Fighting Reserve Storage Tank
- Mine Water Tank
- Potable Water Tank

The Operator has listed all the support facilities that will be used in conjunction with the mining operation and has committed to obeying all federal, state and local regulations.

### **Findings:**

The Operator has met the minimum regulatory requirements.

## UTILITY INSTALLATIONS

Regulatory Reference: 30 CFR Sec. 817.180

### **Analysis:**

The Operator has committed to conduct all underground mining activities in a manner that minimizes damage, destruction, or disruption of services provide by oil, gas, and water wells, oil,

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gas, and coal-slurry pipelines, railroads, electric and telephone lines, and water and sewage line which pass over, under or through the permit area.

### Findings:

The Operator has met the minimum regulatory requirements.

## SIGNS AND MARKERS

Regulatory Reference: 30 CFR Sec. 817.11; R645-301-521.

### Analysis:

CPMC will post and maintain all required signs and markers in compliance with applicable regulatory provisions of Rule R645-301-521.200. Signs and markers will be constructed of durable materials and will be posted so as to be clearly visible. Mine identification signs listing the name, business address, and telephone number of the permittee and the permit number for the permanent program permit authorizing mining and reclamation operations will be posted at each point of access to the permit area from a public road. Perimeter markers will be posted outlining all areas affected by surface operations or facilities prior to initiation of mining, buffer zones will be marked along their limits to prevent disturbance within the buffer zone, and soil/substitute stockpiles will be clearly marked for identification and to limit access and potential disturbance. Signs reading "Blasting Area" will be posted along the edge of any blasting area which comes within 100 feet of any public road right-of-way and at the point where any other road(s) provides access to the blasting area. All required signs and markers will be maintained or replaced during the period of active operations, site reclamation, and until final bond release is approved for all areas within the permit boundaries.

Basic soil handling and stockpile construction practices are described in Section 4.2.2, Soil Salvage, Handling, and Storage. The stockpiled material will be protected from erosion, contamination, and loss by placement in a controlled manner with side slopes at 3H:1V or less, seeding with a temporary vegetative cover, posting with durable signs reading "Soil Stockpile - Keep Off", and the use of appropriate drainage control measures.

Wherever practically possible a 100 foot buffer zone will be maintained between any mining related disturbance and the Willow Creek stream channel. To prevent disturbance within the buffer zone, the edges of the zone will be clearly posted at regular intervals with durable signs reading "Buffer Zone -Keep Out". Based on design plans, the 100 foot buffer zone can be maintained throughout the mine facilities area except in a segment approximately 200 feet long at the main access road bridge crossing, and in the 500 foot segment and 1,000 foot segment where the two Willow Creek realignment segments will be constructed.

The Operator has met the minimum regulatory requirements for placing signs and markers at the mine site.

**Findings:**

The Operator has met the minimum requirements.

**USE OF EXPLOSIVES**

Regulatory Reference: 30 CFR Sec. 817.61, 817.62, 817.64, 817.66, 817.67, 817.68; R645-301-524.

**General Requirements**

**Analysis:**

These requirements apply to surface blasting activities incident to underground coal mining, including, but not limited to, initial rounds of slopes and shafts. Each Operator shall comply with all applicable State and Federal laws and regulations in the use of explosives.

All surface blasting operations incident to underground mining shall be conducted under the direction of a certified blaster. Certificates of blaster certification shall be carried by blasters or shall be on file at the permit area during blasting operations. A blaster and at least one other person shall be present at the firing of a blast. Any blaster who is responsible for conducting blasting operations at a blasting site shall be familiar with the site-specific performance standards and give direction and on-the-job training to persons who are not certified and who are assigned to the blasting crew or assist in the use of explosives.

An anticipated blast design shall be submitted if blasting operations will be conducted within 1,000 feet of any building used as a dwelling, public building, school, church or community or institutional building or 500 feet of active or abandoned underground mines. The blast design may be presented as part of a permit application or at a time, before the blast, approved by the Division. The blast design shall contain sketches of the drill patterns, delay periods, and decking and shall indicate the type and amount of explosives to be used, critical dimensions, and the location and general description of structures to be protected, as well as a discussion of design factors to be used, which protect the public and meet the applicable airblast, flyrock, and ground-vibration standards. The blast design shall be prepared and signed by a certified blaster. The Division may require changes to the design submitted.

The Operator states:

*All surface blasting will be conducted under the direction of a certified blaster. Blasters will be qualified through the Division's blaster certification program. A blaster and at least one other person will be present for all blasts.*

*The certified blaster responsible for blasting operations at the site will be familiar with the blasting plan and site specific performance standards and give on-the-job training to person who are not certified and who are assigned to the blasting crew or assist in the use of explosives.*

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*Blasting may be required at the surface facilities of the Willow Creek Mine. A portion of this area is within 1,000 feet of the PacificCorp Carbon Power Plant, and a portion of the area is within 500 feet of abandoned coal mines in the area. In addition, portions of the area are adjacent to Highways 50 & 6 and Highway 191.*

*The blast design, as illustrated by Table 15-1, is intended to show the general layout and present general blasting information. Any significant deviation from this plan will be presented to the Division prior to the blast.*

The blasting plan presented in Exhibit 15 is a generic plan. The Division approves the concepts show in the plan. For all blasts that use more than 5 pounds of explosives the Operator will be required to submit a specific blasting plan.

### **Findings:**

The Operator has met the minimum regulatory requirements for describing a general blasting permit. A specific blasting plan must be approved by the Division for each blast that uses more than 5 pounds of explosives.

### **Preblasting Survey**

#### **Analysis:**

The Operator has committed to conduct a preblasting survey and notify all residents or owners of dwellings, structures, or utilities within one-half mile of any part of the permit area. Copies of the survey will be given to all persons requesting the survey and the Division.

#### **Findings:**

The Operator has met the minimum regulatory requirements.

### **General Performance Standards**

#### **Analysis:**

The Operator states:

*Blasting will begin in July 1996 are part of the mine site construction. After construction blasting will be done as needed. Blasting during construction will be done during daylight hours. Blasting after construction will be conducted as needed when less than 5 pounds of explosives are used; blasts of more than 5 pounds of explosives will be done during daylight hours.*

*Unscheduled blasts may occur for the following reasons:*

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*Where public safety requires it*

*Emergency blasting, such as boulders falling onto roadways*

*Destruction of damaged or deteriorated explosives or detonators in a safe manner*

*Firing of charged holes as soon as practical after cessation of static electricity or stray current conditions when electric detonators are used*

*Firing of charged holes when weather conditions indicate the existence of a safety hazard is imminent*

*Residents of buildings of structures within one-half mile will be notified of unscheduled blasts using audible signals. The Operator will document the reason for the unscheduled blasts on the blasting records in accordance with R645-301-524.760.*

The Division requires that all scheduled blasts be done during day light hours unless specific approval is given for night-time blasting.

### **Findings:**

In the PAP the Operator states that scheduled blasts during the construction phase will be conducted during daylight hours. Blasts after the construction phase will be done on an as needed basis. The wording, in the PAP, suggests that after the mine facilities are constructed that blasting may occur during night time hours. In emergency cases night time blast may be necessary. However, unscheduled blast should be conducted during daylight hours unless time is of such importance that waiting for sunlight would endanger public health and safety. The Operator must state that night time blasts will only be done in an emergency.

### **Blasting Signs, Warnings, and Access Control**

### **Analysis:**

The Operator states :

*Blasting signs will be posted at the entrances to the Willow Creek Mine site warning all who enter thereon of blasting. There are four possible entrances to the site, at the entry road across from the Carbon Power Plant, on a dirt road at the north end of the Castle Gate preparation plant site, at the lower entrance in Willow Creek off of Highway 191 and at the upper entrance in Willow Creek off of Highway 191. The signs will be in accordance with R645-301-521.200 as follows:*

*Signs will be posted, maintained, and removed by CPMC or its agents*

*Signs will be of uniform design that can be easily seen and read*

*Signs will be of durable material and conform to local laws and regulations*

*Signs will be maintained during all activities which they pertain*

*Signs reading "BLASTING AREA" will be placed at conspicuous places along the edge of Highway 191 adjacent to the Willow Creek Mine facilities and along Highway 56 & 6 adjacent to the Castle Gate preparation plant area where blasting may occur.*

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*Signs reading "WARNING! EXPLOSIVES IN USE" will be placed in conspicuous locations at all entrances to the permit area. The signs will also clearly list and describe the meaning of the audible blast warning and all-clear signals, and explain the marking of blasting areas and charged holes awaiting firing within the permit area.*

### Findings:

The Division has determined that the Operator has met the minimum requirements for placing signs and other warnings for blasting and to control access to areas where blasting will occur.

### Control of Adverse Effects

### Analysis:

Details for the airblast, ground vibrations and flyrock travel distance are found in Exhibit 15. The Division has determined that the generic blasting plan meets the minimum regulatory requirements. A specific blasting plan must be submitted to the Division for all blast that use more than 5 pounds of explosives.

### Findings:

The Operator has met the minimum regulatory requirements for a generic blasting plan. A specific blasting plan must be submitted for all blasts that use more than 5 pounds of explosives.

### Records of Blasting Operations

### Analysis:

The Operator has committed to keeping all blasting records of a minimum of 3 years. The minimum regulatory requirements have been met.

### Findings:

The minimum regulatory requirements have been met.

## MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

### Analysis:

The PAP lists the information regarding maps as:

- Proposed mine permit and disturbance boundaries
- Existing land configuration
- Existing and proposed surface structures and facilities
- Location, extent, and sequencing of proposed underground mine development

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- Extent of potential mining related subsidence, subsidence control features, and subsidence monitoring locations
- Location and design of coal refuse disposal facility
- Drainage and sediment control plans and designs for associated structures
- Existing and proposed roads and utility installations

(See Section 4.5.1.9)

To avoid confusion the Operator should cross reference each map with the above listed requirements.

### **Findings:**

The Operator supplied the required maps and cross sections in the PAP. Since the maps are not cross referenced with the text the Operator has not met the requirements for being clear and concise. To avoid confusion the Operator must cross reference the maps and cross sections with the text.

### **Certification Requirements**

### **Analysis:**

The Operator must include a certification statement for all maps, cross sections and drawings that are required to be prepared by, or under, the direction of a certified, registered professional engineer. The certification statement should state whether or not the structure requires MSHA approval.

### **Findings:**

The Operator needs to include a certification statement for all maps and drawings that must be prepared by a registered, professional engineer.

## 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 Operator has met the minimum regulatory requirements for providing the Division with a general reclamation plan. Specific details of the reclamation plan will be discussed in the following sections.

Sampling, analysis, and evaluation of the disturbed soils materials has verified their suitability as a vegetation growth medium for use in future reclamation of mine disturbance areas. The only mining related vegetation impacts anticipated in conjunction with the proposed operations would be temporary elimination of existing vegetation from surface disturbance areas and possible minor reductions in the areal occurrence of riparian vegetation in Willow Creek adjacent to the mine facilities area due to the relocation of two short segments of the existing stream channel. Given that; 1) The existing vegetation in both the mine facilities area and the effected portions of Willow Creek represents disturbed vegetation communities; 2) A self-sustaining vegetation community of selected native and adapted plant species will be reestablished on all surface disturbance areas under the proposed reclamation plan; and 3) The Willow Creek stream channel relocation plans include provisions for protection and reestablishment of riparian vegetation; no significant adverse vegetation impacts are anticipated.

This section presents and describes reclamation plans and practices to be used to restore disturbed areas resulting from mining and related activities to productive self-sustaining use. Information in this section was developed in accordance with applicable regulatory requirements (R645-301-500) for coal mine permitting in the State of Utah.

final reclamation is designed to restore disturbed areas to a safe, stable condition and to reestablish the productivity of the land consistent with the postmining land use(s). The Willow Creek reclamation plan has been designed to successfully meet these objectives and will result in effective temporary stabilization, and a postmining configuration which blends with the surrounding terrain and provides environmental values consistent with or superior to those which existed prior to mining.

The Willow Creek reclamation plan has been developed utilizing available information on the existing environmental resources as described in Section 3.0, Environmental Information. In addition, CPMC has incorporated both available information on current successful reclamation technology and practices and their extensive operating experience in the area. While the plans presented in this permit represent what CPMC feels to be the most effective reclamation practices for this site, it is important to note that successful reclamation must be a dynamic process, incorporating

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new information to optimize overall effectiveness. In order to meet the reclamation objectives these plans may be modified as appropriate to reflect changing conditions, revised regulatory requirements, advances in reclamation technology, and the results on ongoing research and experience relative to the long-term effectiveness of various reclamation practices. Any future plan modifications will be addressed under applicable regulatory requirements for permit revision and modification.

Reclamation will involve a logical sequence of activities designed to achieve the overall reclamation objectives in an organized progressive manner. The following represent the general steps for reclamation of any mine or mine related surface disturbance areas:

- Facility Demolition and Removal
- Stabilization and Sealing of Mine Openings
- Disposal of Coal Refuse, Non-Coal Wastes, and Mine Waste Materials
- Backfilling and Grading to Establish the Final Design Configuration
- Drainage Reestablishment
- Road Removal
- Soil/Substitute Replacement
- Revegetation
- Post-Reclamation Management, Maintenance, and Monitoring
- Removal and Reclamation of Sedimentation Ponds and Associated Structures

### Findings:

The Operator has met the minimum regulatory requirements.

## 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:

These regulations are not addressed in a dedicated portion of the application, but Section 5.3.1.2 mentions the postmining land use. It says the applicant will reclaim surface disturbance areas to a postmining land use of wildlife habitat. It is assumed the postmining land uses of areas outside the proposed disturbed area will not change.

As discussed under "Land-Use Resource Information," it is unclear what degree of management the proposed permit area receives. For this reason, it is difficult to determine the premining land use to which the postmining land use would be compared.

The application is required to contain a detailed description of the proposed use, following reclamation, of the land within the proposed permit area, including a discussion of the utility and capacity of the reclaimed land to support a variety of alternative uses, and the relationship of the proposed use to existing land-use policies and plans. This description should particularly relate to the landowner's desires. The plan must explain how the proposed postmining land use is to be achieved and the necessary support activities which may be needed to achieve it. If the postmining land use is

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considered a change from the premining land use, the application must provide information in compliance with R645-301-413.

The application needs to contain comments concerning the proposed postmining land use from the legal or equitable owners of record of the surface of the proposed permit area and Utah and local government agencies which would have to initiate, implement, approve, or authorize the proposed use of the land following reclamation. If the use will be wildlife habitat, this is a change from the present use of undeveloped land discussed in the application. For the portions of the formerly-permitted Willow Creek Mine that are/were leased for an industrial use, wildlife habitat could constitute a change.

The areas of interest, from an engineering stand point, are:

- (1) *The Division grants a variance from approximate original contour restoration requirements.*
- (2) *The proposed use is designed and certified by a qualified registered professional engineer in conformance with professional standards established to assure the stability, drainage, and configuration necessary for the intended use of the site.*
- (3) *The highwall is completely backfilled with spoil material, in a manner which results in a static factor of safety of at least 1.3, using standard geotechnical analysis.*
- (4) *Only the amount of spoil as is necessary to achieve the postmining land use, ensure the stability of spoil retained on the bench, and all spoil not retained on the bench shall be placed in accordance with all other applicable regulatory requirements.*

The Operator has not asked for, nor has the Division granted, a variance from the approximate original contour requirements. Therefore, the Operator will be required to meet all AOC regulations.

Regulation R645-301-512 specifies that certain designated cross sections, maps and plans be prepared by or under the direction of a qualified Registered Professional Engineer and that certain maps and design plans be certified by a PE. Consistent with this requirement, the following components which relate to this permit section meet the regulatory supervision and certification requirements:

- Previous Mining Activity Map (Map 10)
- Regional Land Use Map (Map 9)
- Mine Surface Facilities Map (Map 18)
- Sedimentation Pond Maps, (Maps 24 through 27)
- Willow Creek Diversion Design Maps, (Maps 28 through 29)
- Mine Surface Facilities Area - Postmining Topography Map (Map 21)
- Mine Surface Facilities Area - Premining/Postmining Cross Sections, (Map 22)

The Operator does not plan to completely eliminate some highwalls because they are the result of previous mining activities. In order for highwalls to be retained under R645-301-553.520 the volume of all reasonably available spoil is demonstrated in writing to the Division to be insufficient to completely backfill the reaffected or enlarged highwall. Before the Division can determine that some

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highwalls can be retained the Operator must demonstrate that there is insufficient spoil to reclaim the highwalls.

### Findings:

This portion of the application is considered complete and accurate with the following exceptions:

1. The application needs to contain comments from legal and equitable owners of lands in the proposed permit area concerning the postmining land use. It also needs to contain comments from governmental agencies that would have to authorize or initiate the use.
2. The application is required to contain a detailed description of the proposed use, following reclamation, of the land within the proposed permit area, including a discussion of the utility and capacity of the reclaimed land to support a variety of alternative uses, and the relationship of the proposed use to existing land-use policies and plans. This description should particularly relate to the landowner's desires. The plan must explain how the proposed postmining land use is to be achieved and the necessary support activities which may be needed to achieve it. If the postmining land use is considered a change from the premining land use, the application must provide information in compliance with R645-301-413.

The Operator must demonstrate that there is insufficient spoil to reclaim all the highwalls. Before the Division can sign off on highwall retention they must determine that there is insufficient fill. Without that finding the Division cannot authorize the retention of highwalls.

## 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:

The Operator has not requested a variance from the Approximate Original Contour requirements.

### Findings:

The Operator has met the minimum regulatory requirements.

## 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.

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### Analysis:

Following completion of mining and related operations and subsequent facility removal and sealing of mine openings the associated surface disturbance areas will be backfilled and regraded. As previously noted in Section 5.4.2.2, Reclamation Plan, there are a number of features in the mine facilities, preparation plant, and loadout areas which represent existing disturbance. Some of these features are related to existing structures that will be utilized in conjunction with the Willow Creek mining and related activities and mine design and facility layout have taken advantage of other existing features in order to minimize overall surface disturbance. Existing disturbance features are shown on the Mine Surface Facilities Map, (Map 18), and documented by Exhibit 7, Documentation of Existing Site Conditions, and include:

- Road cuts and bench cut in the Fire-Fighting and Mine Water Tank location
- Road cuts and fill bench in the Mine Ventilation Fan area
- Existing mine face-up area
- Fill bench and sidehill cuts in Run of Mine Coal Stockpile area
- Road cuts and bench cut in Potable Water Tank area
- Sidehill cuts along Conveyor SC-1 alignment
- Sidehill cuts and fills along most of the old railroad grade
- Rock Tunnels No. 1 and 2
- Cuts and fills along existing main access road to the mine facilities area

For many of the existing disturbance features, backfilling and regrading to a pre-disturbance configuration would be difficult if not impossible since they involve very steep side slope cuts in competent or weathered rock and insufficient fill material exists within the Willow Creek disturbance area to completely backfill and regrade the existing disturbance. Given this constraint, planned backfilling and grading will involve selective placement of all available fill material consistent with applicable regulatory provisions for backfilling and grading (R645-301-553 through 553.200), and previously mined areas (R645-301-553.500 through 524), and based on the following priorities:

- 1) Cover exposed coal seams, sealed mine openings, and any solid waste disposal sites with a minimum of 4 feet of suitable material;
- 2) Backfill and/or regrade disturbed slopes to establish a stable configuration which provides for effective drainage and minimizes erosion potential;
- 3) Backfill and regrade steep cuts and highwall areas to partially or completely eliminate cut or highwall exposures.

The land configuration in the mine facilities area prior to development of the CPMC Willow Creek operations is illustrated by the Facilities Area Soils Map (Map 4). This map shows that most of the mine surface facilities area consists of an elevated bench on the north and west side of Willow Creek with the existing face-up area and AMR coal refuse fill at the northeast end, the existing railroad bed and rock tunnels along the northern and western limit of the facilities area, the existing access road running along the length of the area parallel to Willow Creek, and numerous roads and small disturbance areas breaking off from the main facilities area. The existing configuration in the Castle Gate preparation plant and loadout areas and the Crandall Canyon facilities area is addressed

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by the permit information for these two areas included as Exhibit 19, Castle Gate Information, and Exhibit 20, Crandall Canyon Information, in this permit submittal.

The design postmining configuration for the mine facilities area is shown by the Mine Surface Facilities Area - Postmining Topography Map (Map 21). This map reflects recovery of available fill from the original fill bench above Willow Creek and the original fill bench in the Run of Mine Coal Stockpile area; backfilling and grading to cover the sealed mine portals and exposed coal seam, the ventilation raise, and the solid waste disposal areas; elimination of the depression in the mine portal area; partial backfilling of the face-up area; grading along the conveyor alignment to reduce bench width and stabilize associate cut/fill slopes; and other backfilling and grading to establish stable slopes, promote effective drainage, and blend the reclaimed areas with the surrounding terrain. The reclaimed configuration for the Castle Gate preparation plant and loadout areas and the Crandall Canyon facilities area is addressed by the permit information for these two areas included as Exhibit 19, Castle Gate Information, and Exhibit 20, Crandall Canyon Information, in this permit submittal.

The design postmining configuration for the facilities area is based on utilization of all available spoil material to achieve the stated reclamation objectives within the constraints of site topography, drainage considerations, and the noted backfilling and regrading priorities. The limits of available fill material were determined by identifying all existing spoil fills in the facilities area and estimating fill thickness and area from both the available mapping and the geotechnical boring logs. Final backfilling and grading of the mine surface facilities area will require the movement of a total of approximately 277,000 cubic yards of material. Of the total, 242,000 cubic yards will be moved in the main facilities bench area, and 34,000 cubic yards will be moved in the vicinity of Pond 001. Comparison of the land configuration prior to site development with the design postmining topography based on the Facilities Area Soils Map (Map 4), the Mine Surface Facilities Area - Postmining Topography Map (Map 21), and the Mine Surface Facilities Area Premining and Postmining Cross-Sections, (Map 22), indicates that the design postmining topography will result in more stable slopes, reduce overall highwall and cut exposures, provide for more effective drainage, and offer better blending of the area with the surrounding terrain.

Backfilling and grading will involve the use of tractor scrapers, tracked dozers, wheel loaders and trucks, and motor graders, as necessary to recover, move, place, grade, and compact backfill materials. Generally, backfill material will be placed in relatively uniform lifts and will be compacted by normal equipment traffic. Backfilled areas will be sloped and graded to promote effective drainage and to the extent operationally feasible long unbroken fill slopes will be avoided to minimize sheet flow and potential resultant erosion. Fill slopes will be limited to a maximum slope of approximately 3H:1V and graded slopes in native material will vary dependent on material from less than 5H:1V to as much as 0.5H:1V in competent rock. Graded areas will incorporate undulations consistent with the surrounding terrain and the postmining drainage configuration and the surface of graded areas will be left in a roughened condition to minimize runoff and erosion in the interim before soil/substitute replacement, improve bonding between the regraded surface and soil/substitute materials, and increase infiltration to maximize soil moisture levels and promote revegetation. Regraded surfaces will be deep (up to 3 feet) ripped and finely chopped native hay from the current seasons crop will be applied to increase organic content, provide soil biota, and increase infiltration and moisture holding capacity.

### Findings:

The Operator did not submit information on slope stability factor calculations.

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### Previously Mined Areas

#### Analysis:

Under the applicable regulatory provisions dealing with re-mining of previously mined areas (R645-301-553.500 through 524), the planned backfilling and grading operations will utilize all available spoil material to eliminate remaining highwall and cut slope exposures to the maximum extent technically practical. Fill material placed against highwall and cut slope areas will be placed and graded to assure long-term stability and final slopes will provide for effective drainage and be compatible with both natural slopes in the area and the postmining land use of wildlife habitat. Highwall and cut slope exposures remaining after backfilling and regrading will be no more than 10 to 30 feet high, will be in competent rock materials similar to the natural cliff exposures in the immediate area which range from 10 to over 100 feet in height, and will have an aesthetic appearance and geomorphic characteristics similar to these natural rock exposures.

The Operator needs to include slope stability studies that show that the regraded slopes will have a static safety factor of at least 1.3. Slope constructed on benches must have a static safety factor of at least 1.5.

#### Findings:

The Operator needs to include slope stability studies that show that the regraded slopes will have a static safety factor of at least 1.3. Slope constructed on benches must have a static safety factor of at least 1.5.

The Operator needs to demonstrate that all highwalls that exist from previous mining operations have been eliminated to the maximum extent possible.

### 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 Operator did not address the temporary closure of mine openings. This needs to be done so that the Division can determine if the procedure is adequate.

The Division has approved the concept of sealing the ventilation raises with concrete plugs. Plugs may fail over time. Before the raises are sealed the Division will examine other methods of shaft sealing. If more effective methods exist then the Division will require the Operator to adopt the best shaft sealing method available.

#### Findings:

The Operator needs to address how mine openings will be temporary sealed.

## TECHNICAL ANALYSIS

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The Division approves the concept of sealing the ventilation raises with plugs. Since shaft sealing technology is currently developing it is possible that improved methods will be available when the area is reclaimed. During final reclamation the Division will evaluate currently available shaft sealing methods. If there are methods superior to plugs the Division will require the Operator to use the best available shaft sealing technique.

### TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-232, -301-233, -301-234, -301-242, -301-243.

#### Analysis:

Volume 3: Section 5.2 Soil Replacement Plans  
Section 5.3 Habitat Restoration Plans  
Volumes 13/13A: Exhibit 19 Castle Gate Information  
Volume 14/14A/14B: Exhibit 20 Crandall Canyon Information  
Map 18 Mine Surface Facilities  
Map 22 Mine Surface Facilities Area Premining/Postmining Cross-Sections  
Exhibit 19 Castle Gate Reclamation Plan  
Exhibit 20 Crandall Canyon Reclamation Plan

The plan describes replacement of soil and soil testing for fertility and other amendments. Some confusion exists between reclamation practices as described in Section 3.1 (page 3.1-30) and that in Section 5.2.2.3. In the first instance CPMC indicates that no mulch will be applied. Instead, the gravels in the soils will serve as mulch. In the second instance, CPMC indicates that the ground will be deep ripped and mulch incorporated into the soil prior to seeding and applied after seeding as well. And earlier in section 5.2.2.2 the plan says deep ripping will occur only when necessary.

Soil Replacement thickness will be 10 inches in the Castle Gate Preparation Plant and the Willow Creek Mine site and 5 inches in the Crandall Site. This is a reduction in depth at the preparation plant where 12 inches had previously been approved. It is unclear where the 10 inch cover for the preparation plant is presently being stored, as all the Gravel Canyon storage and Crandall Canyon storage will be used to cover the refuse pile and Crandall Canyon (see Table 4.2-1). Crandall Canyon cover was previously approved at 6 inches.

Cover depth over the Schoolhouse canyon refuse has been omitted from the discussion in the text. A cover depth of 24 inches over the refuse was previously approved and is discussed in Exhibit 19.

#### Findings:

The reclamation plan can not be considered technically adequate.

The permittee must provide the following, prior to approval, in accordance with the requirements of:

**R645-301-242 Soil Redistribution and R645-301-244 Soil Stabilization.**

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More detail in the plan regarding the soil salvage (as requested in deficiencies listed under Operations Topsoil and Subsoil) is required before the Division can approve the 10" cover over the Willow Creek Mine site and the preparation plant as well as the reduction in cover at the Crandall Canyon site.

Information in the plan should include a statement concerning the location of information on the planned cover over the Schoolhouse canyon refuse pile.

The soil stabilization practices described in each section should not be conflicting.

### 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:

Certain roads within the mine facilities area will continue to provide access to specific areas during both reclamation and the extended liability period, although most roads will be removed and reclaimed during final site reclamation. Generally, the primary access roads will be removed and reclaimed in two phases. The first phase will involve ripping of these roads and removal of the associated road surfacing materials. This phase will occur in conjunction with facility demolition and removal and the surfacing materials removed will be placed in the designated solid waste disposal areas as previously discussed. The second phase of road removal for primary roads and removal and reclamation of all other roads will be sequenced to coincide with backfilling and grading of the areas that the roads either provide access to or pass through. When roads are no longer needed, they will be removed and the associated disturbance areas will be regraded and reclaimed.

Road reclamation will generally involve the use of tracked dozers to rip the road surface and grade any surfacing material into piles which will normally be recovered by wheel loader and either hauled directly or loaded into trucks for haulage to one of the designated disposal areas. Road surfaces will then be ripped to alleviate any compaction and the road area will be graded to blend with surrounding reclaimed areas. During final grading, any culverts will be removed and transported to a temporary steel debris storage site for either salvage or disposal off-site. Cut/fill areas will be reclaimed by pulling the fill material upslope into the cut and grading any remaining cut slope, the fill material, and disturbed downslope areas to a stable configuration consistent with natural drainage patterns and blending with the surrounding terrain. Any major road cuts will be reclaimed by partially backfilling the cut and grading any remaining cut slope exposures so that they are stable as described in the backfilling and grading plan discussion. Any major road fills which would interfere with postmining drainage will be removed and the associated disturbance areas regraded in conjunction with overall site grading activities.

In order to provide access to drainage and sediment control structures, soil/substitute stockpiles, and monitoring sites, several roads will be retained through the extended liability period. In addition, Primary Road PR-3 in the Castle Gate preparation plant area will be retained as a permanent road to provide continued access existing facilities owned by Price City and Price River Water Improvement District. This road follows an existing rights of way and utility easement for

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several existing water mains and a main sewer line. It is anticipated that, following the first phase of road reclamation, the portion of the main mine access road from the west entrance to the office trailer and Sedimentation Pond 001 will be retained as a dirt surface ancillary road to provide access to both sedimentation ponds and the soil/substitute stockpile on the west side of the large rock outcrop. Access to these areas will be necessary for pond inspection, maintenance, and cleanout and later for removal and final reclamation of the pond areas. Given the existing bridge across the Price River, the short access road to the Castle Gate loadout area will also be retained to provide access to the west side of the river. Road PR-3 follows the old County road right-of-way through Price Canyon and is used by several parties for access to areas to the north. Given continuing access requirements there is no justification for either removal of this road or modification to an ancillary road.

The Division approves the engineering aspects of the road reclamation plan. The retention of some roads will be dealt with in the postmining landuse section of the TA. Some roads may be left in during the early stages of reclamation to facilitate in reclamation and monitoring activities. The use of a road during the reclamation does not in and of itself justify retention of the road.

### Findings:

The Operator has met the minimum engineering requirements for road removal.

## 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:

#### Surface-Water Protection

The reclamation sediment control measures are design as part of the surface-water protection plan. These practices are briefly discussed in Exhibit 13, Section 4.5. A sediment pond will be used as sediment control until vegetation has established adequately to control erosion. Section 5.5, Reclamation Hydrology, does not specifically address surface-water protection; however, Sections 5.5.2.1 through 5.5.2.5 are applicable to the overall plan for protecting the surface-water quality.

#### Ground Water Monitoring

In order to obtain maximum benefit from exploration drilling efforts and expenditures and more accurately define ground water conditions in the area, CPMC may complete some future exploration drillholes as ground water monitoring wells. The decision to proceed with well completion will depend on specific information needs, drillhole location and depth, ground water occurrence as documented during drilling, and drillhole conditions at the time drilling is completed. Most of the wells installed in 1994 and 1995 will probably be lost due to interception by mine workings or to subsidence.

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CPMC will continue surface and ground water monitoring activities after completion of reclamation operations to document restoration of pre-mining hydrologic characteristics. Monitoring will be discontinued when untreated surface runoff meets applicable effluent limitations and the UDOGM approves removal of drainage and sediment control structures.

### Surface-Water Monitoring

There is no specific information provided in the permit application about surface-water monitoring in the reclamation phase of the mining activities. A generalized plan is provided in Exhibit 12, Hydrologic Monitoring Plan (or Baseline Hydrologic Monitoring Plan), but it does not supply specific information about monitoring locations and constituents in reclamation. Figure 2 in that exhibit shows the location of baseline monitoring locations.

### Water Rights

The reclamation chapter of the permit application does not include information about water. There is information in Section 4.7-14, page 4.7-14, that is pertinent to water rights.

### Acid- and Toxic-forming Materials

Chemical characteristics of coal and other materials to be disturbed in the Willow Creek Mine are discussed in Section 3.6.3.2. Of the 44 core samples of roof and floor rock collected in 1994, there were a few samples that exceeded DOGM Guideline values for SAR, boron, selenium, and acid-base potential. However, values from numerous samples of soil, mine waste, and coal refuse already at the surface indicate there is no significant potential for acid- or toxin-formation. The manner in which waste materials are typically handled during mining will most likely result in the smaller volumes of unacceptable materials being mixed with larger volumes of acceptable materials and the resulting buffering or dilution leaving material that falls within acceptable values. On page 3.6-27 is a statement that where mine waste rock or coal refuse materials are placed in surface stockpiles, testing these materials for suitability may be appropriate as part of the reclamation program. CPMC commits to handling and disposing of any potentially acid or toxic forming materials encountered or exposed in compliance with the coal mining rules.

In addition, mine dewatering flows have been monitored and there is no evidence of any significant potential for development of acidic or toxic drainage as a result of any mine water discharge or resaturation following mine abandonment and sealing.

On completion of mining operations there will be a number of mining related features and some materials which, if not properly addressed, could pose a potential health or safety hazard to both humans and wildlife. Coal refuse materials, non-coal wastes, and mine waste materials could represent a potential hazard due to any toxicity characteristics associated with these materials and the potential flammability of certain non-coal wastes such as waste petroleum products.

Evaluation of coal roof and floor materials and overburden/interburden materials along with samples of existing coal refuse and mine waste materials indicates no significant toxicity concerns relative to these materials. In addition, specific operational placement and reclamation methods and plans will control or minimize any potential toxicity concerns for both coal refuse and mine waste materials. As described in Section 4.5.2.2, General Description of Mine Plans, Mining Methods, and

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Related Design Requirements, under the subtitle of Non-Coal Waste Disposal, all non-coal wastes will be collected and stored in appropriate containers and will be disposed of off-site by a licensed contract disposal firm. These disposal plans include any non-coal wastes remaining on completion of mining operations with the exceptions of concrete demolition debris and road surfacing materials resulting from facility removal which will be placed and buried in one of four designated disposal sites in the mine facilities, preparation plant, or loadout areas. Off-site disposal of most non-coal wastes and the planned disposal measures for demolition debris will effectively eliminate any potential associated hazards.

### Transfer of Wells

All exploration drillholes established by CPMC within the Willow Creek permit area will either be sealed following completion of drilling, sampling, and logging or completed as monitoring wells. If a hole is to be utilized for monitoring it will be cased, completed, and developed as a monitoring well consistent with methods described in Section 4.6.2.1 of the PAP. When no longer needed for monitoring or other use approved by the Division, and unless approved for transfer as a water supply well, on-site monitoring wells will be sealed by filling the borehole or casing with cement to form a plug from the bottom of the hole to at least 20 feet above any zone of completion or water-bearing zone; filling the remainder of the hole to within 20 feet of the ground surface; and filling the remainder of the hole to the ground surface with cement to form a surface plug. A steel fence post will be placed in the center of the surface plug to provide a permanent marker of the location. There is no current plan to transfer monitoring wells to another owner for use as water supply wells or any other use.

### Discharges into an Underground Mine

The existing approved Castle Gate Mine Permit includes provisions for injection of process water and fine coal refuse slurry into existing abandoned underground mine workings through two existing injection wells near the Castle Gate coal preparation plant. With the possible exception of process water and fine coal refuse slurry that could be injected through these wells, water will not be diverted or discharged into any underground mine in conjunction with ongoing mining and reclamation operations at the Willow Creek Mine.

Wells used for the injection of slurry and recovery of water will be plugged with cement from the top of the slurry material in the mine up to the land surface. Casing will be cut off at the surface and covered with soil. The slurry line will be removed. The water return line will be left in place with the ends cut off and buried. Final reclamation will be in accordance with the approved plan.

### Gravity Discharges

There are no indications that the coals to be mined are acid-producing or iron-producing. Mine dewatering flows have been monitored and there is no evidence of any significant potential for development of acidic or toxic drainage as a result of any mine water discharge or resaturation following mine abandonment and sealing. The Willow Creek mine workings will progress down dip from the outcrop area and mine drainage will be controlled during active operations so there is little or no potential for direct gravity discharge of water from the mine. Upon completion of mining and related activities mine drainage control operations will cease and portions of the mine workings, especially the mine workings farthest down dip, are expected to gradually fill as ground water continuously discharges into the mined-out areas. To prevent any significant discharge from the mine openings following cessation of active mining operations and mine closure, CPMC will seal and backfill the mine portals.

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Sealing practices are discussed in Section 5.4.2.3, Reclamation Practices, and Section 5.5.2.6, Casing and Sealing of Wells and Mine Openings.

### **Water quality standards and effluent limitations**

Sections 5.5.2.2 on page 5.5-2 is a statement that no permanent structure will be out of compliance with water quality effluent limitations. This section says, "effective restoration will include a determination of revegetation success and restoration of surface drainage characteristics such that contributions of suspended solids from untreated disturbed area runoff are within applicable water quality limitations."

### **Diversions**

Reclamation diversion information is provided in Exhibit 13, Section 4.5. CPMC is proposing to construct a reclamation diversion in place of operational diversion which will rout flow from the main portion of the reclaimed area into the sediment pond. Four side drainage postmining ditches have been designed for the undisturbed flow (see Table EXDS-13), for which a culvert has been designed to convey disturbed flow over each. The disturbed diversion will be made up of diversions leftover from the operational drainage control system; however, these diversions will take on a greater amount of undisturbed flow in the reclamation phases. All diversions will be reclaimed and culverts will be pulled prior to final reclamation.

### **Stream buffer zones**

The permit application does not specifically address reclamation activities within the stream buffer zone. Many activities will occur within 100-feet of Willow Creek and CPMC has developed a sediment control plan for most of these areas, but the permit application does not all stream buffer zones covered, nor has the application shown that reclamation activities will not cause or contribute to the violation of applicable Utah or federal water quality standards and will not adversely affect the water quantity and quality or other environmental resources of the stream.

### **Sediment control measures**

CPMC proposes to remove siltation structures after sediment control requirements have been met. However, the proposed sediment control plan for the reclamation of Willow Creek mine facilities will include an interim measures. The interim measure will utilize the main sediment pond (Pond 001) and many of the disturbed diversions that will be established in the active mining phase of operations. The land will be regraded to a large extent, so these drainage system will require modification.

### **Siltation structures**

Sediment Pond 001 from the operation mining plan will be utilized as interim sediment control. All other siltation structures will be removed in regrading the site. Pond 001 will be filled in after vegetation is found to be sufficient to control sediment.

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### **Sedimentation ponds**

Pond 001 will be incorporated into the reclamation interim sediment control plan. Regrading of the mining site will eliminate much of the undisturbed diversion and cause a greater amount of water to flow into the pond in reclamation than during operations. The design of the pond has not been changed, nor is there plans to modify Sediment Pond 001 between operation and reclamation to account for the different land layout. Pond 001 will be retained until sediment control requirements are met by vegetation, but Pond 001 will not be modified to include drainage from an expanded undisturbed area in reclamation.

### **Other treatment facilities**

N/A

### **Exemptions for siltation structures**

CPMC has not asked for any exemptions from siltation structures at this time. However, there are many sites within the disturbed area that sediment control measure have not been clearly defined.

### **Discharge structures**

CPMC has proposed to use the same discharge structures and designs in Pond 001 during operation and reclamation. They have not modeled the reclamation scenario using the regraded land configuration.

### **Impoundments**

Sediment Pond 001 is the only impoundment considered for retention after reclamation. It will be removed after vegetation has established sufficiently to control sediment and erosion.

### **Structure Removal**

All sediment control structures will be removed before final reclamation (section 5.5.2.1). Sediment Pond 001 will be retained through the first reclamation phases, until it is determined that vegetation is sufficient to control erosion and sediment. There is no time table for removal of sediment control and interim sediment control measures.

### **Casing and Sealing of Wells**

In order to minimize any potential hazards to humans or livestock associated with open exploration holes or boreholes and to prevent potential mixing between ground water aquifers, Rules R645-301-631 and 641 require that all exploration holes and boreholes be cased if used for water monitoring, or permanently sealed if not used for monitoring or if no longer required for ongoing monitoring activities. All exploration boreholes established by CPMC within the Willow Creek permit area will either be sealed following completion of drilling, sampling, and logging or completed as monitoring wells. If a borehole is not to be used for monitoring it will be plugged and sealed as soon as drilling, sampling, and logging operations are completed. If a borehole is to be utilized for monitoring it will be cased, completed, and developed as a monitoring well consistent with methods described in

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Section 4.6.2.1 of the PAP. When no longer needed for monitoring or other use approved by the Division, and unless approved for transfer as a water supply well, on-site monitoring wells will be sealed by filling the borehole or casing with cement to form a plug from the bottom of the hole to at least 20 feet above any zone of completion or water-bearing zone; filling the remainder of the hole to within 20 feet of the ground surface; and filling the remainder of the hole to the ground surface with cement to form a surface plug. A steel fence post will be placed in the center of the surface plug to provide a permanent marker of the location. There is no current plan to transfer monitoring wells to another owner for use as water supply wells or any other use.

### Findings:

The permit application does not specifically address surface water protection, although reclamation protection the operational hydrology section of Chapter 4 has some information that is pertinent to reclamation. CPMC must either address surface water protection in the reclamation section or make references in the reclamation section to necessary information in the operational section.

The permit application does not specifically describe the reclamation monitoring plan, but does imply that the baseline monitoring will be continued through operation and reclamation of the mine site. CPMC must clarify their intent for surface-water monitoring during the reclamation phase of the mine.

CPMC has not included diversion designs that are specific to reclamation. Drainages will be restructured and drainage areas altered, so the diversions that are left-over from operations may have different sizing requirements. CPMC must create reclamation-specific designs for all diversions that will be retained past mining operations.

The permit application does not adequately address sediment control for the reclaimed water tank area. CPMC must provide for some sediment control in the area of the water tank and the road to the water tank after mining is complete.

The permit application does not specifically address reclamation within a 100-foot buffer zone of Willow Creek. This includes the stream alteration. CPMC must address reclamation activities within the stream buffer zone and show that these activities will not cause or contribute to degradation of stream quality.

CPMC must either show that Pond 001 is adequate to contain runoff from the 10-year, 24-hour storm event during reclamation, or create a modified design for the reclamation pond. They must include a reclamation time schedule for removal of sediment control measure, and show interim sediment control measures that will be used in each phase of reclamation.

CPMC has not addressed the reclamation of the new facilities on the Castle Gate side. They must include regrading and timetable plans for removing Sediment Pond 003 and other facilities outside of the currently approved Castle Gate permit area.

### Groundwater Monitoring.

Ground-water monitoring will be conducted according to the ground-water monitoring plan and ground-water monitoring data will be submitted every 3 months to the Division. Ground-water monitoring will proceed through mining and continue during reclamation until bond release.

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Equipment, structures, and other devices, i.e., water monitoring wells, used in conjunction with monitoring the quality and quantity of ground water onsite and offsite will be properly installed, maintained, and operated and will be removed by the operator when no longer needed. The proposed reclamation plan for ground water monitoring is complete and accurate except for the following deficiency:

The statement in the PAP concerning notification when the analysis of any water sample indicates noncompliance with the permit conditions is not adequate. (When the analysis of any ground-water (or surface-water) sample, (not just UPDES samples) indicates noncompliance with the permit conditions, the operator shall promptly notify the Division and immediately provide for any accelerated or additional monitoring necessary to determine the nature and extent of noncompliance and the results of the noncompliance. Plans and hydrologic information to evaluate and mitigate the noncompliance situation and information relevant to the PHC shall be submitted to the Division as required.)

Acid- and toxic-forming materials and underground development waste.

The reclamation plan for acid- and toxic-forming materials and underground development waste is complete and accurate except for the following deficiency:

The analysis reports that indicate weathered and oxidized soil, mine waste, and coal refuse and that show no significant acid, alkaline, or toxicity potentials are not found in the PAP.

Transfer of wells.

There are currently no plans to transfer wells to another party for further use. The proposed reclamation plan for transfer of wells is complete and accurate.

Discharges into an underground mine.

The proposed reclamation plan for discharges into an underground mine is complete and accurate except for the following deficiencies:

The discharge will contain solids in excess of effluent limitations for total suspended solids. The Division has previously approved this injection plan including this exceedance of the total suspended solids limitations; however, there is no specific documentation of this approval other than inclusion in the Castle Gate MRP.

The plan does not at present appear to have the required approval of the Mine Safety and Health Administration (MSHA).

Gravity discharges from underground mines.

The proposed reclamation plan for gravity discharges from underground mines is complete and accurate.

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### Sediment control measures.

The proposed reclamation plan for sediment control measures is complete and accurate except for the following deficiency:

In Exhibit 19, Section 3.10 is a statement that a Small Area Exemption (SAE) has been requested for the runoff from the site of the well that will recover water from the slurry injection system. It isn't clear that such an exemption has been granted.

### Casing and sealing of wells.

The proposed reclamation plan for the casing and sealing of wells is complete and accurate.

## 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:

#### Revegetation Methods

Generally, seeding will be accomplished as soon as possible following the cessation of mining and replacement of soil. Normally, this will be in the fall. Exceptions will be for newly established soil/substitute stockpiles, road cuts, newly constructed diversion and collection ditches, and small areas where erosion or other repairs have occurred. In these cases, revegetation will occur at any time when site and climatic conditions offer a reasonable chance for success.

Fall is considered the best seeding time in this area, but seeding is sometimes successful in the spring. Cyprus should definitely plan to try to seed in the fall. Seedings done at other times may need to be repeated.

Backfilling, grading, and soil replacement will be done to minimize compaction. Following grading, the regraded surface will be ripped up to three feet. The applicant will then apply finely-chopped hay at a rate of about one and one-half tons per acre.

The soil surface will be left in a roughened condition. Surface manipulations will be minimized and generally limited to shallow chisel plowing, disking, or tine harrowing to break up the soil and provide a firm seedbed.

Leaving the surface rough is one of the most desirable revegetation practices in Utah. "Rough" means large gouges, averaging about two feet deep and perhaps six feet across. Many roughening techniques commonly used in other areas may not be large enough or last long enough for coal mining areas of Utah. Normally, disking and harrowing break up the soil too much and decrease the amount of roughness. Breaking up fine-textured soils tends to increase compaction and decrease infiltration. Although these are standard reclamation practices in other states, they do not work well in Utah.

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The applicant plans to drill seed most areas and to broadcast seed where the disturbance area is of limited size, where there are steep slopes, and in other areas where traditional agricultural equipment would be limited.

The temporary seed mixture shown in Table 5.3-1 should do well if it is drilled. However, three species in the upland permanent seed mixture should be broadcast seeded. Species in the riparian seed mixture can be drill seeded, but tufted hairgrass and spreading bentgrass (hereafter called redtop) have very small seeds that might be difficult to drill. At a minimum, big sage, rubber rabbitbrush, and prostrate summer cyprus need to be broadcast seeded.

Some operators drill most species then broadcast the rest before mulching. Others simply broadcast the entire mix. Either alternative is acceptable. However, the Division's experience is that broadcasting the entire mix usually results in more diverse composition than drilling. Also, drilling may have a tendency to reduce roughening.

Seed mixtures to be used for final reclamation are shown in Tables 5.3-2 and 5.3-3. Some changes to these mixtures are needed and recommended.

In Section 5.3.2.2, the application says all areas to be revegetated on a permanent basis, including the Willow Creek realignment sections, will be drill seeded at a rate of 13.5 pounds PLS per acre. This conflicts with both permanent seed mixes as shown in Tables 5.3-2 and 5.3-3. This discrepancy needs to be resolved.

Under the heading "Woody Species Transplanting," the application mentions several woody species included in the seed mixture that can be effectively transplanted from seed. Included in this list is fringed sage. Fringed sage is not in the seed mixes in Tables 5.3-2 and 5.3-3.

Concerning the use of introduced species in permanent reclamation seed mixes, the application says they were included due to their abilities to germinate and establish more rapidly than many native species, their value as sod-formers or nitrogen fixers, their specific value as wildlife browse and forage, and the fact that they have been previously approved by the Division and were used in the AMR revegetation work. The AMR program is not subject to the same introduced species performance standards as the Title V program. Introduced species used for permanent reclamation need to be justified for each site.

The upland seed mixture in Table 5.3-2 includes five introduced species. Two of these, alfalfa and yellow sweet clover, are legumes that are normally included in seed mixtures in Utah. They are both pioneer species that increase soil microbial activity and are very palatable to wildlife and livestock. Although native legumes are available and perhaps should be included in the mixture, the natives do not perform the functions of these introduced species nearly as well.

The other introduced species in the mixture are intermediate wheatgrass, orchardgrass, and prostrate summer cyprus. There are native species that can perform the functions of intermediate wheatgrass and orchardgrass, so these species are probably not needed in the mixture. If the applicant desires to keep them, the application will need to show they are desirable and necessary to achieve the postmining land use.

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Downy brome and kochia are major components of previously disturbed areas at Willow Creek. In the Division's 1995 sampling, weeds made up nearly one-fourth of all vegetative cover. Prostrate summer cyprus is known to out compete downy brome, and it is a major component of the reclaimed areas at Willow Creek. Considering the amount of weeds at the site currently, there will probably be weed problems during reclamation. Although it would be possible to reclaim the area without prostrate summer cyprus, using it would most likely increase the amount of desirable perennial cover.

The Division of Wildlife Resources has commented in the past that, before overgrazing caused a shift in the vegetation communities, bluebunch wheatgrass probably dominated areas where salina wild rye dominates now. Bluebunch wheatgrass is more palatable than salina wild rye, and it needs to be included in the seed mixture. A recommended rate is two pounds PLS per acre (drilled).

In the Division's experience, woods rose and mountain mahogany rarely, if ever, establish from seed untreated by sulfuric acid or thiourea. Although these species are desirable, they would probably not establish in the reclaimed area from untreated seed. They could both be established from transplants.

Fourwing saltbush is a very important pioneer species, highly palatable to wildlife, that performs very well in reclaimed areas. The rate of seeding this species should be increased to at least 1.5 pounds PLS per acre. A preferred rate is three pounds PLS per acre.

Judging from experiences in Hardscrabble Canyon and Sowbelly Gulch, a few forb species could be added to the mixture to increase the amount of diversity. Those that appear to have established best from seed in these reclaimed areas are blueleaf aster and yarrow. Other species that might be used successfully include showy goldeneye, northern sweetvetch, and Louisiana sage.

The total amount of seed to be planted in upland areas is 110 seeds per square foot (drilled). While this appears adequate, 68% of these seeds would be from just two species, sagebrush and rabbitbrush. Eliminating these species, the rate becomes just 35 seeds per square foot. The amounts of sagebrush and rabbitbrush need to be reduced, and the amounts of other species should be increased.

The riparian seed mixture in Table 5.3-3 includes four grass and one legume species. Although the application does not indicate any of these species are introduced, redtop and strawberry clover are not native to Utah. Redtop was introduced to the United States before 1750 and is now circumboreal, so it can almost be considered native. It was also the main herbaceous component in riparian vegetation along the creek.

Strawberry clover, although not native, is a legume that spreads by both rhizomes and stolons. It is considered to be adapted to areas with periodic flooding. There were no native legumes encountered in vegetation sampling in the riparian areas, and, for reasons discussed above, it is desirable to have legumes planted in disturbed areas.

Seeds of all the grasses in the riparian mixture are very small. Two pounds per acre PLS of each of these is probably more seed than is needed. It is recommended that the seeding rates be reduced for the four grasses by about one-half. Also, the applicant could add Kentucky bluegrass and blueleaf aster at one pound PLS per acre each (drilled).

The applicant plans to plant Fremont cottonwoods, coyote willows, and serviceberries or currants at a total rate of 54 to 58 cuttings or seedlings per 100 feet of linear channel disturbance. Normal

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seedling transplant methods will be used for the transplants. Willow cuttings will be obtained from existing natural growth along the Willow creek channel during early spring. Transplants will be protected from wildlife by net enclosures.

The application should clarify how many cuttings and transplants will be used. It is unclear whether 54 to 58 cuttings or seedlings per 100 feet applies to both sides or to one side of the stream although it appears from Maps 28 and 29 that it only applies to one side of the stream. It should probably apply to just one side of the stream: one cutting or transplant every two feet is not excessive.

Following seeding, straw or native hay mulch will be applied to most reseeded areas at a rate of about two tons per acre. This will be crimped or anchored using a disk or similar agricultural equipment. In areas with increased erosion potential, other methods, including dozer tracking, application of geotextiles, and hydromulching at a rate of 1.5 tons per acre, may be used.

It is suggested the applicant use certified noxious weed free straw or hay for mulch. Many noxious weed infestations have resulted from using contaminated straw or hay mulch.

Straw or hay applied at the rate of about two tons per acre has been shown in several studies to provide better erosion control and seedling establishment than most other mulches. However, crimping the mulch with a disk is likely to reduce the amount of surface roughness. One method of anchoring straw or hay mulch without particularly decreasing the roughness is to crimp it with the teeth of the bucket on a trackhoe.

The application discusses dozer tracking and hydromulch for use in areas with more severe erosion potential. Dozer tracking, although useful in some areas, does not normally provide enough surface roughness that it is beneficial for erosion control. It does not crimp straw or hay very much, and the cleat tracks are not nearly large enough.

According to a Forest Service publication, hydromulch is only effective for 30 days after application. In the Division's experience, it may inhibit seedling growth when used in lower precipitation zones because it forms a mat that is difficult for seedlings to penetrate. This would be especially true at the relatively high rate shown in the application.

Geotextiles have shown promise in use for erosion control. However, the applicant would need to receive approval for the specific method and materials before using them.

The applicant does not intend to irrigate reclaimed areas. Regular inspections of the reclaimed areas will include checks for significant noxious weeds infestations or insect damage. If problems are discovered, the applicant will consult with the Division and with Carbon County Weed Control to develop and implement appropriate control measures. If pesticides are to be used, the applicant will only use chemicals approved for the particular use and will limit control to spot applications.

Any noxious weed infestations have the potential of spreading to other areas. Some parts of the proposed disturbed area have had noxious weed infestations, and it is likely reclaimed areas will also. The applicant should plan to control any noxious weeds that appear on reclaimed areas.

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### Success Standards

Revegetated areas will be sampled three, seven, nine, and ten years after initial permanent revegetation seeding. The applicant plans to sample ground cover, productivity, and woody plant densities on all permanently revegetated areas and will evaluate revegetation success on the basis of these parameters. Sampling methods will be essentially the same as used for baseline data collection.

Cover and production values for reclaimed areas previously identified as disturbed or reclaimed (AMR) would be compared with a weighted average value based on the baseline data for the disturbed, reclaimed sagebrush-grass, and pinyon-juniper vegetation communities. Areas identified as riparian in the baseline evaluation would be compared with baseline data from those areas.

The Division's "Vegetation Information Guidelines" require that, in order to use the baseline method for revegetation success, original data must be taken during a "normal precipitation year." This is defined as one in which precipitation in the year preceding sampling is at least 90% of the long-term average. Also, precipitation in the month preceding sampling must be at least 90% of average.

The power plant near the confluence of Willow Creek with the Price River maintains a weather station. Precipitation data in the following discussion are from their data as submitted to the National Weather Service and the Utah Climate Center.

The applicant sampled Willow Creek vegetation in September 1994. August 1994 was wetter than average with 1.84 inches of rain. This compares to the long-term average of 1.26 inches. September 1994 precipitation was slightly below average: 1.70 inches fell, and the average is 1.84 inches.

Total precipitation for the period September 1993 through August 1994 was 12.30 inches. This is 80% of the long-term annual average of about 15.34 inches. Therefore, the year prior to September 1994 cannot be considered a normal precipitation year according to the Division's guidelines. This also means that the 1994 data from non-riparian areas cannot be used as a standard for judging revegetation success. The riparian area has a constant water source, so lower than average precipitation should have had a negligible effect on vegetation cover in this area.

Since the Willow Creek refuse removal project has begun, it is now impossible to sample vegetation over the entire site. The best options for success standards for upland areas are using a reference area or range site.

The application is unclear about the success standard for areas not previously disturbed. It appears the applicant is proposing to use a weighted average of all baseline data to derive the standard for all non-riparian areas. If this is correct, it is not appropriate for areas not previously disturbed by mining.

Using a weighted average for previously disturbed areas is allowable since the same set of criteria will be applied to all previously disturbed areas.

The application says if the absolute values for cover and production for the reclaimed areas are greater than or equal to the calculated 90% confidence interval for the baseline data (for the riparian areas) or the weighted average based on the baseline data (for previously disturbed areas), then the mean

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values can be considered statistically equivalent. The statistical test discussed in the application is used to compare a sample value with a set standard, in this case the value for the baseline data. However, the baseline data standard cannot be considered an actual mean value since it is also based on a sample. It is not a fixed standard similar to the woody plant density standard that the Division will set after consultation with Wildlife Resources. The values that would be compared are independent samples. For this reason, it is necessary to pool the variances to perform the t-test.

The application proposes woody plant density success standards of 750 stems per acre for previously disturbed or reclaimed areas and 1000 stems per acre for the sagebrush-grass, pinyon-juniper, and riparian bottom areas. The Division will need to consult with Wildlife Resources about the woody plant density success standards. Both the Division and Wildlife Resources need to approve these standards.

The applicant needs to propose success standard for some of the general requirements in R645-301-353. These include diversity, erosion control, permanence, and seasonality. Methods of measuring some parameters, including cover, production, and woody plant density, are shown in Appendix A of the "Vegetation Information Guidelines." R645-301-356.110 references Appendix A, but the regulations do not specify what methods are to be used for other standards that the applicant must achieve.

### Fish and Wildlife Plan

The application discusses the realignment of Willow Creek and the measures to be used to stabilize it and to recreate aquatic habitat. Pool habitat will be created by placing multiple meanders in the stream and using a concentration of boulders below the bends. The riffle/pool ratio will be about 1:2. Reestablished riparian vegetation will provide effective cover for fish and aquatic species once it becomes established. Boulders will be placed in such a manner as to allow fish movement throughout the realigned sections. Stream restoration will also be used to mitigate habitat loss and modifications resulting from construction of the proposed main access road bridge and the replacement of the existing culvert crossing.

These plans do not show how the habitat in Willow Creek will be enhanced or how stream restoration will mitigate habitat loss. The question is whether the stream realignment will enhance Willow Creek habitat or if it will just restore it to existing conditions. Restoration is expected, but the applicant is also required to enhance habitat where practicable.

The application says recommendations from the Division of Wildlife Resources were reviewed in developing the reclamation seed mixture. A number of the species selected for the proposed seed mix were included because of their value for habitat restoration.

The species in the seed mixture generally meet the requirements of R645-301-342.200. Requirements and recommendations for the seed mixture are discussed above. While Wildlife Resources may have some additional recommendations or requirements, it is believed the seed mix will be in full compliance after the applicant meets the requirements discussed in this review.

The application does not discuss how enhancement will be achieved in the reclamation phase of operations or if it is practicable. Restoring vegetation to approximate premining conditions will not enhance the habitat. The applicant needs to determine whether there are ways of enhancing habitat.

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Except for improvements in Willow Creek, enhancements may not be practicable since there is no need for additional water sources and there is quite a lot of raptor habitat in adjacent cliffs.

A suggestion is to stockpile any large rocks found during site development and reclamation and to place them in piles over the reclaimed area. This provides habitat for small mammals, reptiles, and birds. Raptors use the rock piles as perches. This technique has worked well at several AMR sites as well as Hardscrabble Canyon and Sowbelly Gulch. Several large rocks were placed on the surface at the Willow Creek AMR site, but habitat on unreclaimed areas would be enhanced by doing this.

### Findings:

The applications is considered complete and accurate with the following exceptions:

1. The applicant intends to drill seed in most areas. Broadcasting is recommended over drilling. However, if the applicant chooses to drill seed, at least three species in the upland permanent reclamation seed mixture, big sage, rubber rabbitbrush, and prostrate summer cyprus, need to be broadcast seeded.
2. In Section 5.3.2.2, the application says all areas to be revegetated on a permanent basis, including the Willow Creek realignment sections, will be drill seeded at a rate of 13.5 pounds PLS per acre. This conflicts with the permanent seed mixes shown in Tables 5.3-2 and 5.3-3. This discrepancy needs to be resolved. Also, under the heading "Woody Species Transplanting," the application mentions several woody species included in the seed mixture that can be effectively transplanted from seed. Included in this list is fringed sage, but fringed sage is not in the seed mixes in Tables 5.3-2 and 5.3-3.
3. The permanent reclamation seed mixtures include seven introduced species. Use of most of these is justified, but it does not appear that intermediate wheatgrass and orchardgrass are both desirable and necessary to achieve the postmining land use. These species either need to be eliminated from the mixture or the applicant needs to include further justification for including them.
4. Bluebunch wheatgrass needs to be included in the permanent seed mixture for upland areas. A recommended rate is two pounds pure live seed per acre (drilled).
5. The applicant needs to adjust the quantities of seed to be planted in upland areas. As proposed, 68% of the seeds would come from just two species, rubber rabbitbrush and sagebrush. The amounts of these species should be reduced and the amounts of other species needs to be increased. In particular, it is suggested that the amount of fourwing saltbush be increased to three pounds per acre pure live seed (drilled). Also suggested is the addition of blueleaf aster and yarrow to this mixture.
6. The application needs to clarify how many cuttings and transplants will be used along the stream channel.
7. The applicant should commit to try to eliminate any noxious weed infestation regardless of its size.

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8. The applicant intends to use the baseline data method for judging revegetation success, but the data was not collected during a normal precipitation year as defined in the Division's "Vegetation Information Guidelines." Therefore, except for the riparian area, this method cannot be used unless the applicant presents data taken during a normal precipitation year. Other options for revegetation success standards include establishing a reference area or range sites.
9. It appears the applicant proposes to use a weighted average of vegetation cover for all reclaimed areas to compare to the revegetation success standard. This is acceptable for previously disturbed areas but not for areas not previously disturbed by mining.
10. Section 5.3.2.6 of the application says absolute values for cover and production from reclaimed areas will be compared with a confidence interval for the baseline data to determine if the applicant has met revegetation success standards. Since the values for both baseline data and reclaimed area data are from samples, it is necessary to pool the variances to perform a t-test for equality.
11. The application needs to include revegetation success standards for certain parameters in the general requirements, including erosion control, diversity, seasonality, and permanence.
12. The applicant is required to use the best technology currently available to enhance wildlife habitat in the postmining phase of operations. The application discusses methods for restoring the stream channel, but it does not discuss whether this will constitute enhancement. The application does not show how upland areas will be enhanced. If the application does not include enhancement measures, it needs to include a statement showing why enhancement is not practicable.

The Division will need to consult with the Division of Wildlife Resources to establish a woody plant density success standard.

In addition to the above requirements, The Division makes the following suggestions:

1. Seeds of all the grasses in the riparian mixture are very small. Two pounds per acre PLS of each of these is probably more seed than is needed. It is recommended that the seeding rates be reduced for the four grasses by about one-half. Also, the applicant could add Kentucky bluegrass and blueleaf aster at one pound PLS per acre each (drilled).
2. The applicant intends to use hydromulch and dozer tracking to help control erosion in steeper, more highly erodible areas. These methods are not expected to be as effective as other available methods.
3. Surface roughening is one of the most effective reclamation techniques used in Utah. Some practices proposed in the application, including dozer tracking, disking and harrowing, using a disk to crimp straw or hay mulch, and drilling seed, would tend to decrease surface roughening. Some of these methods, such as disking and harrowing, are simply not needed.