



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

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June 28, 1999

TO: File

THRU: Daron Haddock, Permit Supervisor *DRH*

FROM: Sharon Falvey, Reclamation Specialist *SF*

RE: Deer Creek Reclamation Plan, PacifiCorp, Deer Creek Mine, ACT/015/018-AM99C #1, Folder #2, Emery County, Utah

SUMMARY

The applicant provided an amendment to the Deer Creek Reclamation Plan, received by the Division on June 7, 1999. The applicant has reconfigured the drainage and site configuration. The submitted plan requires additional site specific information that will clarify how regulatory requirements are being met. Additional comments and suggestions are provided to assist the applicant in obtaining a plan that will maximize reclamation success.

RECLAMATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14

Analysis:

Ground-water monitoring plan.

According to table 3-2, section 340 the applicant proposes to monitor the flow from the mine portal quarterly for the first two years and annually thereafter. This will not be adequate for bond release purposes for the following reasons.

1. The recharge process is slow: it may be several years before all mine voids are recharged to capacity.
2. Water quality equilibrium may not be reached until the mine workings are flooded to their full extent. Oxidation and other chemical and physical processes may not be complete or representative during the first two years

following reclamation.

3. The minewater quality seasonal variation and climatic variation may not be realized within the first two years following reclamation. Biannual monitoring may not be adequate to show the variation that might exist in minewater discharged over the reclamation period.

The applicant needs to provide quarterly monitoring for the minewater discharge through bond release. Any additional requirements from the Department of Health UPDES permit must also be reported.

The void created by mine workings may redirect water and result in new discharge locations within or below the mined seam at low points and outcrop locations. The plan should provide for a survey for springs that may issue from these areas along and below the mined seam. The survey should be conducted during the 5th and 9th years following mine reclamation and should include baseline water quality and quantity monitoring where flows accumulate in a measurable stream.

Volume 9 of the MRP describes the groundwater gradient as conforming to the Straight Canyon Syncline, and groundwater will flow in the direction of Cottonwood Canyon Creek. This amendment also suggests water will be discharged through the Deer Creek Portal. Some reference points provided in Table 5-2 identify points that direct, or act as a barrier to in-mine flows. Because numerous locations were identified to have a potential to receive minewater discharge, the Division requests the applicant submit a map showing the flow directions and groundwater divides/watersheds for each mined seam. The Division recognizes that flow direction may change with changes in water surface elevation and these elevations should also be identified. The existing map CE-10478-EM does not differentiate between aquifers and the changes in flow that is predicted to occur due to mining. Although some pertinent information is contained in the existing plan it is scattered and does not provide a clear picture the potential ground water recharge and discharge zones. Where boundary faults were crossed by mining a pre-existing hydrologic barrier may now transmit water. The information to be identified on the maps should include existing mine floor elevations, in mine discharge locations, pertinent geologic controls, mine controls such as sealed mine sections and changes to previously existing hydrologic barriers.

Volume 9, pg 17, states that a series of wells in the Deer Creek and Cottonwood/Wilberg Mine (HM-2 and HM-3) will continue and be utilized to document potential impacts related to dewatering and recovery from mining. Although the water monitoring parameter list provided in Volume 9 includes post-mining reclamation monitoring. Specific water monitoring points were stated to be locations to be monitored above and below the last sediment pond following reclamation backfilling. The plan needs to be specific to reclamation monitoring for surface water and ground water.

In Volume 9, Appendix C the permittee conducted a study after dewatering the Roans Canyon Fault. The Fault might have previously recharged the alluvium. During the monitoring period the confined groundwater in the Star Point Aquifer increased. This increase in the Star Point Aquifer could result from increased recharged from water intercepted during mining which then recharged the Star Point and traveled along the Straight Canyon Syncline. It was also stated that this water is discharging from the floor in the mine. The applicant needs to provide a water monitoring plan that: 1) determines whether changes in flow will occur along the Straight Canyon Syncline during the time mining has idled, and 2) determines whether baseflows to the Cottonwood Canyon Stream increase. In order to confirm conclusions made in their study and to identify the difference between changes due to climate, or from ground water discharge, the following age dating should be conducted in the Cottonwood Canyon wells every 2nd year during the low flow period; radio carbon dating, tritium dating, and stable hydrogen and oxygen isotopes (for meteoric waterline determinations). This should be completed in conjunction with streamflow monitoring.

Surface-water monitoring plan.

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

The macro invertebrate study conducted in 1991 and in 1994 should be repeated in Deer Creek and Huntington Creek in the spring and fall, the year before reclamation, and in the 5th and final year prior to bond release. This monitoring will allow assessment as to whether impacts to fisheries occurs, improves, or remains insignificant over the reclamation period.

Acid and toxic-forming materials.

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

Transfer of wells.

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

Discharges into an underground mine.

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

Gravity Discharges.

Water will be gravity discharged out of the Deer Creek Portal. The applicant designed this discharge with an 8 foot height of gravel and sand to filter solids, prior to discharge. A concern with the proposed method is raised when reading the Macro Invertebrate Study. This study indicated calcium carbonate precipitation is widespread in Deer Creek therefore, the potential for the proposed backfill to plug with precipitate is high. The applicant needs to demonstrate that the proposed method will not plug from precipitate. It is recommended at a minimum a second pipe be used to dewater behind the bulkhead.

Water quality standards and effluent limitations.

The applicant has not described how the State Water Quality Standards for Deer Creek and Huntington Creek will be shown to meet water quality criteria. The applicant needs to provide a water monitoring plan that demonstrates that the water quality criteria for surface streams are met so the Division can make a finding for Bond release. The Division recommends a minimum high and low flow season monitoring for these parameters over the full period of reclamation.

Diversions.

The ephemeral draws adjacent to Elk Canyon drainage should be considered in the grading plan and channel design. At a minimum, grading should be completed to allow water to be conveyed to the Elk Canyon channel. The ephemeral draw above the storage dock should be considered in the site design. These areas tend to collect water and cause gully formation when grading does not consider ephemeral flows from these locations.

The design capacity for perennial and intermittent streams need to be demonstrated to be at least equal to the unmodified channel upstream and downstream from the diversion. This requirement can be met through providing channel cross sections upstream and downstream from the site and estimated channel forming flows. Designs for channel transitions between the upstream and downstream natural channel to the reclamation channels also needs to be provided.

The channel abuts the cut slope across the Mine Office and Bath House. This area was predisposed to failure in 1992 when a tension crack was developed due to ponding water in the diversion ditch. The applicant needs to address stability of this slope and the relation to the proposed drainage. The destabilization or rock fall from this cut slope could cause channel failure.

The item number two on the Final Reclamation Hydrology Map DS1780D is not an acceptable reclamation practice. In the State of Utah the practice of using geotextile filter fabric substituted for granular filter material has not resulted in successful channel stability. The Division will not accept this practice except under specific conditions in pre-approved site specific areas.

Recommended Design Considerations:

- The proposed pool location associated with the converging Deer Creek and Deer Drainage is not located within an area that creates a deposition pool allowing increased vegetative habitat conditions. Because the proposed location is in an area that increases in gradient the result is more like a drop pool structure which provides energy dissipation rather than broad increased vegetative habitat. It is recommended that vegetative habitat be created in areas where the gradient flattens, such as in the Deer Drainage. Channel meanders and "Soft" bio-engineering practices could be used in this area.
- The angle produced at the Deer Drainage and Deer Creek Drainage confluence could promote downstream cutting against the north bank possibly starting somewhere between sections 15+00 and 16+00. It might be a good idea to change the angle so the converging Deer Drainage is not direct water toward the cut slope.
- Drop Pools and grade control drops in areas where the slope is greater than 20% would dissipate energy and increase channel stabilization if designed and implemented properly.
- The use of riprap where the channel abuts bedrock should be carefully reviewed. Riprap is easily lifted and transported if there is not an adequate depth of fill over a bedrock channel. It is preferred that no riprap be used in cases where competent bedrock is present in the channel bed.

Stream buffer zones.

Sediment Control Measures

The applicant proposes to begin reclamation at the upstream end of the site working downstream. In Deer Creek the culverts will be removed and water will be diverted around the construction area to the downstream location. The upstream channel will be completed, and the water will be returned to the completed channel section. This activity will then be repeated in the next section. In ephemeral sections the applicant proposes to remove the culvert without drainage routing.

The applicant has presented the general construction sequence. However, the following questions need to be answered and additional information requested below needs to be provided:

1. What method will be used to minimize sedimentation during re-routing the Deer Creek drainage? Will a half round culvert, flexible culvert, sediment trap with silt fence, routing drainage to the disturbed area pond or other method be provided to treat\convey the water diverted around the construction area?
2. Assuming the mine portal is completed and will drain to the Deer Drainage prior to regrading, how will the water be handled during the construction period to minimize sediment contributions?
3. The applicant did not describe how sediment transport from the up-gradient slope to the completed channel will be minimized during construction after rerouting flow through the reclaimed channel. Will the up-gradient regraded sections be pocked, seeded and mulched prior to re-directing water down the reconstructed channel? If not, what treatment measures will be used to keep sediment from sloughing into the reconstructed channel section?
4. What sediment control measures will be conducted in the ephemeral channels should the construction be initiated and then a precipitation event occurs? A good approach could be to reclaim the upper portions in the ephemeral drainage prior to connecting the ephemeral drainages with the Deer Creek Drainage. For instance in Elk Canyon the drainage could be completed to the 7325 elevation and then use the existing drainage to convey any temporary runoff to the pond until the Deer Creek drainage is completed to the junction with Elk Canyon.
5. Specific information, maps, design detail, and maintenance information for the silt fence to be employed after removing the sedimentation pond needs to be provided.

Sedimentation Ponds.

According to page 7-1, the applicant states the sediment pond will be removed after all other reclamation work is completed to ensure that runoff is treated before leaving the disturbed area. However, no details are provided to indicate how the disturbed area drainage will be transported to the pond within disturbed areas which are not undergoing reclamation construction. Will the existing drainages be maintained through the reconstruction period?

Other Treatment Facilities.

No other treatment facilities are proposed for the reclamation phase.

Exemptions from Sediment Control Measures.

No exemption from sediment control measures are requested or granted with this amendment.

Discharge structures.

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

Impoundments.

See sedimentation ponds.

Casing and Sealing of wells.

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

Findings:

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

R645-301-731. Provide a monitoring plan specific to reclamation that: 1) Commits to provide quarterly monitoring for the minewater discharge through bond release and includes a full baseline parameter list for the 5th year of reclamation and the year prior to bond release. Any additional requirements from the Department of Health UPDES permit must also be reported. 2) Commits to survey areas down dip and below the mined seam for springs that may develop or increase in discharge from mining. The survey should at a minimum be conducted during the 5th year and one year prior to bond release. Include water quality and quantity monitoring where flow accumulation is measurable.

R645-301-731.221. Provide a monitoring plan specific to reclamation to assure impacts to hydrologic balance are prevented, and 1) include commitments made

in Volume 9, page 17 for continued monitoring of HM-2 and HM-3, 2) describe how the State Water Quality Standards, Utah Administrative Code R317-8, for the Deer Creek, Huntington Creek, and any other stream receiving minewater discharge will be shown to meet water quality standards. The Division recommends a minimum high and low flow season monitoring for (selected) parameters over the full period of reclamation. Parameters should be reflective of all potential in-mine contaminants, 3) Include a map showing flow direction and groundwater divides in the permit and adjacent area for each mined seam which identifies existing mine floor elevations, in-mine discharge locations, pertinent geologic controls, mine controls such as sealed mine sections, and changes to previously existing hydrologic barriers, 4) Provide a water monitoring plan that; a) determines whether changes in flow hydrology will occur along the Straight Canyon Syncline during the time mining has idled, b) determines whether baseflows to the Cottonwood Canyon Stream increase, c) identifies the difference between changes due to climate, or from ground water discharge by including age dating to be conducted every 2nd year during the low flow period for; radio carbon dating, tritium dating, and stable hydrogen and oxygen isotopes (for meteoric waterline determinations) in the Cottonwood Canyon wells and Cottonwood Creek streamflow below well CCW-1S, 5) Repeat the macro invertebrate study conducted in 1991 and in 1994 in the Deer Creek and Huntington Creek during the spring and fall, the year before reclamation, and in the 5th and final year prior to bond release.

R645-301-742. Details, maps and plans, which indicate how drainage will be conveyed to the pond within the disturbed areas not undergoing reclamation construction during the reclamation period.

R645-301-725.210. A grading plan that considers small tributary ephemeral drainages for the draws adjacent to Elk Canyon, and the draw above the Storage Dock that will control or prevent erosion.

R645-301-625. A demonstration showing the proposed method for backfilling the mine portal will not plug from calcium carbonate precipitation. Calcium carbonate precipitate was identified to be widespread within the Deer Creek drainage through a Macro Invertebrate Study done to assess minewater discharge impacts to fisheries.

R645-301-752.210. and -752.250. Address stability of the cut slope across from the Mine Office and Bath House area, and its relation to the proposed Deer Creek Drainage location. The channel abuts an area that was predisposed to failure in 1992 when a tension crack developed from water ponding in a diversion ditch. Destabilization, or rock fall from this cut slope could cause channel failure.

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R645-301-742.314. 1) Remove item number two on the Final Reclamation Hydrology Map DS1780D or provide additional site specific detail (The practice of using geotextile filter fabric is not an acceptable reclamation practice in the State of Utah because it does not promote channel stability. The Division will accept this practice only for pre-approved site specific locations). 2) Provide designs for the channel transitions between the upstream and downstream natural channel and the reclaimed channel.

R645-301-742. The applicant needs to provide additional information for the proposed sediment control measures during the reclamation phase to meet BTCA for alternate sediment control measures. Specific issues are identified in the technical assessment.

RECOMMENDATION:

It is recommended; the application be denied, the information be returned to the applicant, and the applicant should resubmit the amendment after addressing the deficiencies identified this technical analyses.