



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

Michael O. Leavitt
 Governor
 Ted Stewart
 Executive Director
 Lowell P. Braxton
 Division Director

1594 West North Temple, Suite 1210
 PO Box 145801
 Salt Lake City, Utah 84114-5801
 801-538-5340
 801-359-3940 (Fax)
 801-538-7223 (TDD)

May 15, 1998

TO: File

THRU: Daron Haddock, Permit Supervisor

DARH

FROM: David Darby, Senior Reclamation Hydrologist

DD

RE: Hydrologic Technical Analysis, Cyprus Plateau Mining Corporation, Star Point Mine, ACT/007/006-96C, Folder #2, Carbon County, Utah

RECLAMATION HYDROLOGY

SUMMARY

Cyprus Plateau Mining Corporation (CPMC) submitted a new permit for the Star Point Mine in September 1996. A Draft Technical Analysis was developed by the Division and sent to the Operator. The Operator responded June 1997 and the Division responded to that revision September 1997. Round III was submitted in November 1997 and February 1998. The following technical analysis is a review of the September 1996, November 1997 and February 1998 revisions.

CPMC is proposing to cease coal mining operations at the Star Point #2 Mine during 1998. Mining took place in the vicinity of the Star Point operations prior to the passage of SMCRA. There was substantial disturbance to the surface from those operations which CPMC will reclaim. CPMC has submitted hydrologic information to describe baseline conditions that existed before mining operations and operational data to help identify changes while mining. CPMC will continue monitoring to identify any impacts after mining operations cease.

An analysis was conducted on the reclamation hydrology sections of the Starpoint Mine's Mining and Reclamation Plan as part of the five-year renewal.

TECHNICAL ANALYSIS

Groundwater Information

Analysis:

CPMC described groundwater rights and presented a list identifying ownership and purpose of use in Table 724-100a. CPMC identifies 88 groundwater rights (Map 731.800a) on and adjacent to the mining operations. Eight of the water rights are classified a "domestic" or

“other”, the other eighty springs are classified as “stock watering”.

The location of seeps and springs which have been identified throughout surface investigation are shown on Map 728a. The operator has drilled several wells within the permit area which are used for water level or quality monitoring . There are three east of the Bear Canyon Graben, one south of Gentry Ridge and one located in Little Park Canyon near Castle Valley Ridge. These wells are shown on Maps 728a and 728b.

Springs, wells and in-mine sites were monitored to garner information on quality, flow and levels. The information is summarized in tables and graphs in the MRP and discussed under each section.

Operational monitoring of the groundwater systems include the collection of quarterly ground water samples since 1980. Additional springs were added to the monitoring plan in 1985 representative of Gentry Ridge. Expansion of the permit area into Castle Valley Ridge necessitated the addition of seven ground and three surface water monitoring sites. CPMC developed a data base program for all water quality data collected to date. Data and statistical summaries are presented in text and exhibits. The applicant has provided extensive summaries and comparisons between constituents, sites and geologic units on pages 700-35 through 700-41.

Groundwater flow is identified on Page 700-65. Available data was used by the applicant to establish the general direction and flow patterns of groundwater through formations and units. Geologic structure within the permit area strongly influence the flow patterns. Stratigraphy, faulting, fracturing, sand channel and attitude of the strata all influence the pattern of groundwater flow. Monitoring has provided the tools to identify the transmissivities of some units and the vertical and horizontal flow patterns.

Groundwater monitoring will be conducted with the same frequency during reclamation as it currently is during the operational phase. Monitoring will continue until sufficient information is collected to determine if impacts have occurred. This information is addressed in the operational section of this TA.

Findings:

The groundwater information is complete.

Groundwater Monitoring

Analysis:

CPMC presents a hydrologic plan in Section 700 of the MRP. The applicant has assembled historic and operational information to summarize the surface and groundwater hydrology of the mine plan area. The applicant begins describing sampling and analysis

information on 700-34. Water monitoring stations are displayed on Map 222.200a of the MRP.

The MRP presents the location of all water bodies in Table 722.100a. It also identifies the spring sites inventoried during the 1986 and 1991 field inventory. The in-mine water monitoring sampling locations are outlined in Table 722.100b. Additional water well data is identified in Table 722.400a.

CPMC has collected baseline and operational data for surface and groundwater quality and quantity for the past 20 years, since the passage of the Surface Mining Control and Reclamation Act. The information is presented in Exhibits 722.100a through 724.100a. The sampling and analysis procedures are adequate to meet the requirements of the regulations.

Findings:

CPMC has provided complete information for this section.

Surface-water Information

Analysis

CPMC submitted plans to protect the quality and quantity of surface water within the MRP. The data collected during baseline and operational phases provided a basis to assess mining activity trends and project possible reclamation situations..

CPMC describes surface water conditions in Section 700 and surface water rights as seen in Map 731.800b. Surface water quality and quantity issues are presented to identify potential impacts to water rights and water uses. The applicant describes and discusses surface water recharge sources, seasonal variations, water quality influences and potential impacts. The applicant discusses the potential of interbasin transfers of water, impacts to culinary water supplies and mitigation prospects.

CPMC proposes methods for surface water protection by establishing hydrologic structures sized to control the flows and energy coming from disturbed areas. Calculations were submitted to established the expected flows and sediment load to be handled by diversion and treatment structures. Runoff volumes were calculated using the USDA Soil Conservation Service (curve number method) for estimating runoff volumes from unmeasured areas.

CPMC reported streamflow data collected from a variety sampled sources. Peak flows and flood recurrence intervals were calculated to estimate the potential of flood frequencies.

Peak flows were calculated develop design standards for channels, sedimentation

pond containment and treatment volumes.

Surface water monitoring will be conducted with the same frequency during reclamation as it currently is during the operational phase. Monitoring will continue until sufficient information is collected determine if impacts have occurred. This information is addressed in the operational section of this TA.

Findings:

The surface water information is complete.

Surface Water Monitoring

Surface-water monitoring information is found in Section 724.200 beginning on page 700-42. Surface-water quality information begins on page 700-47 and quantity information is found on pages 700-42 through 700-47. CPMC submitted maps (Map 722.200 a) and information identifying all water bodies on the permit area. The permit and adjacent areas exhibit a rugged topography varying between 7,000 to 10,120 feet in elevation. Ephemeral drainages are common to the Wasatch Plateau area. These stream types are shown to exist on the permit area, perennial stream exist where at higher elevations or where springflow coalesces and causes flow at lower elevations. Most smaller channels are ephemeral in and transmit flows in response to rainfall. Ephemeral streams are harder to monitor and usually produce large volumes of sediment. and perennial streams.

Findings:

CPMC reported streamflow data collected from a variety sampled sources. Peak flows and flood recurrence intervals were calculated to estimate the potential of flood frequencies. Surface water rights in and adjacent to the mine plan property were researched and listed in Table 724.200b. The list identifies the owner and purpose of use for the water right.

Surface-water monitoring plans for reclamation are the same as the plans for operational. This information is addressed in the operational section of this TA.

Water quality assessments were conducted to identify the quality and characteristics of water sources.

Findings:

Surface water monitoring information is complete.

Runoff Control

All temporary structures used during the operation phase and those used during the first and second part of the reclamation phase are designed to control the 10 yr-6 hr precipitation storm and will be removed on final reclamation. Permanent structures are designed to control the 100 yr-6 hr precipitation event. Permanent structures consist of permanent channels and culverts constructed to transmit flows under the retained county road.

CPMC provided sizing calculations for culverts and channels that control runoff flows during reclamation. Sizing calculations are presented in Exhibit 761a for 20 watersheds. A major concern in reclaiming the site is designing reclamation channels suitable for the steep terrain.

Surface water flow volumes were determined by direct measurements or by using the curve number technique based on the triangular unit hydrograph approach of the U.S. Soil Conservation Service and a design precipitation event determined from the NOAA Atlas 2, Volume VI-Utah.

The applicant states that reclaimed channels will be constructed to conform as closely as possible to pre-mining conditions. All channels to be reclaimed will be surveyed at least 60 days prior to construction to evaluate slope stability. Many of the disturbed slopes are very steep. The use of riprap for slope protection becomes taxed to the point that of design cannot be accurately determined. The main access roadway, designated County Highway 290, will be left as a travel route.

All siltation structures will be maintained and systematically removed during reclamation according to the reclamation plan in Section 500. Post mining reclamation contours are identified on Maps 542a through 542c..

Findings:

The surface-water runoff control plan is complete and accurate.

Acid- and Toxic-forming Materials

Analysis:

CPMC submitted soil studies in Section 200 to help identify potential acid- and toxic-forming material which may be encountered during reclamation. CPMC presents a study prepared by Kent A Crofts in Exhibit 231.200a which discusses and identifies samples taken to evaluate toxic and acid forming materials. The study presents an analysis of toxic and hazardous constituents concludes that acid- and toxic-forming materials are not believed to be a problem.

Findings:

The applicant plans to cover coal refuse and toxic materials with at least 4 feet of soil. 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:

CPMC discusses the reclamation of all shafts and wells in Section 500. Prior to abandonment CPMC would contact the Division and seal all wells according to federal and state requirements. All wells will be filled with a non-porous material, sealed and capped to prevent exchanges of fluids between strata.

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.

Gravity Discharges

Analysis:

Gravity discharges are located on page 700-118. Section 731.520 and 731.522 say that gravity discharges from the mine are not likely, 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. Map 742a identifies the proposed 54" half round CMP for Ditch No. 14. Page 700-188 says that reclaimed channel designs are in Exhibit 761a. Natural drainage patterns will be restored during reclamation. CPMC identifies the type of channel will be constructed in Table 761a, broad swale or riprap design. Table 761b identifies the particular channel dimensions, slope, depth and volume. Table 761c summarizes culvert design (diameter, peak flow and outlet velocity).

Findings:

The proposal for reclamation diversion plans are complete, however the proposed half round CMP proposal for permanent reclamation does not appear feasible without a maintenance overseer. This proposal should not be approved.

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.

Sediment Control Measures

Analysis:

CPMC proposes to control sediment from the reclaimed areas using existing sedimentation control structures, constructing 3:1 terraced side slopes, using mulch to help hold soils, roughen slopes by pocking and revegetating slopes. CPMC intends to use sedimentation ponds and ASCA's, until they are removed when regrading reaches the pond site. The company has provided a time table for removing sediment control structures during reclamation.

The reclamation plan calls for the removal of Ponds 5, 6, 7 and 9 from Area 1, Pond 3 from Area 2 and Pond 4 during reclamation of Areas 1 and 9. Sedimentation locations and designs were submitted under the Map Section in Section 700 of the MRP. The plans show pond configurations, sizes and associated outflow controls.

Findings:

The reclamation plan for sedimentation the refuse pile and road outslope is not complete. CPMC has submitted plans to remove sedimentation ponds, however an analysis of the timing of pond removal and containment volumes could exceed safe levels sediment contribution standards. It appears that some of the sediment ponds mentioned above, other than Pond 5 (Map 731.720b) could be left intact until reclaimed slopes are shown to be stable.

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.

Exemptions for Siltation Structures

Analysis:

There are no exemptions of siltation structures. During operations the mine operated several alternate sediment control areas (ASCA's) which will be removed and incorporated in to the reclamation process that drain to the a sedimentation pond.

Findings:

This section is complete.

Discharge Structures

Analysis:

Discharge structures are identified in the sediment pond maps 733.120a through 733.120 j. All spillway and outflow control dimensions accompany the maps.

Findings:

This section is complete

Impoundments

See Sediment Control Measures.

Casing and Sealing of Wells

CPMC describes the permanent sealing and casing of wells on page 700-191 of the revised submittal (11/13/97). Monitoring wells will be surveyed until no longer required. All sealing of wells will be conducted according to the methods outlined in Section 551 and at the discretion of the Division. Each well will be backfilled, sealed and capped to prevent contact with the coal seams and to prevent interchange of fluids between formations.

Findings

The information provided by CPMC for casing and sealing monitoring wells is sufficient.

MAPS, PLANS AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Affected area boundary maps

Analysis

The Division received three updated reclamation topographic maps (Map 542.200a-542.200c) on April 28, 1998. The maps identify the final configuration of slopes on disturbed areas. The legend identifies areas described as retained cutslopes and highwalls. The cross-sections which accompany the maps show that the highwalls and cutslopes are partially backfilled at the base of the cut to give a sloping effect to the excavated wall. The legend indicates that the highwalls and cutslopes will be retained, the legend should be modified to state that partial backfilling will take place. The contours for backfilled areas appear to represent a gradation to approximate original contour (AOC).

Findings

The information provided by CPMC for boundary maps is sufficient.

Reclamation surface and subsurface manmade features map

Analysis

The Division received three maps identifying watersheds and diversions. Maps 761a and 761c were updated and submitted on November 14, 1997 and Map 761b was updated and submitted on June 24, 1997. All maps identify the watershed boundaries and culverts that will be retained for reclamation.

Findings

The information provided by CPMC for structures and features boundary maps is sufficient.

Control facilities maps

Analysis

The Division received several maps (Maps 731.720a-731.720e) with the September 27, 1996 submittal identifying the locations of surface water and sediment control facilities. The maps identify diversions, bridges, streams, channels, ponds, ditches and alternate sediment control areas that is planned for reclamation.

Findings

The information provided by CPMC for treatment maps is sufficient.