

Document Information Form

Mine Number: C/007/006

File Name: Outgoing

To: DOGM

From:

Person N/A

Company STATE OF UTAH.

Date Sent: N/A

Explanation:

TECHNICAL ANALYSIS AND FINDINGS

cc:

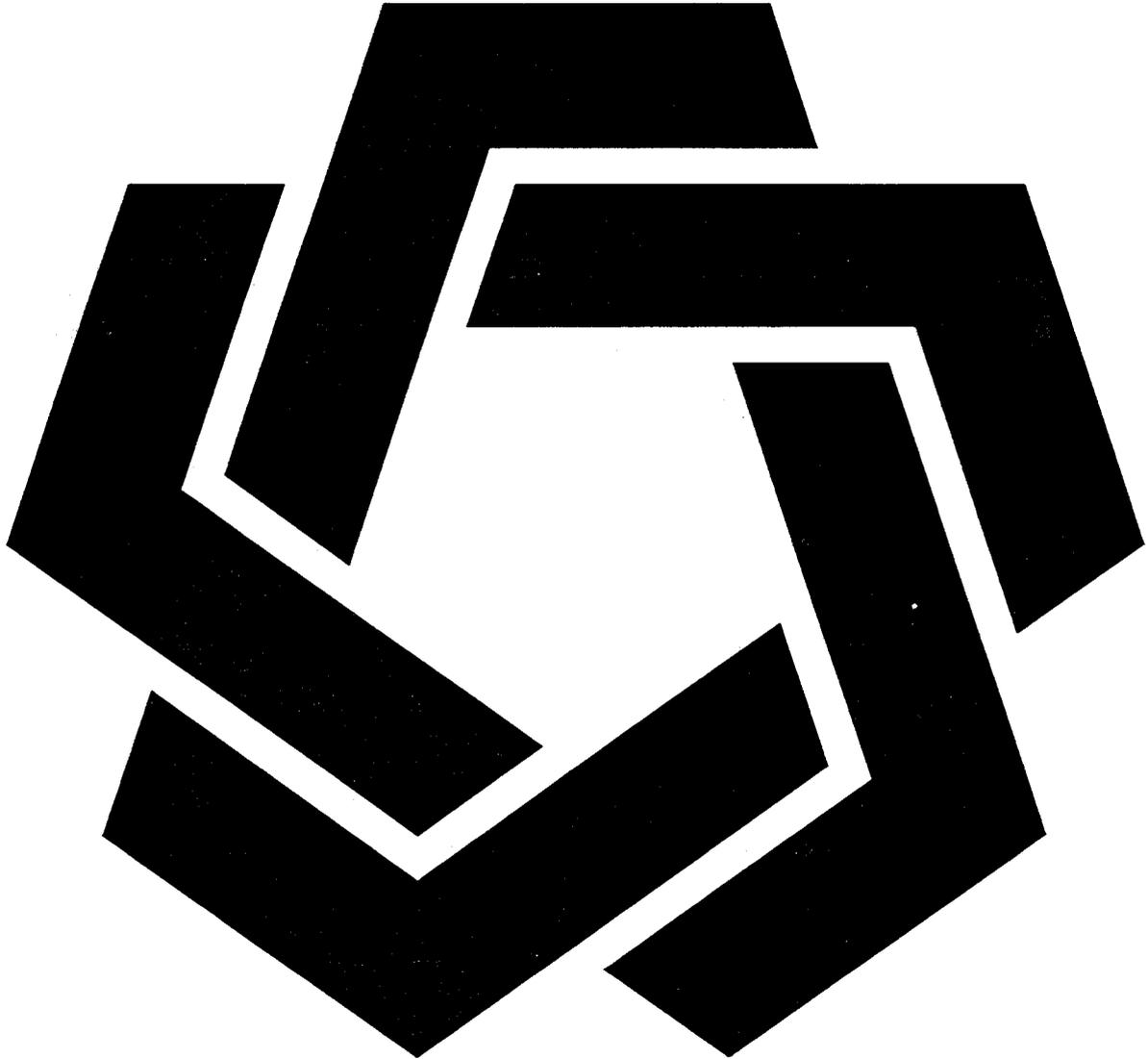
File in: C/007,006, Outgoing

Refer to:

- Confidential
- Shelf
- Expandable

Date _____ For additional information

State of Utah
Division of Oil, Gas and Mining
Utah Coal Regulatory Program



File in:

- Confidential
- Shelf
- Expandable

Refer to Record No. 0007 Date _____

In C/ 007, 006, Outgoing

For additional information

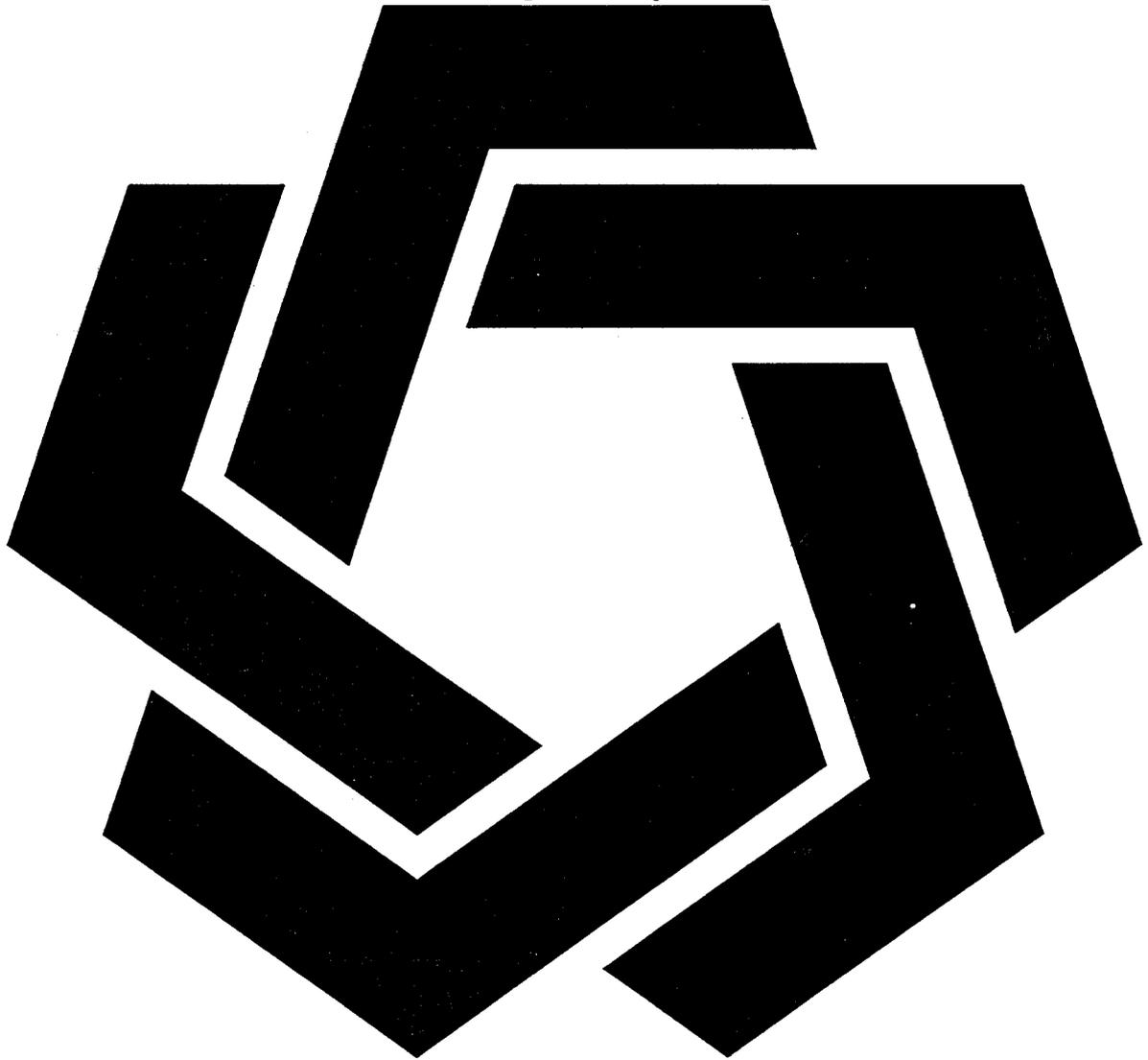
1 Findings

ie

ound 2

997

State of Utah
Division of Oil, Gas and Mining
Utah Coal Regulatory Program



Technical Analysis and Findings
Star Point Mine
Renewal Changes Round 2
September 12, 1997

TABLE OF CONTENTS

INTRODUCTION	5
SUMMARY OF DEFICIENCIES	6

TECHNICAL ANALYSIS

ENVIRONMENTAL RESOURCE INFORMATION	
MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION	7
MINE WORKING MAPS	7
SOILS RESOURCE INFORMATION	7
SOIL SURVEY AND SOIL CHARACTERIZATION	7
REFUSE PILE- TOXIC AND ACID FORMING CHARACTERISTICS	8
VEGETATION RESOURCES INFORMATION	11
FISH AND WILDLIFE INFORMATION	12
HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION	13
LAND USE REOUSRCE INFORMATION	14
HYDROLOGIC RESOURCES	15
SAMPLING AND ANALYSIS	15
BASELINE INFORMATION	15
GROUNDWATER INFORMATION	15
SURFACE WATER INFORMATION	16
CLIMATOLOGICAL INFORMATION	16
ALTERNATIVE WATER SOURCE INFORMAITON	16
PROBABLE HYDROLOGIC CONSEWQUEINCES DETERMINATION	16

OPERATION PLAN

TOPSOIL AND SUBSOIL	17
FISH AND WILDLIFE INFORMATION	18
PROTECTION AND ENHANCEMENT PLAN	18
ENDANGERED AND THREATENED SPECIES	18
BALD AND GOLDEN EAGLES	19
WETLANDS AND HABITATS OF UNUSALLY HIGH VALUE FOR FISH AND WILDLIFE	19
VEGETATION	19
COAL RECOVERY	20
USE OF EXPLOSIVES	21
HYDROLOGIC OPERATIONAL INFORMATION	22
GROUNDWATER MONITORING	22
SURFACE-WATER MONITORING	22
ACID AND TOXIC-FORMING MATERIALS	23
TRANSFER OF WELLS	23
DICHARGES INTO AN UNDERGROUND MINE	23
GRAVITY DISHCARGES	24
WATER-QUALITY STANDARDS AND EFFLUENT LIMITAIONS	24
DIVERSIONS	24
STREAM BUFFER ZONES	25
SEDIMENT CONTROL MEASURES	25
SILTATION SRUCTURES AND SEDIMENTATION PONDS	25
EXEMPTIONS FOR SILTATION STRUCTURES	26
DISCHARGE STRUCTURES	26
IMPOUNDMENTS	26
CASING AND SEALING OF WELLS	26

RECLAMATION PLAN

POSTMING LAND USE	27
TOPSOIL AND SUBSOIL	28
SOIL REDISTRIBUTION	28
SOIL STABILIZATION	29
PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES	30
CONTEMPORANEOUS RECLAMATION	31
REVEGETATION	31
GENERAL REQUIREMENTS	32
TIMING	33
MULCHING AND OTHER SOIL STABILIZING PRACTICES	33
STANDARDS FOR SUCCESS	33
APPROXIMATE ORIGINAL CONTOUR RESTORATION	35
BACKFILLING AND GRADING	36
MINE OPENINGS	38
ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES	39
RECLAMATIONAL HYDROLOGY	39
SURFACE WATER MONITORING	40
ACID- AND TOXIC-FORMING MATERIALS	40
TRANSFER OF WELLS	40
DISCHARGES INTO AN UNDERGROUND MINE	41
GRAVITY DISCHARGES	41
WATER-QUALITY AND EFFLUENT LIMITATIONS	41
DIVERSIONS	42
STREAM BUFFER ZONES	42
SEDIMENT CONTROL MEASURES	42
SILTATION STRUCTURES AND SEDIMENTATION PONDS	44
EXEMPTIONS FOR SILTATION STRUCTURES	44
DISCHARGE STRUCTURES	44
BONDING AND INSURANCE REQUIREMENTS	45
FORM OF BOND	45
DETERMINATION OF BOND AMOUNT	45
TERMS AND CONDITIONS FOR LIABILITY INSURANCE	46

TECHNICAL ANALYSIS

Last revised - September 15, 1997

INTRODUCTION

This Technical Analysis (TA) is written as part of the permit review process. It documents the Findings that the Division has made to date regarding the application for a permit and is the basis for permitting decisions with regard to the application. The TA is broken down into logical section headings which comprise the necessary components of an application. Each section is analyzed and specific findings are then provided which indicate whether or not the application is in compliance with the requirements.

Often the first technical review of an application finds that the application contains some deficiencies. The deficiencies are discussed in the body of the TA and are identified by a regulatory reference which describes the minimum requirements. In this Technical Analysis we have summarized the deficiencies at the beginning of the document to aid in responding to them. Once all of the deficiencies have been adequately addressed, the TA will be considered final for the permitting action.

It may be that not every topic or regulatory requirement is discussed in this version of the TA. Generally only those sections are analyzed that pertain to a particular permitting action. TA's may have been completed previously and the revised information has not altered the original findings. Those sections that are not discussed in this document are generally considered to be in compliance.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

SUMMARY OF DEFICIENCIES

R645-301-140, maps must designate pre-SMCRA areas which have not been used since 1977, pre-SMCRA areas which have been continuously used, and post-SMCRA disturbed areas.

R645-301-411.140 no cultural or historic information could be found in the permit for structures within the disturbed area greater than 50 years old. A survey performed by a permitted archeologist or historian must be conducted (the Division will provide a list of permitted people if desired). The exact reclamation plans for any structure or ruin must be detailed for SHPO evaluation.

R645-301-232.720 and R645-300-112.400, The proposed topsoil borrow site (SW 1/4, SW 1/4 Section 2, T.15 S. R. 8 E) will be permitted during 1998 with completion by January 1, 1999.

R645-301-330, the permit must provide a discussion and summary based on collected data which document the impacts of mining and reclamation activities on the aquatic resources. The inclusion of missing Exhibit 322.220c may answer all or part of this deficiency.

R645-301-412, comments from land owners supporting the post mining land use must be provided in the permit. No documentation could be found to request the powerline road be left and who will accept the road liability and be responsible for any maintenance. Documentation for the railroad spur and spur road land use must be provided.

R645-301-746.110 and R645-301-746.120, With regards of the Main Channel Restoration Area, coal waste may not be used as backfill within the main channel and/or channel side slopes without:

- Testing the coal waste for acid forming and toxic characteristics, and
- CPMC must first demonstrate that placement will minimize the adverse effects of leachate and surface water runoff on surface and ground water quality and quantity.

R645-301-244.200, The Soil Stabilization discussion does not give consideration to the special treatment for reclaiming the Badland-Rubble Complex based soils. The high salt, high clay content Mancoes soils are highly erosive and difficult to reclaim.

R645-301-342.100, the permit must detail the wildlife enhancement plans for the reclaimed areas.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

R645-301-341.100, a detailed schedule and timetable for the completion of each major step in the revegetation plan must be included in the permit.

R645-301-353.110, a vegetation success diversity standard for the reclaimed area must be proposed. The standard should be based on undisturbed lands in the area.

R645-301-355, the permittee must provide maps of the post disturbance topography which will allow sufficient information and detail to review mulching and other soil stabilizing practices proposed for reclamation.

R645-301-742.110, CPMC must design using the best technology currently available a sediment control measure for the road outslope and all other reclamation areas that prevents to the extent possible additional contributions of sediment to stream flow or to runoff outside the permit area.

R645-301-764, CPMC must show the timetable for removal of sediment control structures that treat the refuse pile, road cuts, pad outsoles, and all other reclamation areas. This timetable must be specific to each structure.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

ENVIRONMENTAL RESOURCE INFORMATION

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:

Mine Workings Maps

The location and extent of known mine workings, along with anticipated mine workings, are shown on Map 116.100a--Mine Plan Hiawatha Seam, Map 116.100b--Mine Plan Third Seam, and Map 116.100c--Mine Plan Wattis Seam. The location and extent of known, prelaw mine workings are shown on Map 142.100a--Pre-Law Mining Activity Hiawatha Seam, Map 142.100b--Pre-Law Mining Activity Third Seam, and Map 142.100c--Pre-Law Mining Activity Wattis Seam.

Maps 116.100a and 116.100b were certified by David E. Hansen, a professional engineer licensed and registered in the state of Utah. Map 116.100c and 142.100a through 142.100c were certified by Daniel Thomas Hurst, a professional engineer registered in the state of Utah.

Findings:

The plan fulfills the requirements of this section.

SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.21, 817.200(c); R645-301-220, -301-411.

Analysis:

Soil Survey and Soil Characterization

Numerous soil surveys have been conducted for the CPMC permit area. These include the following:

- The Soil Conservation Service (SCS) conducted an Order-III survey on all private and public domain lands east of the forest boundary in 1978, 1979 and 1980. Portions of these surveys were extracted and integrated in the MRP.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

- In 1981, Endangered Plant Studies, Inc. (EPS) conducted an Order-I soil survey of areas adjacent to the Refuse Pile Expansion Area, the Unit Train Loadout site, and the Gentry Mountain Air Shaft site.
- In 1982, Utah State University Soil Science Department, under the direction of Dr. Al Southered, conducted an Order-I soil survey for the Corner Canyon Breakout Fan site.
- In 1983, field soil sampling studies were conducted within the Unit Train Loadout and associated conveyor areas.
- During 1984-1986, the U. S. Forest Service conducted Order-III soil surveys for lands located within CPMC Permit Area lying within the Manti-La Sal National Forest. Portions of these surveys were extracted and integrated in the MRP.
- Portions of the SCS's Carbon County 1988 Soil Survey (Order-III) were extracted and integrated in the MRP.
- In 1991, IME conducted an Order-I soil survey of the Little Park Canyon Breakout area.
- On May 6, 1997, EarthFax conducted an extensive soils investigation of the Star Point No. 1 Mine Haul Road and the coal load-out area near Pond #3. The soil survey is contained in Exhibit 241b. This survey investigates soils and coal waste qualities within the pre-SMCRA disturbed area.

Soil sampling locations listed in Table 230.200 (a through i) are shown on soil maps 222.100 (a through f). Soil pit locations are difficult to locate on the soil maps and correlate with the text. Confusion exists between soil survey pits and other soil sampling points as listed in the MRP. However, with persistence, correlation can be made for each sampling point. Detailed soil profile descriptions and field notes are not found in the MRP for most sampling points. In fact, for all soil profile descriptions listed in Exhibit 222.300a, not a single referenced soil survey pit is located within Star Point's permit boundaries.

The MRP correlates soil resource information between the Order-I and Order-III soil surveys. This correlated information aids in the delineation and interpretation of soils data for the purpose of identifying on-site soils. However, a complete assessment of soil quality and volumes is not possible without actual on-site soil surveys. To help rectify this problem, CPMC conducted a 1997 soil investigation of the Star Point No. 1 Mine Haul Road and coal load-out area near Pond #3. This survey quantifies the quality and location of soil and coal waste materials within this pre-SMCRA disturbed area. In general, soils in this area meet the Division's guidelines for soils; soils along the road edges where road salt is used during the winter contain elevated SAR values. The coal waste in the area of TP-8 and TP-2 contain elevated levels of water extractable selenium at 0.28 and 0.12 ppm, respectively.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

With respect to all sample sets, including the 1997 study, several samples show toxic and acid forming characteristics. Toxic levels of selenium and boron are both discussed and shown in several overburden, refuse, and coal waste samples. Acid-base potential values based on sulfide material show several overburden and refuse samples having acid forming potentials. Specifically, the Wattis Split (Boney) sample substantiates the resulting acid forming potential (-40 tons CaCO₃/1000 tons) by having a 4.4 pH value.

Refuse Pile - Toxic and Acid Forming Characteristics

Exhibit 231.200a, "An Evaluation of the Toxic and Acid Forming Properties of Overburden and Coal Refuse Materials" by Kent Crofts, IME, evaluates soils and refuse with respect to reclamation suitability. In the report, CPMC requested that the Division provide documentation on how the requested information relates to the determination of the reclamation suitability or protection of the environmental resources of the area. The report actually provides a suitable response for this request with the following statement: "Examination of the cited Tables documents the overburden is a 'cleaner' plant growth medium than is the native topsoil with respect to pH, EC, texture and percent clay, and equal to topsoil in suitability with respect to SP and SAR. Only with respect to the parameters of sand, selenium, boron and acid base potential does the overburden possess a lower reclamation suitability than the 'control' native soils."

With respect to selenium, the 1987 evaluation showed 15 percent of the refuse samples were classified as unsuitable and exceeded the 0.10 mg/Kg standard. During 1989, 18 percent of the refuse samples were classified unsuitable. As the 1987 report states, the potential for elevated selenium values to exceed the recommended standard exists within the refuse material. The Division concurs with this statement and is the basis for maintaining the four feet cover minimum requirement.

A complete evaluation of the 1989 selenium data is given in a report submitted to CPMC on February 26, 1992 entitled "An Evaluation of Plant and Soil Selenium Concentrations in Coal Refuse and Undisturbed Soils" by Kent Crofts, IME. The literature review is an excellent source of information on selenium with the report discussion focusing on many notable and relevant points. Based on the literature review and data analysis, several significant factors were presented in this report:

- Strong statistical correlations between selenium and other soil properties were shown to be critical considerations when determining potential plant selenium toxicity. Factors other than selenium should be considered when determining potential plant selenium toxicities. New standards need to be shown and substantiated by data.
- Salinity and sulfate levels dramatically influence plant selenium uptake. Numerous studies document an inverse relationship of plant selenium levels with increasing levels of sulfate. Since sulfur and selenium chemistries are similar, plants will uptake available selenium if sulfates are low. Likewise, if sulfates are abundant, even in the presence of high selenium, plant selenium uptake will likely be

TECHNICAL ANALYSIS

Last revised - September 15, 1997

lower. High levels of sulfate in seleniferous soils and waters should be considered when determining the availability and selenium phytotoxicity.

- 1989 data analysis conclude that elevated selenium occurs at the surface layer of refuse exposed to the atmosphere. The distribution of selenium in the experimental refuse plots show that uniform levels of elevated selenium occur at the zone that was originally the uppermost refuse layer prior to topsoil placement. Before topsoil placement, the oxidization of selenium in the surface refuse exposed to the atmosphere is probably the critical factor for finding elevated levels of extractable selenium within the refuse surface.

Plant selenium concentrations were statistically compared between native plants and plants grown on the refuse research plots. Conclusions showed that no statistical difference exists between native and refuse grown plants. However, these conclusions are not accurate for several reasons:

- Statistical comparisons and conclusions using less than values are not only inappropriate but invalid. A striking observation is the data comparison of native and refuse affected plots. Excluding the Prince's Plume samples, virtually all of the plant selenium concentrations for the undisturbed native sites were below the analytical detection limits. On the Refuse affected plots, data show that many of the plants contained detectable selenium, although none of the refuse plants produced forage with selenium levels exceeding the toxic 5 ppm level.
- Conclusions were made on data sets containing different plant species and distribution between the native and reclaimed soils. Such data is biased and negates the statistical assumption of unbiased data. Unpaired data cannot be used with T-test comparisons.

Based on the 1989 report, CPMC submits that the existing regulatory selenium standard of 0.1 mg/Kg is unsupported by scientific literature and that this lack of support results in gross exaggeration. The Division submits that selenium issues are not easily rectified because the selenium cycle is a highly dynamic system involving biological, chemical and physical pathways which add to the complexity of the system. These issues need clarification before a new standard is adopted by regulatory agencies. The ubiquitous presence of selenium found in overburden waste and coal refuse therefore makes these selenium issues highly pertinent and relevant for protecting the environment. It appears that the lack of available four feet of cover for the refuse pile is the justification for preparing the reports and the motivation for conclusions reached. Justification for DOGM's selenium standard is protecting the environment from mining induced problems of selenium solubilization, leaching and toxicity. Therefore, before DOGM alters the current selenium standard to allow less than four feet of cover, CPMC needs to show by data and scientific research that a different standard value is substantiated.

Findings:

TECHNICAL ANALYSIS

Last revised - September 15, 1997

The requirements of this section of the regulations are considered adequate.

VEGETATION RESOURCE INFORMATION

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

Analysis:

Plant communities within and adjacent to CPMC's permit area are shown on Map 321.100a. Maps 321.100b thru 321.100f delineate the vegetation types in greater detail. Map 321.100e shows the Little Park Canyon Fan Site, this fan site is only proposed at this time (1997). These maps (or others) must contain information which allows the Division to determine the date of disturbance (i.e. pre-SMACRA and never been touched, pre-SMACRA and continuously used, and post-SMACRA), disturbed area boundaries, and post mining land use. It is very important to designate all areas which CPMC does not claim as their responsibility both adjacent to and within the disturbed area. An attempt was made by the Operator to satisfy this requirement in the submission of Maps 542.200a through 542.200f. However, the only information on these maps pertained to cut slopes and highwalls. No disturbed area boundary designation was provided. Dates of disturbance with regard to SMACRA liability must be designated for all areas.

Nine vegetation types are described within the permit area. They are Douglas Fir, Aspen, Mountain Grassland, Mountain Shrub, Spruce/Fir, Sagebrush, Pinyon-Juniper, Saltbush, and Barren. Acreage of vegetation types within the permit area and disturbed area are provided in Table 321.100a and 321.100b. The permit area is 9060 acres and the disturbed area is 173.76 acres. The largest disturbed area given in the Table is the Sagebrush community. The Mountain shrub and Pinyon-Juniper have been disturbed extensively also. These areas are known to be of great importance to deer and elk as winter range. The Saltbush Community has been disturbed to a lesser extent, however this area will most likely be the hardest to revegetate and to control erosion due to the poor soils.

The productivity of the land in terms of range condition and forage production is discussed in Section 321.200.

In 1981, the reference area for the Mountain Shrub, Douglas Fir, Mountain Grassland and Sagebrush areas were established. The reference area sampling for the Saltbush, Pinyon-Juniper and the Aspen Community was conducted in 1982. Reference Areas were selected and sampled using approved Division procedures at the time of sampling. Reference area sampling during the period of extended responsibility and at bond release will need to follow current Division procedures. Currently, the Division requires cover sampling to be based on total cover of 100 percent and to include all tree and shrub canopy cover. Including all vegetation cover within the 100 percent will likely result in a higher cover value for some community types, however, the Saltbush Community will likely be unchanged. Reference areas and predisturbed areas were compared using the t-test and McArthur Index of Similarity (Table 321.100i).

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Findings:

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

R645-301-140, maps must designate pre-SMACRA areas which have not been used since 1977, pre-SMACRA areas which have been continuously used, and post-SMACRA disturbed areas.

FISH AND WILDLIFE RESOURCE INFORMATION

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

Analysis:

In 1982, site specific sampling of various vegetative communities for wildlife were conducted to determine occurrence and animals per unit area. Other methods such as literature research and personal contacts were used to evaluate the wildlife resources within the area. Table 322.200a provides a list of mammals, Table 322.200b birds, and Table 322.200c reptiles and amphibians which are likely to occur within the CPMC's permit area. Deer and elk are a major concern to the management agencies. Elk utilize the permit area on a seasonal basis. High elevation fan portals in the aspen and mountain brush areas are likely to be used as summer range and possibly calving areas for elk. The areas surrounding the main mine site are most likely used from early November until mid May. Mule deer on the CPMC permit area are considered part of herd unit 33. Deer generally use the permit as do the elk, on a seasonal basis. Mitigation measures have been conducted by enhancing winter range. Enhancement has mostly focused on providing water sources for the winter range. Other high value mammal species are discussed in this section of the permit. The impacts of mining on high interest mammals is shown in Table 322.200e and rated on a scale of 0 to 10 (0 being no impact). The operator felt that only the Desert Cottontail, elk and deer had a potential for impact and the impact was 1, 1, and 3, respectively. The Division is unable to concur with this assessment at this time (1997), however, the disturbance has already occurred, and the point is mute.

Raptor inventories have been conducted yearly in the permit area since 1981 in conjunction with UDWR and USFWS. According to published UDWR information the mine permit area is represented by the Transition and Canadian Life zones. UDWR states that there is a potential for 172 bird species in the area. It is likely that two endangered species of birds, the bald eagle and the peregrine falcon are present within the permit area. The bald eagle as a winter visitor and the peregrine falcon has been observed in 1996 and 1997 adjacent to the permit area. The continued monitoring of these birds should document any impacts. Table 322.200f, Raptor Nest Sites Activity, reports the results of the raptor monitoring for the permit area from 1982 to 1997. A total of 44 nests have been observed in the 15 years of monitoring and 23 young in the nests have been observed during this time.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Section 322.210, Threatened or Endangered Species, states that the only threatened or endangered species present within or adjacent to the permit area is the peregrine falcon and bald eagle and these species are likely not to be affected by any mining impacts. It is recommended that prior to any site disturbing reclamation activities a threatened and endangered plant and animal assessment be made.

The aquatic resources are considered important wildlife habitat areas. Section 322.220 thru 230 state that the permit area includes the headwaters of two small perennial streams, Miller Creek and Tie Fork. Nuck Woodward Creek is also an important aquatic resource. Numerous macroinvertebrate sampling studies have been and continue to be conducted to document mining impacts on the aquatic resources within and adjacent to the permit area. Sampling of Tie Fork Creek and Wild Cattle Hollow were initiated in 1981. Miller Creek has been studied since 1976. It appears that the studies have not all been from the same stations or samplers. Macroinvertebrate sampling in Wild Cattle Hollow, Gentry Hollow/Tie Fork, and Nuck Woodward Creek continues till 2001. The permit states that no impacts to the streams from mining have been observed to date. However a reach of Miller Creek has been lost to subsidence. A schedule of future aquatic resource sampling is presented in Table 322.220b.

Findings:

The permit meets the minimum requirements of this section.

HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION

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

Limited cultural and historic resource information could be found for the area of Lion Deck facilities and the lower facilities, most all reports are for areas to be disturbed after 1980. Limited historic reporting could be found for the town of Wattis. All mine structures or ruins older than 50 years (i.e. the old tipple) within the disturbed area must be evaluated for potential nomination to the Historic Register. Any structure or ruin which is determined to have potential for nomination must have the reclamation plan fully described. The plan must state if demolition will occur or if the structure will be retained. Responsibility and maintenance for the retained structure should be discussed. Any structure which will remain for historic purposes must be nominated to the Historic Register. The Division will then seek approval from SHPO.

Findings:

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

TECHNICAL ANALYSIS

Last revised - September 15, 1997

R645-301-411.140 no cultural or historic information could be found in the permit for structures within the disturbed area greater than 50 years old. A survey performed by a permitted archeologist or historian must be conducted (the Division will provide a list of permitted people if desired). The exact reclamation plans for any structure or ruin must be detailed for SHPO evaluation.

LAND-USE RESOURCE INFORMATION

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

Analysis:

Premining land use is livestock, timber, and wildlife habitat. The permit states that mining has continued in the area for several decades with only minor effects on vegetation, wildlife, hydrology, and vegetation. Oil and gas were produced in limited quantities from 1924 to 1976. In the mid 1990's gas development was again important on lands adjacent to the permit area. During this development period River Gas Corporation intends to develop their oil and gas leases in the area adjacent to the mine facilities and contemplates using the pre-existing roads in the area. Carbon County's communication and relay facilities are located on the ridge above the mine facilities. Timbering in the Price area has increase in recent years however, land owner(s) in the permit area have no interest in this resource as yet.

Existing land use also consists of hunting, camping, picnicking, mountain biking and other recreational uses. The Mancos shale area of the train loadout is designated as used by livestock and wildlife however due to the low productivity of the Mancos Shale the contribution of this area as a grazing resource is limited. A discussion of land productivity is found in Section 411.120.

Findings:

The permit meets the minimum regulatory requirements of this section.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

HYDROLOGIC RESOURCES

Sampling and Analysis

Analysis:

Sampling and analysis is covered on page 700-34. The MRP describes procedures that are acceptable under the coal mining regulations.

Findings:

The sampling and analysis procedures are adequate to meet the requirements of the regulations.

Baseline Information

Analysis:

Baseline information begins on page 700-35. It is separated into groundwater information, surface-water information, geologic information and climatological information. These are individually addressed in corresponding sections of this TA.

Findings:

CPMC has provided complete and accurate baseline information.

Groundwater information

Analysis:

Groundwater baseline information is found on pages 700-35 through 700-41. Water rights and water quality begins on pages 700-35 and 700-38, respectively.

Findings:

The groundwater information is complete and accurate.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Surface-water Information

Analysis:

Surface-water baseline information is in found section 724.200 beginning on page 700-42. Surface-water quality information begins on page 700-47 and quantity (rights) information is found on pages 700-42 through 700-47.

Findings:

The surface-water baseline information is complete and accurate.

Climatological Information

Analysis:

Climatological baseline information is found on pages 700-51 through 700-52.

Findings:

The climatological information is complete and accurate.

Alternative Water Source Information

Analysis:

Alternative water source information is found on pages 700-53 and 700-54 in section 727.

Findings:

The provided information on alternative water sources is complete and accurate.

Probable Hydrologic Consequences Determination

Analysis:

The probable hydrologic consequences (PHC) determination is found on pages 700-54 through 700-93. The PHC is included in Section 728 through 728.400. On page 700-93 the CPMC refers the read to section 200 for information on acid and toxic-forming materials. This section indicates that there is no acid or toxic-forming potential in the Star Point Mine; however,

TECHNICAL ANALYSIS

Last revised - September 15, 1997

greater analysis on the information provided by CPMC regarding this topic is addressed in the Soils Environmental Resource section of this TA. New information about sampling in the Nuck Woodward drainage is provided on page 700-68.

Findings:

The PHC is complete and accurate; however, discussion on acid- and toxic-forming materials is subject to findings under the Soils Resource section of this TA.

OPERATION PLAN

TOPSOIL AND SUBSOIL

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

Analysis:

Table 233.100, Section 233, Topsoil Substitutes and Supplements, clearly outlines reclamation soil balance results in fulfillment of Stipulation 817.24-(1)-(DD) from the 1987 Technical Analysis. Available soil is correlated with topsoil stockpile sites that are identified on Maps 222.200 (a through f).

As indicated in Table 233.100, a topsoil deficiency of approximately 147,238 CY currently exists. CPMC proposes to supplement soil volumes available for reclamation by using any available excess fill as growth media or substitute soil found during demolition of the surface facilities. If suitable substitute soils in quantities equal to the deficiency are not found during reclamation, then CPMC will utilize an alternate borrow area. The borrow area will be on property currently owned by CPMC and is located in the SW 1/4, SW 1/4 Section 2, T.15 S. R. 8 E. Soils in this area are identified as SCS soils map unit 113, Strych soil series (see Exhibit 222.300a). CPMC commits to permitting this area prior to implementation of reclamation activities.

Findings:

As determined in the analysis section of this TA, approval of the plan is subject to the following Permit Conditions. Accordingly, the permittee has committed to comply with the requirements of the following Permit Conditions, as specified, and in accordance with the requirements of:

R645-301-232.720 and R645-300-112.400, The proposed topsoil borrow site (SW 1/4, SW 1/4 Section 2, T.15 S. R. 8 E) will be permitted during 1998 with completion by January 1, 1999.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

FISH AND WILDLIFE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.21, 817.97; R645-301-322, -301-333, -301-342, -301-358.

Analysis:

Protection and Enhancement Plan.

The Technical Analysis prepared by the Division in 1987, found that the Permittee was in compliance with this section of the regulations. The reasoning is as follow:

Much of the Star Point Mine's facilities were in existence before passage of SMACRA or Utah's Rules. Wildlife has adapted to some extent to the presence of the mine as evidenced by big game use of sediment ponds and wildlife sightings in the mine facilities area. The Permittee has tried to minimize impacts on wildlife from existing facilities and to design new facilities to take wildlife into consideration, including raptor-proof power lines and conveyors constructed to allow deer crossing (Section 330). The permittee has committed to notify the Division of the use of pesticides and fires and to fence, cover or buffer hazard areas.

Mitigation of impacts and enhancement of wildlife resources include employee education, deer winter range vegetation enhancement and a guzzler to compensate for the Unit Train Loadout and refuse expansion areas, availability of sediment ponds for deer use and interim final revegetation planned to maximize benefit to wildlife.

Numerous inventories and studies gathering resource information have been conducted since the late 1970's and early 1980's (see Fish and Wildlife Resource Information in this Technical Analysis). Studies and inventories were designed to assess impacts of mining and reclamation activities on the raptor and macroinvertebrates populations. Studies and inventory data continue to be collected. Data collected from these studies designed to assess mining impacts can be used to document impacts should they occur.

Endangered and Threatened Species.

See Wildlife Resource section. The permittee has committed to promptly report to the Division any state or federally-listed threatened or endangered species within the permit area (Section 358.100).

Bald and Golden Eagles.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

The permit reports (Section 330) that subsidence could have impacted two golden eagle nests on a cliff face in Section 18, T15S, T8E during initial permitting. In 1987 a Nest Taking Permit was issued by the U.S. Fish and Wildlife for two golden eagle nests that had potential to be impacted by mining. The two nests were fenced with chain link to prevent the golden eagle pair from nesting. The area was monitored from 1988 till 1991. Subsidence movement was detected during this time but the nests were not lost. The eagle pair produced young in 1991. During the time of the survey, 1988 to 1991 the eagle pair remained in the territory and used alternate nest sites (Exhibit 342.100a).

Wetlands and Habitats of Unusually High Value for Fish and Wildlife.

The permit states under the Mitigation and Management Plans (Section 330) that subsidence impacts to Miller Creek and Tie Fork Creek will be monitored and mitigated if required. Both of these areas have been monitored for macroinvertebrates. Miller Creek has subsided and mining has ceased in the area of Tie Fork Creek. Exhibit 322.220c, Hydrologic Response to Land Subsidence Caused by Underground Coal Mining, Miller Creek Drainage, Carbon County, Utah could not be found.

Findings:

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

R645-301-330, the permit must provide a discussion and summary based on collected data which document the impacts of mining and reclamation activities on the aquatic resources. The inclusion of missing Exhibit 322.220c may answer all or part of this deficiency.

VEGETATION

Regulatory Reference: R645-301-330, -301-331, -301-332.

Analysis:

The permit states that vegetation monitoring on U.S. Forest Service property will be monitored by color infrared photography and by visual observations (Section 332.). Monitoring is conducted to document changes in vegetation communities as a result of subsidence affects. This monitoring has been conducted several times since 1980 (Section 525.100). A commitment is given to provide the Division with reports in the annual report. The changes were evaluated by comparing the photo's from 1980 and 1993 by the Operators consultant. Possible changes in vegetation were observed in 11 locations of which none were greater than 4 acres. Changes could be due to insect damage, disease, subsidence, groundwater alterations, and/or weather conditions. Two surveys are only adequate to suggest a change but no conclusion can be made. The monitoring will continue.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

As wildlife mitigation during operations disturbed areas not in use will be seeded with an interim seed mixture. A general interim seed mixture is specified in Table 341.210e.

Findings:

The permit meets the minimum regulatory requirements of this section.

COAL RECOVERY

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

Analysis:

A description of the measures used by the permittee to maximize the use and conservation of the coal resource is found on pages 500-7 to 500-8 of the plan.

The permittee commits to using sound engineering practices to recover the highest percentage of the coal resource possible. Longwall methods, which at present achieve the highest possible recovery rate, are used to extract coal. Room-and-pillar methods are used where longwall methods are not feasible and the permittee practices full pillar recovery where possible.

Exhibit 522a includes a copy of an approval letter for the Resource Recovery and Protection Plan (R2P2) from the Price office of the Bureau of Land Management (BLM). The letter itself is dated September 19, 1991. It was transmitted to the permittee on March 6, 1997, at the request of the Division, for the purpose of documenting the fact that the approved R2P2 was current and that the permittee was adhering thereto as of August, 1997.

Findings:

The plan fulfills the requirements of this section.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

USE OF EXPLOSIVES

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

Analysis:

Blasting procedures are described on pages 500-13 through 500-17 of the plan.

The permittee will comply with all applicable state and Federal laws in the use of explosives. The permittee does surface blasting rarely and only for splitting boulders, clearing chutes, clearing trenches, and other such maintenance purposes.

Persons conducting blasting will be properly certified and certification will be carried by those doing the blasting or will be on file at the mine office. A certified blaster and at least one other person will be present at the firing of all blasts. The person responsible for blasting will be familiar with the blasting plan and site-specific performance standards and will give on-the-job training to uncertified persons who will assist in the use of explosives.

A blasting record will be completed and submitted to the Division for approval prior to any blast, including those which are to take place within 500 feet of an active or underground mine. A sample blasting record is found on pages 500-14 and 500-15 of the plan. A copy of the blasting record will be filed at the minesite for at least three years.

Page 500-16 states that there are no dwellings or other structures within one half mile of the permit area. Therefore, neither a preblasting survey nor a blasting schedule is required.

Blasting signs will be posted in the vicinity of blasting operations. Warning signs will be posted at points of public access to the blasting area. Warning and all-clear signals of different character or pattern, audible within a range of one half mile from the blast, will be given. All persons in the permit area or who regularly work within one half mile of the permit area will be notified of the meaning of the signals.

Airblast will not exceed the limits set forth in R645-301-524.621 at any dwelling, public building, church, school, or community or institutional building outside the permit area. Flyrock will be prevented from traveling in the air or along the ground more than one half the distance to the nearest dwelling or other occupied structure or beyond the permit area.

Ground vibration will not exceed the limits set forth in R645-301-524.642 at any dwelling, public building, school, church, or community or institutional building outside the permit area.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

If necessary, the permittee will use the scaled distance equation found in R645-301-524.651 to determine the allowable charge weight to be detonated in any eight-millisecond period. If the scaled distance equation is used, a seismographic record of that blast will not be required, as stipulated by R645-301-524.651.

Findings:

The plan fulfills the requirements of this section.

HYDROLOGIC OPERATIONAL INFORMATION

Groundwater Monitoring

Analysis:

The groundwater monitoring program is addressed beginning on page 700-101 in section 731.210. In this section beginning on page 700-102, CPMC proposes to cease monitoring of several springs. The reason for each spring's removal from the monitoring plan is provided in this section. Predominantly the reason given for removing monitoring sites is redundancy, insignificance of past data collected, and extremely poor production rates. Redundancy means that there are one or more springs within a short distance from the deleted spring that samples the same water supply. Some sites produced only one or two samples over years of attempting to make collection.

In total there are nine sites proposed for discontinuation. Despite the large number of sampling locations that will no longer produce data, there will still be enough data to analyze water quantity and water quality. The number of stations needed for a triangulation was taken into account for each discontinued station.

Findings:

All springs proposed for discontinuation from the groundwater monitoring plan are not critical for detecting mining effects on the hydrologic balance; therefore, removing them is reasonable. The new plan is complete and adequate.

Surface-water Monitoring

Analysis:

The surface-water monitoring plan, Section 731.221, begins on page 700-116. Table 731.221a lists the monitoring sites and the duration of monitoring is on page 700-117.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Findings:

The surface-water monitoring plan is complete and accurate.

Acid and Toxic-forming Materials

Analysis:

Page 700-118 says that acid- and toxic-forming material are discussed in Sections 200 and 300 of the MRP. This section further states that acid- and toxic-forming materials are not believed to be a problem.

Findings:

The hydrology discussion on acid- and toxic-forming materials is adequate and does not require any further information. However, further findings found under the Soil Resource section of this TA may require addition information regarding cover needs.

Transfer of Wells

Analysis:

On page 700-118 the CPMC states that transfers of wells will all be approved by the Division.

Findings:

The transfer of wells plan is complete.

Discharges Into an Underground Mine

Analysis:

CPMC states on page 700-118 that they do not plan to discharge water into the mine but if a need were to arise the Division would be notified. All in-mine diversions are addressed in Sections 731.100, 731.522 and 731.800.

Findings:

The information on discharging into the mines is complete and accurate.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Gravity Discharges

Analysis:

Gravity discharges are located on page 700-118. Section 731.520 and 731.522 say that gravitational discharges from the mine not likely possible from the mine because of the gradient of the geology.

Findings:

The information on gravitational discharges from the mines is complete and accurate.

Water-Quality Standards and Effluent Limitations

Analysis:

Water quality standards and effluent limitations are addressed on page 700-185. Briefly CPMC says that they will meet all limits.

Findings:

Water-quality standards and effluent limitation are adequately addressed.

Diversions

Analysis:

Diversion design generalities are discussed in Section 742.300 beginning on page 700-171. The methodologies are the predominant subject of this chapter. Channel specific designs are located in Exhibits 732.300a through 761a. Specific summaries are given in Tables 742a through 742f on pages 700-128 through 700-136.

Findings:

Operational diversion designs are complete and accurate

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Stream Buffer Zones

Analysis:

Stream buffer zone information is provided on page 700-116. The Corner Canyon Fan Breakout is the only facility considered to be in a stream buffer zone according to the MRP. This area is not near any "aquatic resource" but CPMC has marked the buffer zone anyway.

Findings:

Stream buffer zone information is complete and accurate.

Sediment Control Measures

Analysis:

Information of sediment control for the Star Point plan is provided on pages 700-126 through 700-170. In Section 742.120 on page 700-149 CPMC has provided the most specific information about the types of measures used. This section includes information on eleven alternate sediment control areas (page 700-149 and Table 742g, page 700-150). There are a number of alternate measures used according to this section. The ASCAs appear on Maps 731.720b, 542.200g, 542.200h, 731.729a, and 542.200i.

Findings:

The sediment control designs and information is complete and accurate. All sediment control areas are designed using the best technology currently available (BTCA).

Siltation Structures and Sedimentation Ponds

Analysis:

Siltation structures and sediment pond information is found on page 700-151 and is analysis under the sedimentation pond section of this TA. The sediment pond designs are located in Exhibit 525a. There is a total of eight sediment ponds and one other treatment facility that are discussed in this section. Further information is found on page 700-124 and 700-125.

Findings:

The sediment pond designs and information is complete and accurate.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Exemptions for Siltation Structures

Analysis:

Page 742.240 says that there are no small area exemption areas within the permit area.

Findings:

The small area exemption information is complete and accurate.

Discharge Structures

Analysis:

Discharge structures are discussed on page 700-182 and in the sediment pond sections. This information is predominately included along with each individual pond design.

Findings:

The discharge structure information is complete and accurate.

Impoundments

Analysis:

Impoundments are discussed in Section 733, page 700-123 and in the sediment pond section of the MRP and TA. All impoundments are part of the sediment control plan and discussed in the Sediment Pond section of this TA.

Findings:

The impoundment information is complete and accurate.

Casing and Sealing of Wells

Analysis:

Casing and sealing of wells is addressed on page 700-186 in Section 755.

Findings:

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Casing and sealing of wells is addressed completely and accurately.

RECLAMATION PLAN

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:

The permit states that the access road to the power line by Treatment facility #1 will remain after reclamation for the post mining land use as granted by ROW 1262. No documentation could be found to request the road be left and who will accept the road liability and be responsible for any maintenance. Inclusion of the Right of Way document in the Permit may resolve part or all of this deficiency.

No discussion is provided in the permit concerning the disposition of the railroad spur and access road, of which the entire length was permitted and included in the disturbed area. The post mining land use and any right of ways must be included and discussed in the permit.

The post mining land use will include leaving the road which is designated as County Road No.290 for access to Gentry Mountain and Castle Valley Ridge. The County is currently in the process of finalizing easements and maintenance agreements for County Road 290 (Exhibit 412.200a). The permittee does retain the bond liability for the road until the Division has released the mine of the bond liability.

The post mining land use for each area of the mine is described in Table 412.100a. The land use in relation to physical features is also described in this table. The land uses consist of road, wildlife, grazing, recreation, and forestry. The two components of the table seem to conflict. To clarify a map would be appropriate. This issue is especially important in reclamation for future bond release. For example, if an area did not support grazing prior to mining then this land use should be deleted from the post mining land use and productivity will not be a component of the vegetation measurement for bond release. If an area will be used as a road right-of-way then at minimum the vegetation should be adequate to control erosion prior to bond release.

The post mining land use for the refuse pile is grazing and wildlife. The Division is concerned about a grazing post mining land use in this area. Four feet of plant growth material will be placed on top of the refuse material. Often shrub roots extend well beyond 4 feet and a potential exists for plant uptake of selenium from the refuse material.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Copies of letters sent to surface owners concerning the post mining land use are found in Exhibit 412.200a. However no comments from the land owners could be found which supports the post mining land use.

Findings:

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

R645-301-412, comments from land owners supporting the post mining land use must be provided in the permit. No documentation could be found to request the powerline road be left and who will accept the road liability and be responsible for any maintenance. Documentation for the railroad spur and spur road land use must be provided.

TOPSOIL AND SUBSOIL

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

Analysis:

Soil Redistribution

The Reclamation Plan, Soil Redistribution section generally states the following:

- CPMC commits to placing four feet of cover over the Refuse Pile.
- Any toxic or acid forming material and coal waste material used as fill or left in place, will be covered by four feet of growth media.
- In areas where coal waste is not present, the area will receive at least 17 inches of substitute soils.
- CPMC proposes to supplement soil volumes available for reclamation by maximizing the use of in-place fill materials as substitute soils and growth media.
- Whenever buried topsoils are encountered, they will be used for topsoiling.
- For areas where little or no topsoil existed prior to disturbance, CPMC will strive to return these locations to AOC using locally available previously disturbed materials and recover as much potential growth media within the individual disturbed areas as possible.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

- If suitable substitute soils in quantities equal to soil deficits are not found during reclamation, then CPMC will utilize an alternate borrow area currently owned by CPMC and located at SW 1/4, SW 1/4 Section 2, T.15 S. R. 8 E.

Specific comments for reclamation are given for the following areas: Corner Canyon Fan, Unit Train Loadout, Refuse Expansion and Lower Facilities, Lion Deck Portal Access, Lion Deck, Star Point No. 1 and 2 Mine, Main Channel Restoration, and Subsoil Stockpile.

Reclamation concerns within the Star Point No. 1 and 2 Mine area are specifically addressed in Exhibit 241b.

With regards of the Main Channel Restoration Area, coal waste may not be used as backfill within the main channel and/or channel sideslopes without:

- Testing the coal waste for acid forming and toxic characteristics, and
- CPMC must demonstrate that placement will minimize the adverse effects of leachate and surface water runoff on surface and ground water quality and quantity.

Soil Stabilization

The Soil Stabilization section includes discussion concerning ground preparation, soil placement, and soil stabilization methods. However, the discussion does not give consideration to the special treatment for using the Badland-Rubble Complex based soils. These high salt, high clay content soils are highly erosive and difficult to reclaim. Research conducted on Mancoes based soils within the Cottonwood/Wilberg area shows that soil-surface treatments using coal waste were highly effective for reestablishing successful vegetation. It is theorized that the coal-waste treatment resulted in altering the soil chemistry of the Mancoes material by lowering the pH and leaching sodium from the root zone. Additional plots using sandstone cover mixed with coal waste were also equally effective. The latter adds greater longevity by protecting the soil surface from erosion.

Findings:

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

R645-301-746.110 and R645-301-746.120, With regards of the Main Channel Restoration Area, coal waste may not be used as backfill within the main channel and/or channel side slopes without:

- Testing the coal waste for acid forming and toxic characteristics, and

TECHNICAL ANALYSIS

Last revised - September 15, 1997

- CPMC must first demonstrate that placement will minimize the adverse effects of leachate and surface water runoff on surface and ground water quality and quantity.

R645-301-244.200, The Soil Stabilization discussion does not give consideration to the special treatment for reclaiming the Badland-Rubble Complex based soils. The high salt, high clay content Mancoes soils are highly erosive and difficult to reclaim.

PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES

Regulatory Reference: 30 CFR Sec. 817.97; R645-301-333, -301-342, -301-358.

Analysis:

The post mining land use consists of wildlife, grazing, recreation and forestry. The Permittee proposes to meet the wildlife land use by planting species which are known to be of value to wildlife for food and cover. Transplants will be used in the reclamation of several community types which may result in accelerated community establishment. Section 342 of the plan states that enhancement of seed mixtures is found in Section 353.120. Section 353.120 only tries to justify the use of introduced species with references and studies conducted in the 1960's and 1970's. Most agencies which conducted these studies in the early years of revegetation have now committed to the use of native plant species.

Probably the best enhancement for all types of wildlife, not just big game is providing as great as diversity as possible in the reclamation. Diversity in topography, aspect, food, and cover is of great value for habitat development.

Findings:

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

R645-301-342.100, the permit must detail the wildlife enhancement plans for the reclaimed areas.

CONTEMPORANEOUS RECLAMATION

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Regulatory Reference: 30 CFR Sec. 785.18, 817.100; R645-301-352, -301-553, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

THE DIVISION HAS NO DEFINITION OF CONTEMPORANEOUS RECLAMATION AT THIS TIME

The permittee has committed to reclaim the Exploration Road found in Area 11 and the No. 2 Mine found in Area 3 in 1997.

Findings:

No regulatory requirements.

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:

General Requirements

A detailed schedule and time table for the completion of each major step in the revegetation plan could not be found in the permit. This detailed schedule should include at minimum a time line for material procurement, including adequate lead times for growing transplants and collecting seed, expected time to seed, fertilize and mulch if necessary and any follow-up activities.

Seed mixtures have been designed to correspond to the different plant communities found in the areas disturbed. If the areas are drill seeded they will be seeded at a rate of one-half that given in the seed mixture tables. On areas too steep to be drill seeded these sites will be broadcast seeded. Areas to be broadcast seeded will be seeded at the rates given in the specific discussions for each specific area (Section 341.210). Four seed mixtures (Tables 341.210a through 341.210d) will be used for final reclamation seeding these are:

<u>Name of Mixture</u>	<u>Table No.</u>	<u>Areas of Use</u>
Fan Site	341.210a	Corner Canyon Fan Mudwater Canyon Breakout

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Unit Train Loadout	341.210b	Unit train loadout area (saltbush type)
Mountain Grassland and Douglas Fir	341.210c	Star Point No. 1 Mine Area Lion Deck Portal Area
Disturbed Area	341.210d	Refuse Pile, Topsoil Stockpile, Lower Office, Wash Plant, Conveyor, Lion Deck Portal Access Road

These areas are also shown on Maps 341.100a thru 341.100d.

The seed mixtures contain several introduced species. In this area numerous native species are available and are known to support the post mining land uses. The seed mixtures were previously approved by the Division and therefore, the Operator does not wish to change the mixtures. However the Operator should be warned that some of the species in the seed mixture may not be counted toward the success standard unless they meet the requirements of the regulations to be desirable and permanent. Seeding rates are low and the permittee has been advised to increase these rates.

The lower Wattis area has considerable amounts of cheatgrass. Cheatgrass is a very aggressive winter annual which may inhibit revegetation success. Squirreltail has been used successfully in some instances in the Intermountain area to compete with Cheatgrass. Squirreltail has been included in the seed mixture. The permittee should make every effort now to reduce the amounts of weeds within the disturbed area prior to final reclamation. Also the permittee should read the Utah Coal Mining Rules at R645-301-357.320 which will allow limited weed control activities into year two of the bond liability period.

The saltbush community type associated with the Mancos Shale, Badlands, is probably the most difficult community to reclaim. The permittee propose organic soil amendments as treatment for this area. Soil chemistry, crusting and erosiveness all inhibit seed germination. The organic amendments may help reduce the surface crusting for seed germination. PacificCorp at the Des Bee Dove Mine have established several revegetation test plots on flat and sloped areas within the Mancos Shale. Some of the most successful treatments included excelsior blanket topped with a surface treatment of coal waste and sandstone rocks. Soil surface erosion is of the greatest concern to the Division on this soil type for establishing vegetation.

Drill seeding on completely flat surfaces should be successful. The Division's experience with drill seeding is that the furrow openers reduce any surface roughness provided by the scarification or gouging. In fact surface roughness has been shown to greatly enhance the rate of revegetation success and protection from erosion.

Timing

Seeding will occur after September 15, in the fall. Seeding will occur as contemporaneously as practicable with topsoil distribution (Section 354.) Normal seeding for the area is August thru November in the higher areas and October thru December

TECHNICAL ANALYSIS

Last revised - September 15, 1997

in the lower elevation areas. Normally spring seeding is not done in final reclamation due to seed dormancy requirements and sporadic spring moisture.

Mulching and Other Soil Stabilizing Practices

Maps 542.200a through 542.200d, Reclamation Topography, fail to show the disturbed area boundary. Insufficient map detail is provided to ascertain the slope gradients in final reclamation. Generally, any slope at all requires some type of erosion protection. Slopes less than 3:1 may only require deep surface roughening for stabilization until seed has germinated. Slopes greater than 3:1 usually require deep surface roughening and some type of mulch applied and slopes 2:1 and steeper require a high quality erosion control matting. Mancos Shale on any gradient requires erosion protection and soil surface modification for seed germination.

Two tons per acre hay or straw mulch will be incorporated into the soil prior to seeding. Incorporation will likely take place during surface roughening. An additional 1.5 to 2 tons per acre will be spread on the surface after seeding and held in place by crimping or tackifier.

Standards for Success.

Revegetation success determination will be based on the community type reference area, stocking rates, the post mining land use, and other standards as described in R645-301-353 such as a diverse, effective, and permanent. Forest Service requirements for success are required as part of the post mining land use. A diversity standard has not been established for bond release. The Operator should propose a diversity standard based on the reference areas.

Reference areas were originally sampled early in the division program. Reference area sampling and sampling of revegetated areas for success must use current Division standards. The Division requires cover sampling to be based on total cover of 100 percent and to include all tree and shrub canopy cover in that 100 percent. With this sampling areas such as the Douglas Fir will have a much greater cover value than the described 15 percent in Table 321.100d, however the Saltbush Community will likely be unchanged. The permittee may want to reconsider using the Douglas Fir community as a standard since early revegetation (first 10 years) will likely never be similar to a mature Douglas Fir stand.

The revegetation success standard for the Mudwater Canyon Fan Site must be based on a cover standard meeting 90 percent of the undisturbed. The permit states that a cover standard will meet 50 percent of the undisturbed vegetative cover. Whether or not the Operator changes this statement in the permit the requirement remains the same for bond release as required by the regulations.

Revegetated areas will be compared to the reference area of the corresponding vegetation types based on the Maps 341.100a thru 341.100d. The permittee could begin sampling the seeded right of way along the Lion Deck portal access road that will not be redisturbed for Phase III bond release now. The bond release demonstration requires meeting the approved

TECHNICAL ANALYSIS

Last revised - September 15, 1997

success standard the last two years of the responsibility period. The success standard for a road right of way probably would need to meet a vegetative ground cover standard (R645-301-356.240) and the County to accept all liability for the road.

Woody plant density requirements were previously approved at 900 plants per acre on all south and west facing slopes and 2,200 stems per acre on all north and east facing slopes. These are noted on Maps 341.100a through d. A problem with these maps are that they are not based on the final reclamation topography. Areas such as the refuse pile will have additional north and east facing slopes than as shown on the maps.

Section 356.100 of the permit states that considerable areas were disturbed without topsoil salvage between 1917 and 1980. CPMC, as well as the Division, does not expect to have difficulty in meeting the success standards which have been committed to. However, the permit does state that if problems do exist then CPMC will readdress the revegetation success criteria for these previously disturbed areas. The Operator has been asked to designate these areas of previous disturbance in **R645-301-140**.

The permittee has been sampling reference areas to determine range condition (Section 356.100). Usually a request is made to the National Resource Conservation Service (formally SCS) to assess range condition. However, the sampling done by the permittee is acceptable.

One of the requirements for success is that the plant cover will be capable of stabilizing the soil surface from erosion (long term stabilization) and is part of the determination for Phase II bond release. Stabilization usually takes into consideration background level of erosion. However, for Phase II bond release on the refuse pile soil stabilization will be determined successful if no refuse is exposed or can expect to be exposed. Reference area vegetation cover in the sagebrush community was 34 percent and slopes were generally flat. The refuse pile will be contoured to approximately 3:1 slopes. With this type of slope and vegetative ground cover of 34 percent long term stabilization by vegetation alone may occur, if grazing use of the area is properly managed.

The permit states (Section 341.220) that managed grazing will be used as the primary means to supplement transplanted and seeded shrub densities. This is not an approved husbandry practice. Utah's husbandry rules (R645-301-357.300) do allow for limited reseeding, transplanting, and irrigation of shrubs if approved in the permit.

Table 356.100a, Revegetation Monitoring Schedule, describes anticipated monitoring of interim and final reclamation. The table may need to be revised to allow for sampling during the periods specifically mentioned in R645-301-357.300. The schedule may also be revised to reflect the sampling for Phase II bond release. Phase II bond release (vegetation establishment) at other mines in the area have been successful four years initial seeding. All dates of quantitative sampling of the temporary or interim vegetation shown in the table is not a requirement of the Division but may be useful in determining revegetation techniques and stabilization.

Findings:

TECHNICAL ANALYSIS

Last revised - September 15, 1997

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

R645-301-341.100, a detailed schedule and timetable for the completion of each major step in the revegetation plan must be included in the permit.

R645-301-353.110, a vegetation success diversity standard for the reclaimed area must be proposed. The standard should be based on undisturbed lands in the area.

R645-301-355, the permittee must provide maps of the post disturbance topography which will allow sufficient information and detail to review mulching and other soil stabilizing practices proposed for reclamation.

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:

Table 542.100a (page 500-73) is a reclamation timetable and also gives a brief description of all reclamation activities.

This site was disturbed prior to SMCRA and there are, therefore, no reliable predisturbance maps. Nevertheless, the site will be restored to its approximate original contour, as can be best determined, as shown in plan view on Maps 542.200a through 542.200c and in cross section on Maps 542.200d1 through 542.200f.

Fairly large portions of several pre-SMCRA highwalls and cut slopes will be retained following final reclamation, as will some very small portions of post-SMCRA highwalls. The locations and extent of these slopes are shown in plan view on Maps 542.200a through 542.200c. Their final configurations are shown by cross section on Maps 542.200d1 through 542.200f. All of these highwall and cutslope remnants are associated with the cut of the main access road, Carbon County Road 290, which will be retained as a permanent feature following final reclamation. Their retention is made necessary by the fact that, because of the space taken by the retained road, there is not enough room to backfill them completely without creating fills so steep that they would be unstable.

Findings:

The plan fulfills the requirements of this section.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

BACKFILLING AND GRADING

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

Analysis:

The backfilling and grading plan is found on pages 500-83 through 500-86 of the plan and is shown graphically on Maps 542.200a through 542.200f.

Table 542.100a (page 500-73) is a reclamation timetable and contains backfilling and grading information as well. Table 542.100a divides reclamation area into 5 geographically- determined phases and tells what reclamation activities will be carried out in each of them. The 5 phases are:

Phase 1-No. 1 and No. 2 Mines and Access Road	
Phase 2-Mudwater Canyon Fan, Corner Canyon Fan, and Little Park Canyon (if constructed)	Breakout
Phase 3-Gentry Mountain Air Shaft	
Phase 4-Lion Deck	
Phase 5-Lower Operations (Coal Preparation Plant, Refuse Disposal Area, and Train Loadout)	Unit

Phase 1, the No. 1 and No. 2 Mines and Access Road, will be accomplished in months 1 through 5 of the reclamation period. Phase 2, Mudwater Canyon Fan, Corner Canyon Fan, and Little Park Canyon Breakout, will be accomplished in months 3 through 5. Phase 3, the Gentry Mountain Air Shaft, will be accomplished in months 5 and 6. Phase 4, the Lion Deck, will be accomplished in months 10 through 18. Phase 5, the Lower Operations, will be accomplished in 3 subphases: the first in months 4 through 7, the second in months 11 through 18, and the third in months 22 through 24.

Sidehill cuts will be reduced by dragging fill material from the outslope of the operations benches and placing it at the toe of the cuts. Road surfacing material will be broken up and buried at the toe of the cut under at least two feet of material. Entrances to reclaimed roads will be blocked to vehicle access by native rock barriers or earthen berms.

Roads will be reclaimed by pulling material back from the outslope and placing it in the cuts. The replaced fill material will be shaped to conform to the adjacent topography and replace the natural drainage patterns. Natural drainage will be reestablished and erosion protection provided. Culverts will be removed and water bars and cross drains will be constructed where necessary to minimize erosion.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

The refuse pile will be configured for the duration of the operation period as described under **SPOIL AND WASTE MATERIALS** and as shown on Map 542.200c. Following the completion of mining and the sampling program described on pages 500-54 to 500-55, the pile will be graded and then ripped and scarified to insure good contact between the refuse and the cover material. After placement of the cover material, the surface will be gouged to produce a rough surface which will minimize runoff and enhance plant growth.

The results of a volume analysis are shown in Table 542.200a, page 500-76. They show an overall cut availability of 1,127,592 cubic yards and a fill requirement of 993,859 cubic yards. The excess of 133,733 cubic yards, which is a little less than 12% of the total available cut, is expected to be taken up with compaction.

A stability analysis of the reclaimed slopes was done by the consulting firm of Rollins, Brown and Gunnell, Inc. Of Provo, Utah. The results of this analysis are found in Exhibit 553.130a. The analysis was based on fill material characteristics determined from five samples and used a computer model based on the Modified Bishop's Method. It showed that, for an ultimate slope of 1.5h:1v, the backfill material has a minimum static stability safety factor of approximately 1.4.

Findings:

The plan fulfills the requirements of this section.

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 plan for the reclamation of mine openings is found on pages 500-81 to 500-82 and in Figure 551a of the plan.

All drill holes are to be partially filled with a slurry, the consistency of which is approximately 5.5 gallons of water to 1 bag of cement. The bottom 200 feet of each hole is to be filled first and the rest of the hole is then to be filled in

TECHNICAL ANALYSIS

Last revised - September 15, 1997

200-foot increments until the hole is filled to the collar. This is in accordance with the USGS guidelines, which the Division accepts, which require that drill holes be filled with concrete slurry or some other suitable material from bottom to collar in order to prevent the migration of water between strata within the hole.

The Gentry Mountain air shaft will be reclaimed following the cessation of underground mining operations. The shaft casing will be cut off four feet below the surface of the ground. The shaft will be completely filled with either concrete or else a bentonite mixture specifically designed for well plugging. The barbed wire fence will then be removed and the area will be graded and revegetated.

The stope hole on the Lion Deck, through which coal passes vertically from the mine conveyor to the main conveyor, will be completely filled from bottom to collar with earthen material. The top 10 feet will be filled with a substitute topsoil material.

Portals will be sealed and backfilled. Seals will consist of double rows of solid concrete block set on a concrete footing. The footing will be keyed into the floor at least 12 inches. The block seal will be keyed into the ribs at least 16 inches. The backfill will extend at least 25 feet from the seal to the surface and will be graded to conform to the postmining contour. A typical portal seal is shown in Figure 551a of the plan.

Findings:

The plan fulfills the requirements of this section.

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:

Information regarding the reclamation of roads is found on pages 500-73 through 500-75 of the plan and shown on Maps 542.200a through 542.200i.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Roads will be reclaimed as discussed under **BACKFILLING AND GRADING** above. Material will be pulled back from the outslope and placed in the cuts. The replaced fill material will be shaped to conform to the adjacent topography and replace the natural drainage patterns. Natural drainage will be reestablished and erosion protection provided. Culverts will be removed and water bars and cross drains will be constructed where necessary to minimize erosion.

County Road No. 290, which is the main portal access road that crosses the Lion Deck area, is owned by Carbon County. This road will remain as a permanent feature as part of the postmining land use. The short access road between County Road No. 290 and Treatment Facility No. 1 is within the right-of-way corridor of County Road No. 290. It will also remain, as part of the postmining land use, for powerline access.

Findings:

The plan fulfills the requirements of this section.

RECLAMATIONAL HYDROLOGY

Groundwater Monitoring

Analysis:

Groundwater monitoring is the same during mining and after. This information is addressed in the operational section of this TA.

Findings:

The groundwater monitoring plan is complete and accurate.

Surface-water Monitoring

Analysis:

Surface-water monitoring is the same during mining and after. This information is addressed in the operational section of this TA.

Findings:

The surface-water monitoring plan is complete and accurate.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Acid- and Toxic-forming Materials

Analysis:

Page 700-118 says that acid- and toxic-forming material are discussed in Sections 200 and 300 of the MRP. This section further states that acid- and toxic-forming materials are not believed to be a problem.

Findings:

The hydrology discussion on acid- and toxic-forming materials is adequate and does not require any further information. However, further findings found under the Soil Resource section of this TA may require addition information regarding cover needs.

Transfer of Wells

Analysis:

On page 700-118 the CPMC states that transfers of wells will all be approved by the Division.

Findings:

The plan for transferring of wells is complete. CPMC will not transfer any well without prior approval by the Division.

Discharges Into an Underground Mine

Analysis:

CPMC states on page 700-118 that they do not plan to discharge water into the mine but if a need were to arise the Division would be notified. All in-mine diversions are addressed in Sections 731.100, 731.522 and 731.800.

Findings:

The information on discharging into the mines is complete and accurate.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Gravity Discharges

Analysis:

Gravity discharges are located on page 700-118. Section 731.520 and 731.522 say that gravitational discharges from the mine are not likely possible from the mine because of the gradient of the geology.

Findings:

The information on gravitational discharges from the mines is complete and accurate.

Water-Quality Standards and Effluent Limitations

Analysis:

Water quality standards and effluent limitations are addressed on page 700-185. Briefly CPMC says that they will meet all limits.

Findings:

Water-quality standards and effluent limitation are adequately addressed.

Diversions

Analysis:

The reclamation diversion plans are located beginning on page 700-187. Maps 761a through 761g show the reclamation drainage and designs for the mine. Page 700-188 says that reclaimed channel designs are in Exhibit 761a.

Findings:

The reclamation diversion plans are complete and accurate.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Stream Buffer Zones

Analysis:

Stream buffer zone information is provided on page 700-116. The Corner Canyon Fan Breakout is the only facility considered to be in a stream buffer zone according to the MRP. This area is not near any "aquatic resource" but CPMC has marked the buffer zone anyway.

Findings:

Stream buffer zone information is complete and accurate.

Sediment Control Measures

Analysis:

CPMC has requested some reclamation design changes for the refuse pile, and road cuts and pad out slopes in this package. These changes are in Chapter 5, Exhibit 528.322d. Two maps from this exhibit have been included at the end of the Engineering small scale map volumes.

Page 11 of this report lists five items that will be used for sediment control in reclamation of the refuse pile. They are listed below:

- Existing sedimentation structures;
- 3 to 1, terraced side slopes;
- Hay mulch;
- Extremely roughened (pocked) slopes; and
- Revegetation.

This five-step method of sediment is best technology currently available for preventing additional contributions of sediment to streamflow or to runoff outside the permit area during reclamation.

Page 11 and 12 of the report in Appendix 522.322d discuss five measures to be used on road cuts and out slope pads. They are listed below:

- Shaping, ripping and scarifying of the out slopes;
- Placement of suitable cover material;
- Addition of soil amendments;

TECHNICAL ANALYSIS

Last revised - September 15, 1997

- Application of mulch at a rate of 1 ton/acre; and
- Revegetation.

Reclamation of this area will not include the extreme surface roughing that is included in the refuse pile reclamation. These outslopes are extremely steep in places and will be highly erodible. Mulch alone will not be sufficient to control sediment until vegetation is satisfactorily reestablished. Additional sediment control measures must be designed for these areas.

Findings:

The reclamation plan for the refuse pile and road outslope is not complete. CPMC has not adequately designed for sediment control on the road outslopes. The following deficiency is maintained.

R645-301-742.110, CPMC must design using the best technology currently available a sediment control measure for the road outslope and all other reclamation areas that prevents to the extent possible additional contributions of sediment to stream flow or to runoff outside the permit area.

R645-301-764, CPMC must show the timetable for removal of sediment control structures that treat the refuse pile, road cuts, pad outslopes, and all other reclamation areas. This timetable must be specific to each structure.

Siltation Structures and Sedimentation Ponds

Analysis:

The reclamation plan for the Star Point mine does not include designs for siltation structures and sediment ponds. The current maps do not clearly show which, if any, sediment ponds will be retained through the reclamation and there is no timetable for removing any of the sediment ponds.

Findings:

Siltation structures and sediment pond designs and timetables are missing and incomplete. Deficiencies on these items are listed under the reclamation sediment control section of this TA.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Exemptions for Siltation Structures

Analysis:

The MRP does not clearly state if there are any planned exemptions for reclamation of the mine site. Presumably, all areas will be treated by either sediment ponds or alternate sediment control measures. Clarifying the reclamation timetable and sediment control treatments use as requested under the reclamation sediment control section of this TA will benefit the MRP in showing areas planned for exemption.

Findings:

Deficiencies for this section are listed under the reclamation sediment control section of this TA.

Discharge Structures

Analysis:

There is no information on discharge structures that is specific to reclamation.

Findings:

Deficiencies for this section are listed under the reclamation sediment control section of this TA.

BONDING AND INSURANCE REQUIREMENTS

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

Analysis:

Form of bond. (Reclamation Agreement)

A copy of the bonding form is found in Exhibit 820.100a.

At present (January, 1997) the permittee holds a surety bond with Aetna Casualty and Surety Company. The bond is for the amount of \$5.18 million and covers 173 acres of disturbed land.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

Determination of bond amount.

In 1997, the reclamation plan was revised significantly, particularly the earthwork. This, of course, required a thorough recalculation of the reclamation cost estimate. Details of the revised reclamation cost estimate are found in Appendix 542.800a. Unit costs for site demolition, drainage control, surveying and most revegetation were taken from the 1997 edition of Means© *Heavy Construction Cost Data*. Unit costs for excavation, backfilling, surface preparation and topsoil distribution were taken from the *Caterpillar© Performance Handbook*, Edition 27 (1997), and the 1997 *Rental Rate Blue Book for Construction Equipment*. Equipment operator costs were also taken from the 1997 edition of Means© *Heavy Construction Cost Data*. Indirect costs were calculated using the methods set forth in the 1987 edition of the Office of Surface Mining Reclamation and Enforcement's *Handbook for Calculation of Reclamation Bond Amounts*.

The revised reclamation cost estimates are summarized on the second page of Appendix 542.800a. The total of the direct costs is \$6,232,556. The indirect costs, including mobilization, engineering redesign, management and contractor overhead and profit, come to a total of \$1,190,418. The total of direct costs and indirect costs, \$7,422,974, is escalated over 5 years at an annual rate of 2.5% to obtain a total reclamation cost estimate of \$8,395,384 (2002 dollars).

The Division calculated the bond amount to be \$11,686,000. The Division's calculation should be considered draft since the reclamation plan has not been approved.

The reclamation cost estimate is divided into 4 parts, demolition, earthwork, revegetation and indirect costs. The major area of disagreement between the two estimates involves the earthwork costs. The Division calculated the earthwork to cost \$5,357,683 while the Permittee estimated the earthwork to cost \$3,676,223.

Findings:

No findings have been made at this time. The reclamation plan has not been approved. Therefore, the bond amount cannot be determined.

Terms and conditions for liability insurance.

A copy of the certificate of liability insurance is found in Exhibit 117.100a.

The permittee holds general liability insurance with National Union Fire Insurance Company. The policy number is RMGL1437605. The policy was originally issued July 1, 1991, but its current effective period is from June 1, 1996 to June 1, 1997.

TECHNICAL ANALYSIS

Last revised - September 15, 1997

The policy specifically includes explosives, as required by R645-301-890.100. It has a general aggregate liability limit of \$6,000,000 and a limit of \$1,000,000 for each occurrence, which exceed the respective minimums of \$500,000 and \$300,000 required by R645-301-890.100. As required by R645-301-890.300, the policy includes a rider, dated July 3, 1991, which states that National Union Fire Insurance Company will notify the Division, by certified mail, of any change or cancellation of the policy, within 45 days of the change or cancellation.

Findings:

The plan fulfills the requirements of this section.