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

Act/007/004
#2

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April 21, 1995

TO: Daron Haddock, Permit Supervisor

FROM: Steven M. Johnson, Reclamation Hydrologist

RE: Draft Review, Willow Creek Refuse Removal, Castle Gate Mine, Amax Coal Company, ACT/007/004-95B, Working File, Carbon County, Utah

#2

SYNOPSIS

Amax Coal submitted a significant revision to the Castle Gate Mine plan which would allow for the removal of refuse in the Willow Creek area to be completed. This review is for administrative completeness of the hydrology.

ANALYSIS

ENVIRONMENTAL RESOURCE INFORMATION

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

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Sampling and analysis.

Sampling and analysis information is found in Section 12.7.2.3. Monitoring sites are shown on Exhibit 12-7-1. In section 12.7.2.3, Amax commits to sampling in accordance with the current addition of "Standard Methods for the Examination of Water and Wastewater" or the methodology outlined in 40 CFR 136 and 434.

Baseline information.

Baseline information is included in Chapter 7 and Chapter 12. Groundwater quantity and quality is found in Section 12.7.2.4.1 and Sections 7.1 and 7.3 beginning on page 12-7-3. Surface water quality and quantity information is found in Section 12.7.2.4.2



beginning on page 12-7-5. Surface water rights are mentioned on page 12-7-5. Geology information is in Chapter 12, Section 12.6 and Climatological information is in Chapter 11 of the MRP. Section 12.7.2.4.5 says that there is no supplemental baseline information, because the other information is adequate. There will be no underground mining in this project so there was no survey of renewable resource lands. Alluvial valley floors are addressed in Chapter 7, Appendix 7-3.

Drill logs are found in Appendix 12-6-1 (located after 12-6-3 in the proposal). Three of the fifteen drill holes had water. There is no water in the refuse. Figure 12-7-1 is a cross section constructed from drill hole data. This data also shows that water flowing under the refuse is moving towards Willow Creek. Water quality samples were collected from point B-27 (shown on Exhibit 12-7-1) at Cross cut No. 3. These samples were collected from March 1985 through April 1992 and are provided in Appendix 12-7-1 and Figure 12-7-2. Iron concentrations at station B-27 ranged from <0.02 mg/L to 12.70 mg/L. Variation of iron and manganese concentrations are thought to be a function of sampling error because the representative water is flowing into the mine and should not be directly influenced by mining. Amax assumes that water quality below the refuse is similar to station B-27.

Normally Willow Creek has the greatest monthly flows in April through June but peak flows can be greatest in the summer because of large localized thunderstorms. Data from Willow Creek sampling projects over the last 15 years are presented in Appendix 12-7-1 and summarized in Figures 12-7-3, 12-7-4 and 12-7-5, and Table 12-7-3. The typical water in Willow Creek is calcium/magnesium bicarbonate. TDS concentrations average around 600-mg/L. Willow Creek is slightly alkaline with pH values ranging from 7.9 to 8.2 standard units. Iron concentrations range between 12.1 mg/L and 16.2 mg/L.

Baseline cumulative impact area information.

Section 12.7.2.5 and 12.7.2.9 say that a Cumulative Hydrologic Impact Assessment has been prepared for the Willow Creek area.

Modeling.

Section 12.7.2.6 says that the existence of data for ground water and surface water in the area made it so modeling was not necessary.

Alternative water source information.

Section 12.7.2.8 says that the project will not result in contamination, diminution, or interruption of ground or surface waters, therefore, no alternate water source information is necessary.

Probable hydrologic consequences determination.

The Probable hydrologic consequences determination is made in Section 12.7.2.8. Determinations are made that say no damage will be caused to the water quality and quantity. Potential impacts to surface and ground water are identified on Page 12-7-9 as: 1) contamination from acid- and toxic-forming materials, 2) increased sediment yield, 3) increased total dissolved solids, 4) flooding or streamflow alteration, 5) impacts to surface water availability, 6) hydrocarbon contamination, and 7) contamination of surface water from spillage of refuse during hauling operations.

Data presented in Section 12.6 show that no acid-forming materials exist within the refuse. However, slight boron toxicity was found. The material will be move to a permitted refuse disposal area at the Castle Gate Refuse Removal Facility which will prevent impact to the hydrologic balance due to this toxicity. Increased total dissolved solids (TDS) will not be a problem because no groundwater will be encountered during this project.

Surface waters will be protected from increased sediment yield by use of sediment-control measures that are or will be installed on the disturbed area. Sediment-control measures will include sediment ponds and sediment traps and will be regularly inspected and maintained. Alternate sediment control measures will be used to protected against increased sediment yield during reclamation of the site. The sediment control devices will also protect against flooding.

The groundwater table lies at least 20 feet below the coal refuse that will be removed during this project. This distance will allow removal or the refuse without encountering the groundwater; therefore, the availability of groundwater will not be effected. Surface water will not be significantly reduced because of the relatively small contribution that the disturbed area provided to the Willow Creek watershed.

Fuels, oils and greases will be used in this project but should not impact the water quality because of the short time that the project will be active and because the economic value of these substances dictate that spills be prevented. Refuse spills will be minimized by not overfilling the trucks used to transport the materials. Accidental spillage of significant quantities may wash into the creek but are not believe to have significant potential to impact the hydrologic balance because of the short termed nature of the project and the minimal amount of coal refuse that would actually reach Willow Creek.

Findings:

There is no hydrocarbon or coal refuse spill containment or cleanup plans considered in the PHC.

OPERATION PLAN

HYDROLOGIC INFORMATION

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

Analysis:

Water monitoring.

The groundwater and surface water monitoring plans for the Willow Creek Project are outlined in Chapter 12, Section 12.7.3.1.2 and in Chapter 7, Section 7.5. Information in Chapter 7 is regarding the current sampling program. In addition AMAX proposes to sample one well in the Willow Creek area and sample Willow Creek above and below the disturbed site. Surface water parameters that will be sampled are total suspended solids, total dissolved solids, total iron, total manganese, and pH. Groundwater levels will be monitored but no quality samples will be taken. AMAX will monitor both surface and groundwater in accordance with their currently approved plan and Chapter 7 of the Castle Gate MRP.

Acid and toxic-forming materials.

Slightly toxic boron has been identified on site. It will be moved to the Castle Gate Refuse Removal Facility and handled as indicated in Chapter 3, Section 3.4 of the MRP.

Transfer of wells.

According to Section 12.7.3.1.4, no existing well ownerships will be transferred. Before final bond release the monitoring well on the site will be properly sealed in accordance with R645-301-631, R645-301-738, and R645-301-765.

Discharges into an underground mine.

There will be no discharges into underground mine workings during this project according to Section 12.7.3.1.5.

Water quality standards and effluent limitations.

Section 12.7.5.1 says that all discharged water from the disturbed area will meet applicable water-quality standards and effluent limitations.

Diversions.

Diversion design criteria is outlined in Section 12.7.4.2.3 of the proposal. Diversion designs are located in Appendix 12-7-2, and shown on Exhibits 12-5-1 and 12-7-3. Table 12-7-5 is a summary of diversion criteria. Diversions are designed for the 10-year, 6-hour storm event. Only miscellaneous flow will be diverted.

AMAX Coal will be constructing or upgrading a crossing of Willow Creek. The stream crossing upgrade calculations are found in Appendix 12-5-1.

Stream buffer zones.

Stream buffer zone information is provided in Section 12.7.3.1.6. Topsoil and access facilities will be located and some maintenance will occur within 100-feet of Willow Creek. The activities should not cause or contribute to Utah and Federal water standard and should not adversely effect water quality and quantity. No permanent stream channel diversion are proposed.

Sediment control measures.

Sediment control measures are discussed in Sections 12.7.3.2 through 12.7.3.2.2 and designs for sediment control measures are discussed in Sections 12.7.4.2.1 through 12.7.4.2.3. One sediment pond, sized below the MSHA requirements, and six sediment traps are proposed. The pond is shown on Exhibit 12-5-1 and designs are in Appendix 12-7-2. It will contain the 10-year, 24-hour storm event and will have a spillway that will pass the 25-year, 6-hour event. Some silt fence will be used to complete the sediment control plan.

Five of the six sediment traps are currently existing, though two will require modification. Table 12-7-4 is a summary of the sediment traps at the Willow Creek facility. The outflow from each trap will be nonerosive.

Siltation structures.

One sediment pond and six sediment traps will be constructed as part of this project.

Sedimentation ponds.

One sediment pond will be constructed as part of this project. The sediment pond is shown on Exhibit 12-5-1 and designs are in Appendix 12-7-2. It will contain the 10-year, 24-hour storm event and will have a spillway that will pass the 25-year, 6-hour event. The sediment traps are designed to contain the 5-year, 24-hour storm event and safely pass the 25-year, 6-hour event.

Other treatment facilities.

No other treatment facilities are proposed.

Exemptions for siltation structures.

No exempt areas are proposed.

Discharge structures.

The sediment pond is proposed to have a open spillway that will pass the 25-year, 6-hour event. The designs for the spillway are included in Appendix 12-7-2.

Impoundments.

The Willow Creek site sediment control plan will consist of one sediment pond and six sediment traps. These are designed and the designs are discussed in Section 12.7.3.2.2. All maps and plans are certified by the registered professional engineer. All impoundments will be inspected quarterly as provided in Section 12.5.1.4.3.

Casing and sealing of wells.

Section 12.7.4.8 covers casing and sealing of wells. The one monitoring well at the Willow Creek site has been case to prevent acid and toxic drainage from entering the ground water.

Findings:

The plan does not show how activities within the stream buffer zone will be protected from causing or contributing to the violation of applicable Utah and federal water quality standards and how the water quality, quantity and other environmental resources of the stream will not be effected. AMAX must provide evidence that the hydrologic balance will not be degraded by activities within 100-feet of Willow Creek.

The four sediment traps are under designed. These traps must be able to treat runoff resulting from, at least, the 10-year, 24-hour storm event, but are only designed for the 5-year, 24-hour event.

AMAX Coal has included structural designs for an upgraded crossing of Willow Creek. These designs do not include hydrologic calculation. This crossing must be designed to convey the entire flow of Willow Creek upstream from the crossing. The crossing should be designed to convey at minimum the runoff from 10-year, 6-hour storm event for a temporary diversion; however, it is recommended that it be design to pass a larger peak flow than the minimum.

RECLAMATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

The reclamation plan is found in Section 12.5.4. General hydrologic reclamation information is found in Section 12.7.6. AMAX does not plan to reclaim the site as part of this project because they plan to use it as an opening into a mine that will be permitted later. However, if reclamation is necessary, there is a prepared plan.

Water monitoring.

The groundwater and surface water monitoring plans for the Willow Creek Project are outlined in Chapter 12, Section 12.7.3.1.2 and in Chapter 7, Section 7.5. Information in Chapter 7 is regarding the current sampling program. In addition AMAX proposes to sample one well in the Willow Creek area and sample Willow Creek above and below the disturbed site. Surface water parameters that will be sampled are total suspended solids, total dissolved solids, total iron, total manganese, and pH. Groundwater levels will be monitored and data submitted at the end of the project.

The site is intended as a surface entry following removal of the existing refuse. The mining activity will be further permitted later. However, if plans change and reclamation is necessary on-site monitoring will continue on a quarterly basis through the post-reclamation period. The data will be submitted to the Division in annual monitoring reports.

Acid and toxic-forming materials.

Slightly toxic boron has been identified on site. It will be moved to the Castle Gate Refuse Removal Facility and handled as indicated in Chapter 3, Section 3.4 of the MRP.

Transfer of wells.

According to Section 12.7.3.1.4, no existing well ownerships will be transferred.

Discharges into an underground mine.

There will be no discharges into underground mine workings during this project according to Section 12.7.3.1.5.

Water quality standards and effluent limitations.

Section 12.7.5.1 says that all discharged water from the disturbed area will meet applicable water-quality standards and effluent limitations.

Diversions.

Diversion design criteria are outlined in Section 12.7.4.2.3 of the proposal. Diversion designs are located in Appendix 12-7-2, and shown on Exhibits 12-5-1 and 12-7-3. Table 12-7-5 is a summary of diversion criteria. Diversions are designed for the 10-year, 6-hour storm event. Only miscellaneous flow will be diverted. All natural drainage patterns will be restored.

Stream buffer zones.

Stream buffer zone information is provided in Section 12.7.3.1.6. Topsoil and access facilities will be located and some maintenance will occur within 100 feet of Willow Creek. The activities should not cause or contribute to Utah and Federal water standard and should not adversely effect water quality and quantity. No permanent stream channel diversions are proposed.

Sediment control measures.

Sediment control measures are discussed in Sections 12.7.3.2 through 12.7.3.2.2 and designs for sediment control measures are discussed in Sections 12.7.4.2.1 through 12.7.4.2.3. One sediment pond and six sediment traps are proposed. The pond is shown on Exhibit 12-5-1 and designs are in Appendix 12-7-2. It will contain the 10-year, 24-hour storm event and will have a spillway that will pass the 25-year, 6-hour event.

Five of the six sediment traps are currently existing, though two will require modification. Table 12-7-4 is a summary of the sediment traps at the Willow Creek facility. The outflow from each trap will be nonerosive.

Siltation structures.

One sediment pond will be constructed as part of this project.

Sedimentation ponds.

One sediment pond will be constructed as part of this project. The pond is shown on Exhibit 12-5-1 and designs are in Appendix 12-7-2. It will contain the 10-year, 24-hour storm event and will have a spillway that will pass the 25-year, 6-hour event. Sediment ponds will be maintained until removal is approved.

Other treatment facilities.

No other treatment facilities are proposed.

Exemptions for siltation structures.

No exempt areas are proposed.

Discharge structures.

The sediment pond is proposed to have an open spillway that will pass the 25-year, 6-hour event. The designs for the spillway are included in Appendix 12-7-2.

Impoundments.

Other than the pond there are no impounding structures proposed.

Casing and sealing of wells.

Section 12.7.4.8 covers casing and sealing of wells. The one monitoring well at the Willow Creek site has been cased to prevent acid and toxic drainage from entering the ground water.

Findings:

The hydrologic reclamation plan is complete and accurate.

RECOMMENDATION

The hydrologic information of the Willow Creek Refuse removal plan is lacking in the following areas. This information should be added, complete or clarified prior to approval by the Division.

1. AMAX must submit hydrocarbon or coal refuse spill containment or cleanup plans as part of the PHC.
2. AMAX must provide evidence that the hydrologic balance will not be degraded by activities within 100-feet of Willow Creek.
3. All sediment ponds and sediment traps that are acting as sediment ponds must be able to treat runoff resulting from, at minimum, the 10-year, 24-hour storm event.
4. The upgraded stream crossing should be designed to convey, at minimum, the runoff from 10-year, 6-hour storm event for a temporary diversion. However, it is recommended that it be design to pass a larger peak flow than the minimum.