TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

#3261

June 1, 2009

TO: Internal File

THRU: Jim Smith, Permit Supervisor / Environmental Scientist III, Hydrology DS 06/08/09
Sc Steve Christensen, Environmental Scientist II / Hydrology / Team Lead

FROM: Peter Hess, Environmental Scientist III / Engineering / Bonding PH bm 8/25

RE: Water Aeration Treatment Area, Genwal Resources, Inc., Crandall Canyon Mine, C/015/0032, Task ID #3261

SUMMARY:

Mine water collecting and discharging from behind the four seals built at the Crandall Canyon #1 Mine has not been able to meet UPDES effluent parameter limits for total iron for numerous samples. This prompted a violation from the Utah Division of Water Quality and a Division Order from the Utah DOGM mandating that the Permittee address the high iron discharge and revise the reclamation plan to address the water seeping out of the Starpoint sandstone upon which the portals are built.

Task ID # 3261 is a proposal to convert the old loadout area (located immediately north of the USFS access road below the #1 Mine portals) into a water treatment area utilizing aeration and limestone gravel to chemically drop out the iron.

RECLAMATION PLAN

PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES

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

Analysis:

Due to failure to meet the UPDES discharge parameter for total iron in the Crandall Canyon #1 Mine mine water discharge volumes, and the subsequent enforcement actions from the Utah Division of Water Quality and DOGM, the Permittee

has proposed in the Task ID # 3261 application to construct a water treatment area where the "old truck loadout" was constructed in the 1980's. The treatment area will be built where a dish of Star Point sandstone was shot and removed. This is the same geologic member which is seeping mine water at the #1 Mine portal area (seals are built directly on top of the Star Point).

The Mine water discharge will be piped from the portal area down to the west end of the treatment area, where it will be open ended to flow across an area of approximately 1500 square yards.

The flow will be dispersed to course over concrete parking "bumpers" to increase the flow turbulence and enhance the oxygen content of the water (i.e., aeration). The bumpers will not be anchored, such that they can be individually adjusted to disperse the flow, and so they can be moved when it becomes time to replace the gravel. The purpose of the limestone gravel is to neutralize the pyritic solution.

The design tries to neutralize and aerate in the same treatment zone. Generally speaking, mine water must be neutralized before it is aerated. It is not known if neutralization and aeration can occur in the same area or process step.

The Permittee also states that "it will also be possible to add a chemical flocculant and / or coagulant to the water at the upstream end of the treament area to aid in the iron removal process. This would require a chemical injection pump of adequate size / volume and an AC power supply.

After flowing through the gravel and over and around the concrete parking bumpers, the treated water will be collected to a common point which is a buried pipeline inlet. This line will route the treated water under the USFS road and connect with the existing discharge line. The existing discharge line will convey the treated mine water to the main undisturbed bypass culvert in the Crandall Canyon channel. This is an approved UPDES discharge point.

Thus, the proposed plan is to treat 400 to 500 gallons per minute of high iron mine water through neutralization and aeration.

The only design specification shown for the treatment area is the 13,500 square foot area. The Division should have more definitive information for the treatment bed such as;

1) How many cubic feet of limestone gravel are needed to treat a gallon of water?
2) How will AC power be sustained for needed chemical injection pumps ?

3) How will the discharging water be tested to confirm that the treatment plant is functioning properly ? What sampling frequency will be utilized ? How and to whom will the monitoring results be reported ?
4) What methods will be implemented to maintain the treatment area, and how often will the Permittee monitor this proposed system ?
5) How will the spent limestone gravel be disposed of and where ?
6) What flocking agent /coagulent is being considered for the treatment process ?
7) What contingency plan will be implemented to treat the discharging mine water when the treatment bed is being re-graveled ?

Findings:

The application # 3261 is deficient.

In accordance with the requirements of;

R645-301-731.611, Water Quality Standards
R645-301-740. General Requirements / Design Criteria

The Division needs additional design information for the proposed treatment facility. It is unclear what criteria were used to determine that a 1500 square yard treatment facility utilizing neutralization and aeration is adequate to effectively treat the needed design volume of 400 to 500 GPM.

The Division recommends that the Permittee develop a contingency plan for water treatment during maintenance of the limestone treatment bed.

The Division also recommends that the Permittee consider utilizing constructed wetlands for the possible long term treatment of this mine water discharge.

BONDING AND INSURANCE REQUIREMENTS

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

Analysis:

General

The 1500 square yard treatment area will have a poured concrete / asphalt thickness of 4" (i.e., 165 cubic yards of material must be removed and disposed of). The Permittee has submitted an escalated demolition and removal cost over a 5 year period including direct and indirect costs of $ 11, 272.

It needs to be clearly stated in this document that the current amount of reclamation bond for this site **DOES NOT FACTOR IN** a bond amount for long term treatment of the mine water discharge. If it is determined that long term treatment is necessary to keep the discharge in compliance with UPDES standards, the Permittee, in co-operation with the Division may need to establish another means of bonding to ensure that this discharge is effectively treated into the future.

The need for long term treatment remains to be determined by the Division, the Utah Division of Water Quality and the US Forest Service.

Form of Bond

The two bonds held by the Division to cover the reclamation of the Crandall Canyon Mine are $ 1,654,000 as a surety bond issued by American Home Assurance Company and a collateral bond in the amount of $ 408,000 in Treasury Securities.

Determination of Bond Amount

R645-301-800 The currently posted reclamation bond amount is $ 2,062,000.

The Division estimates that a bond of $ 2,115,000 is required to reclaim this site.

The Permittee must post an additional $53,000 of bond.

Findings:

Task # 3261 does not meet the minimum regulatory requirements of this section of the R645 Coal Mining Rules.

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