

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

January 31, 2007

TO: Internal File

THRU: D. Wayne Hedberg, Permit Supervisor

FROM: Steve Eluke, Team Lead, Senior Reclamation Hydrogeologist *SE*

RE: Pasture Pond Expansion, Sunnyside Cogeneration Association, Sunnyside Refuse/Slurry, C/007/0035, Task ID #2644

SUMMARY:

Sunnyside Cogeneration Association (SCA, the Permittee) submitted an amendment to their Mining and Reclamation Plan (MRP) on September 13, 2006 in order to expand the Excess Spoil Disposal Area #2. They are proposing to include the area of the existing Clearwater Sedimentation Pond within the expanded excess spoil area and to modify the slope of the existing excess disposal area. Subsequently, they are also proposing to increase the size of the Pasture Sedimentation Pond to accommodate the additional capacity needed from the removal of the Clearwater Pond. This review covers the hydrologic aspect of the MRP amendment.

The application does not meet the requirements of the relevant hydrology regulations. The Division should not approve it until the deficiencies listed below are resolved.

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TECHNICAL ANALYSIS:

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, -300-148, -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:

General

The Sunnyside Cogeneration facility has seven sedimentation ponds within their permit boundary and three outside of their permit boundary. The Utah Division of Water Quality (DWQ) currently permits all of the ponds. The MRP amendment calls for the removal of one sedimentation pond (the Clear Water Pond) and the expansion of another (the Pasture Pond).

Water-Quality Standards And Effluent Limitations

The DWQ has issued UPDES (Utah Pollution Discharge Elimination System) Permit No. UT0024759 to Sunnyside Cogeneration Associates. The permit specifies the reporting and self-monitoring requirements for twelve UPDES points. Seven of the UPDES points (outfalls 004, 007, 008, 009, 012, 014, and 016) are for discharge from sedimentation ponds located within the permit area. UPDES 004 is for discharge from the Clear Water Pond that is to be removed and UPDES 009 is for discharge from the Pasture Pond that is to be expanded. The remaining UPDES points will not be affected by the proposed permit amendment. Effluent limitations set by the permit for the Pasture Pond include total suspended solids (TSS) limits of 70.0 mg/L for a daily maximum discharge, 35 mg/L for a 7-day average discharge, and 25 mg/L for a 30-day average discharge. Total dissolved solids (TDS) limitations are set at 1,650 lbs per day from a monthly grab sample. According to Jeff Studenka, DWQ, a new UPDES permit is being issued to SCA to reflect the removal of UPDES 004. The new UPDES permit will need to replace the existing permit in Appendix 7-1 of the MRP once it is issued.

Diversions: Miscellaneous Flows

All diversions (drainage controls) within the permit area consist of culverts and ditches and are shown on Plate 7-1. All the diversions are temporary and will be removed during

reclamation. The existing SCA facility has nine ditches and eight culverts for the Clear Water Pond watershed. As part of the amendment, these diversions, with the exception of two, will be included within the Pasture Pond watershed. One ditch (CW-D-9) and one culvert (CW-C8) will no longer be needed due to the proposed expansion of the excess spoil disposal area. Design criteria for the diversions within the Pasture Pond watershed are included in Appendix 7-3A, Pasture Sediment Pond – Hydrologic Calculations. The diversions were previously designed and constructed to handle the conservative 100-year/6-hour precipitation event. However, some of the diversions within the proposed combined Clear Water and Pasture Pond watershed no longer meet the 100-year/6-hour precipitation event, but all easily exceed the required 10-year/6-hour precipitation event. The calculated maximum flow velocities for all the diversions are below six feet per second, and therefore do not require additional protective linings. In general, upon review of the SCA MRP, it appears all diversions have been designed, located, constructed, and used to prevent, to the extent possible, additional contributions of suspended solids to stream flow outside the permit area.

Although the Clear Water watershed diversions have been included in Appendix 7-3A of the amendment, the Permittee has not removed Appendix 7-3E, Clear Water Sediment Pond, Slurry Ponds 1 & 2, as part of the amendment. The Permittee needs to update or remove Appendix 7-3E to reflect the changes to the MRP.

Siltation Structures: General

The SCA sedimentation ponds are the only siltation structures within the permit area. The sedimentation ponds design calculations are presented in Appendix 7-3 of the MRP. Appendix 7-3A, Pasture Sediment Pond, has been updated for the amendment for the expanded Pasture Sediment Pond design calculations. The Permittee needs to remove/replace the existing Appendix 7-3A as part of the amendment to keep the MRP clear and up-to-date. The sedimentation ponds are briefly described in Section 732.200 and the operation and maintenance of the sedimentation pond is described in Section 742.220. The Permittee needs to update Section 732.200 to reflect the changes in the proposed amendment.

Siltation Structures: Sedimentation Ponds

According to the information in Appendix 7-3A, the Pasture Pond drainage area is divided into 18 subwatersheds for a total watershed area of 109.25 acres. Average curve numbers for each subwatershed are provided in a table in Appendix 7-3A, Sub Watershed Characteristics. The watershed characteristics and sedimentation pond volumes were used to model the 10-yr/24-hr, 10-yr/6-hr, 25-yr/6-hr, and 100-yr/6-hr precipitation events using the Sedimot-II program. The input and output data for each run is provided in the appendix. The Pasture Pond design is presented as Plate 7-9.

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The pond is designed with two inlets from culverts protected with rip rap and outlets consisting of a primary spillway and emergency spillway. The primary spillway consists of a 2-inch pipe with an intake elevation of 6486.6 feet. The emergency spillway consists of an 18-inch CMP riser and conduit with an intake elevation of 3490.6 feet. According to the stage diagram presented on Plate 7-9, the storage between the two elevations is approximately 1.9 acre-feet. This is less than or near the inflow runoff volume of 1.93 acre-feet presented in the Sedimot-II output on page 22 of the 10-yr/24-hr precipitation event run. Therefore, some discharge through the emergency spillway would be anticipated from a 10-yr/24-hr storm event, but the amendment does not indicate how effluent limitations will be met. The information in the amendment needs clearly demonstrate that the Pasture Pond is designed with adequate runoff and sediment storage volume to handle the 10-yr/24-hr precipitation event.

The amendment to eliminate the Clear Water Pond and increase the size of the Pasture Pond does not meet the hydrology Operation Plan for Sedimentation Ponds as provided in R645-301-732.200 and -742.200. A brief description of how the R645 Coal Rules have been met follows.

- R645-301-711.300, All methods and calculations are provided in Appendix 7-3A.
- R645-301-742.221.35, Short-circuiting will be minimized (in the event of a discharge) because inflow culverts are located across the pond from the spillways, as is standard practice for short circuit prevention.
- R645-301-742.222, The pond does not meet the size or other qualifying criteria of the MSHA, 30 CFR 77.216(a).

The Pasture Pond amendment has not met the requirements of the R645 Coal Rules because of the following deficiencies.

- R645-301-742.221.31, Sediment inflow and storage requirements are not presented in the amendment.
- R645-301-742.221.32, Detention time and relation to the required UPDES effluent limitations are not discussed in the amendment.
- R645-301-742.221.33, It is not clear if the pond has been designed to contain or treat the water and sediment for the 10-yr/24-hr storm event because: 1) the sediment volume contribution from the storm event is not presented, 2) the sediment cleanout level is not clear and, therefore, it is not clear whether the pond volume will be adequate to contain the storm event inflow, and 3) if discharge is to occur during the storm event, adequate detention time is not available and sediment concentration at the time of discharge is not presented.
- R645-301-742.221.34, The primary spillway is fitted with a gate valve to control retention time, but is not demonstrated to be fitted with a non-clogging inlet. The emergency spillway is fitted with an anti-vortex device and trash rack.

- R645-301-742.221.36, The pond clean-out level and adequate volume needed to contain the design event is not clear.
- R645-301-742.221.37, There is no assurance that excessive settlement will not occur.
- R645-301-742.221.38, There is no assurance that the pond will be free of sod, large roots, frozen soil, and acid- or toxic-forming coal-processing waste.
- R645-301-742.221.39, There is no assurance that the pond will be compacted properly.
- R645-301-742.223, The 18-inch CMP emergency spillway is not demonstrated to safely discharge the 25-yr/6-hr precipitation event.

Discharge Structures

The Permittee has not met the requirements of R645-301-744. There is no discussion of how the discharge from the Pasture Pond will be controlled to reduce erosion and to minimize disturbance to the hydrologic balance.

Impoundments

The Pasture and Clear Water Ponds are sedimentation ponds and are addressed in the findings discussions above.

Ponds, Impoundments, Banks, Dams, and Embankments

The Pasture and Clear Water Ponds are sedimentation ponds and are addressed in the findings discussions above.

Findings:

The application does not meet the Operation Plan for Hydrologic Information. The following deficiencies must be addressed.

R645-301-121.100 and -121.200, The Permittee needs to update or remove Appendix 7-3E to reflect that the Clear Water Pond has been removed from the SCA facility.

R645-301-121.100 and -121.200, The Permittee needs to remove/replace the existing Appendix 7-3A as part of the amendment to keep the MRP clear and up-to-date.

R645-301-121.100, -121.200, and -732.200, The Permittee needs to update Section 732.200 to reflect the changes in the proposed amendment.

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R645-301-742, The Permittee needs to address the following deficiencies regarding the design of the Pasture Pond.

- **-742.221.31**, The information in the amendment does not clearly demonstrate that the Pasture Pond is designed with adequate runoff and sediment storage volume to handle the 10-yr/24-hr precipitation event. Specifically, the stage-storage curve diagram on Plate 7-9 should show spillway and sediment cleanout elevations. Additionally, sediment load and runoff inflow for the 10-yr/24-hr precipitation event should be presented.
- **-742.221.31**, Sediment inflow and storage requirements are not presented in the amendment.
- **-742.221.32**, Detention time and relation to the required UPDES effluent limitations are not discussed in the amendment.
- **-742.221.33**, It is not clear if the pond has been designed to contain or treat the water and sediment for the 10-yr/24-hr storm event because: 1) the sediment volume contribution from the storm event is not presented, 2) the sediment cleanout level is not clear and, therefore, it is not clear whether the pond volume will be adequate to contain the storm event inflow, and 3) if discharge is to occur during the storm event, adequate detention time is not available and sediment concentration at the time of discharge is not presented.
- **-742.221.34**, The primary spillway is fitted with a gate valve to control retention time, but is not demonstrated to be fitted with a non-clogging inlet. The emergency spillway is fitted with an anti-vortex device and trash rack.
- **-742.221.36**, The pond clean-out level and adequate volume needed to contain the design event is not clear.
- **-742.221.37**, There is no assurance that excessive settlement will not occur.
- **-742.221.38**, There is no assurance that the pond will be free of sod, large roots, frozen soil, and acid- or toxic-forming coal-processing waste.
- **-742.221.39**, There is no assurance that the pond will be compacted properly.
- **-742.223**, The 18-inch CMP emergency spillway is not demonstrated to safely discharge the 25-yr/6-hr precipitation event.

R645-301-744, The Permittee needs to describe how the discharge from the Pasture Pond will be controlled to reduce erosion and to minimize disturbance to the hydrologic balance.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Mining Facilities Maps

The Permittee has not met the requirements of R645-301-731.740. The expanded Pasture Pond, removal of the Clear Water Pond, and expanded Spoil Disposal Area are updated on Plate 7-1. The Pasture Pond design and cross section are provided on Plate 7-9. However, Plate 7-9 should be updated to reflect changes requested by the Division for this review including, but not limited to the stage-storage curve diagram should show spillway and sediment cleanout elevations, and the riser detail should be consistent with other descriptions.

In order to keep the MRP up-to-date and consistent with the proposed amendment, Plate 7-1G should be updated and Plate 7-4 should be removed.

Certification Requirements

The application has met the requirements of R645-301-712, and R645-301-733.210. A registered professional engineer has properly certified maps 7-1 and 7-9.

Findings:

The application does not meet the Operation Plan for Maps, Plans, and Cross Sections. The following deficiencies must be addressed.

R645-301-731.740, The Permittee should update Plate 7-9 to reflect changes requested by the Division for this review including, but not limited to the stage-storage curve diagram should show spillway and sediment cleanout elevations, and the riser detail should be consistent with other descriptions.

R645-301-731.740, The Permittee should update Plate 7-G and remove Plate 7-4 in order to keep the MRP up-to-date and consistent with the proposed amendment.

RECLAMATION PLAN

HYDROLOGIC INFORMATION

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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:

Hydrologic Reclamation Plan

The amendment includes new design calculations for the Pasture Pond that includes the 18 contributing subwatersheds submitted as Appendix 8-1A. Average curve numbers for Phase 1 and Phase 2 reclamation for each subwatershed are provided in a table in Appendix 8-1A, Sub Watershed Characteristics. The watershed characteristics and sedimentation pond volumes were used to model the 10-yr/24-hr, 10-yr/6-hr, 25-yr/6-hr, and 100-yr/6-hr precipitation events using the Sedimot-II program. The input and output data for each run is provided in the appendix. The Pasture Pond design will remain as presented in Section 7 of the amendment until reclamation in Phase 2.

According to the stage diagram presented on Plate 7-9, the storage between the two elevations is approximately 1.9 acre-feet. This is less than the inflow runoff volume of 2.91 acre-feet presented in the Sedimot-II output on page 22 of the 10-yr/24-hr precipitation event run (Appendix 8-1A). Therefore, significant discharge through the emergency spillway would be anticipated from a 10-yr/24-hr storm event, but the amendment does not indicate how effluent limitations will be met. The information in the amendment needs clearly demonstrate that the Pasture Pond is designed with adequate runoff and sediment storage volume to handle the 10-yr/24-hr precipitation event during the Phase 1 and Phase 2 reclamation.

The Pasture Pond amendment has not met the requirements of the R645 Coal Rules because of the following deficiencies.

- R645-301-742.221.31, Sediment inflow and storage requirements are not presented in the amendment.
- R645-301-742.221.32, Detention time and relation to the required UPDES effluent limitations are not discussed in the amendment.
- R645-301-742.221.33, It is not clear if the pond has been designed to contain or treat the water and sediment for the 10-yr/24-hr storm event because: 1) the sediment volume contribution from the storm event is not presented, 2) the sediment cleanout level is not clear and, therefore, it is not clear whether the pond volume will be adequate to contain the storm event inflow, and 3) if discharge is to occur during the storm event, adequate detention time is not available and sediment concentration at the time of discharge is not presented.
- R645-301-742.221.34, The primary spillway is fitted with a gate valve to control retention time, but is not demonstrated to be fitted with a non-clogging inlet. The emergency spillway is fitted with an anti-vortex device and trash rack.

- R645-301-742.221.36, The pond clean-out level and adequate volume needed to contain the design event is not clear.
- R645-301-742.221.37, There is no assurance that excessive settlement will not occur.
- R645-301-742.221.38, There is no assurance that the pond will be free of sod, large roots, frozen soil, and acid- or toxic-forming coal-processing waste.
- R645-301-742.221.39, There is no assurance that the pond will be compacted properly.
- R645-301-742.223, The 18-inch CMP emergency spillway is not demonstrated to safely discharge the 25-yr/6-hr precipitation event.

Findings:

The application does not meet the Reclamation Plan for Hydrologic Information. The following deficiencies must be addressed.

R645-301-121.100 and -121.200, The Permittee needs to update the Table of Contents and organization of Appendices 8-1 and 10-1 such that Appendices 8-1A and 10-1A will replace outdated information.

R645-301-121.100 and -121.200, The Permittee needs to update Appendices 8-1 and 10-1 to reflect the removal of the Clear Water Pond.

R645-301-742, The Permittee needs to address the Pasture Pond design deficiencies listed for Section 7 in the updated information provided in Appendix 8-1A and 10-1A.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

The Plates provided in the application for reclamation activities do not have a direct bearing on the hydrologic review.

Certification Requirements.

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The application has met the requirements of R645-301-712, and R645-301-733.210. A registered professional engineer has properly certified Plates 8-2, 8-3, 9-8a, 9-8b, 9-8c, 9-8d, 10-4, and 10-5.

Findings:

The application meets the Reclamation Plan for Maps, Plans, and Cross Sections.

RECOMMENDATIONS:

The SCA application for the Pasture Pond expansion should not be approved by the Division at this time. In general, the application only updates calculations and maps that are directly affected by the proposed changes. The Permittee is responsible for updating the entire permit to be consistent with proposed changes. Deficiencies listed need to be addressed by the Permittee prior to approval. In addition, once the application is approved, the new UPDES permit will need to replace the existing permit in Appendix 7-1 of the MRP once it is issued by the DWQ.