

0002



State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Norman H. Bangarter
Governor

Dee C. Hansen
Executive Director

Dianne R. Nielson, Ph.D.
Division Director

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340

December 18, 1992

TO: Pamela Grubaugh-Littig, Permit Supervisor

FROM: Ken Wyatt, Reclamation Hydrologist *KW*

RE: Technical Deficiency Review of December 4, 1992 submittal, Sunnyside Cogeneration Associates, Sunnyside Coarse Refuse, PRO/007/035, Folder # 3, Carbon County, Utah

SYNOPSIS

On December 4, 1992, Eckhoff, Watson and Preator (EWP) submitted additional information to address some of the issues raised in the technical deficiency review up to November 12, 1992 of the Sunnyside Cogeneration Associates (SCA) proposed mining plan. This memo serves to review the re-compiled PAP submitted on December 4, 1992.

ANALYSIS

Information submitted on December 4, 1992, includes a re-compiled version of the PAP to address issues from previous Division reviews.

The following plates and maps still are not certified by an EWP or A SCA Professional Engineer as required by R645-301-512 and R645-301-712. Plates 7-2, 7-3, 7-5, 7-8c, 7-9, 7-9b, 7-11a, 7-11b, and 7-12a.

CROSS SECTIONS AND MAPS

R645-301-722

722.500 requires that adequate cross sections and maps be provided with sufficient slopes measurements or contours to adequately represent the existing land surface of the permit area. This applies to the sediment ponds, diversions, and the final hydrology map. Pond design maps do not contain adequate contours to calculate sediment pond volumes.

BASELINE WATER QUALITY

R645-301-724

Baseline water quality requirements as required by R645-301-724 are defined in the Guidelines for Establishment of Surface and Groundwater Monitoring Programs for Coal Mining and Reclamation Operations. Baseline

water quality sampling sites are shown on Plate 7-2. It includes 5 sites: F-2, Ice-1, CRB, 004 and the Carbon City well. Some data is provided for sites 004, Ice-1, CRS and CRB.

The new PAP includes one set of data for sample sites F-2 and the Carbon City well. This single sampling event with 6 parameters is not sufficient to provide seasonal water quality information. The permittee is required to sample and analyze these sites to provide seasonal variation in quantity and quality in accordance with R645-301-724 and the Division's guidelines dated January 1986.

The information submitted as baseline does not fulfill the requirements of the regulations as specified in R645-301-724 and the guidelines. The PAP fails to analyze and describe how baseline and operational monitoring will be used to determine impacts of the operation on the hydrologic system as defined by R645-301-731.200, 731.210 and 731.220.

R645-301-724.100

The seep associated with the refuse pile must be included in the baseline and water monitoring program. **Sampling of the seep at the point of emergence will be conducted as a ground water monitoring point and included on Plate 7-2.** Two years of baseline information will need to be gathered in accordance with the Guidelines for Establishment of Surface and Groundwater Monitoring Programs for Coal Mining and Reclamation Operations. Sampling of this water at the property boundary can be conducted as a surface water point as identified on plate 7-2.

PROBABLE HYDROLOGIC CONSEQUENCES DETERMINATION

R645-301-728

This section relates the projected impacts from the refuse mining activity on the hydrologic balance both in and adjacent to the permit area. The operator indicates that no impacts to the hydrologic regime are anticipated. This was based on review of discharge data from the Clear Water pond and the Coarse Refuse Toe pond.

The PHC does not discuss the seep at the base of the refuse pile. As discussed in previous deficiency memos the plan discusses the seep emitting from the refuse pile and indicates that the data submitted to date demonstrates that the water meets all water quality standards for class 4 and 3C receiving streams.

A cursory examination of this data shows that the seep water quality contains Total Dissolved Solids (TDS) ranging from 3090 up to 5950 mg/l and averaging 5136 mg/l. The State of Utah Water Quality Standards for Class 4 waters has a TDS standard of 1200 mg/l. The data from this seep averages 4.3 times higher than the receiving water quality standard for TDS. Even using the current UPDES permit limitation for TDS of 1650 mg/l the seep from the refuse pile exceeds the UPDES standard. No baseline data was submitted to compare this seep with other local seeps and springs. An assessment of impacts and need for monitoring cannot be made from the information provided.

Additionally, previous geotechnical reports and the Sunnyside Mine plan identify this seep as water from the slurry cells which has percolated through the refuse pile, flowed along the refuse/soil interface and then emerges at the bottom of the refuse pile. Evidence of this is seen in the high temperatures associated with fires in the refuse pile and the acidic nature of this effluent. Regardless of whether the source of this effluent is natural water emerging from formations beneath the refuse pile or as water from the slurry ponds, as it flows along the soil/refuse interface below the refuse pile it is being altered by the current mining activities on this site and as such is considered a discharge related to mining activities. **This is a discharge which is directly related the slurry ponds and the refuse pile is affected by mining activities and will need to be permitted through the Utah Pollution Discharge Elimination System (UPDES). An application for permitting or an actual UPDES permit for this site will need to be included in the mine plan or supply a demonstration that this water is not mine related.**

The use of dyes in the slurry pond as a tracer does have merit. The exact fate of these dyes may be unknown. The movement could take much longer than the two week time frame described to flow into the slurry pond, down through the material, across the natural drainage channel under the refuse area and then emerge at the seep. The integrity and decomposition of these dyes through adsorption and absorption, chemical decomposition will need to be assessed prior to this study. The use of alternative tracers such as radioactive isotopes may need to be considered in lieu of dyes.

A discussion of the permitting actions planned, the mining methods and refuse mining sequences will need to be incorporated into this section. As mining progresses, potential changes to onsite diversions and pond locations

will need to be addressed. As mining progresses, what changes are anticipated to the sedimentation control and diversion system within the permit area? This will be discussed further in the post mining reclamation hydrology section.

WATER MONITORING

R645-301-731.200

The applicant states that a water monitoring plan will be developed based on the PHC determination. This monitoring plan is required. Water monitoring will be performed to characterize all water within and adjacent to the permit area. This includes monitoring all UPDES discharge sites, all surface water streams, and all ground water sources. The seep at the toe of the refuse pile will need to be included in this monitoring program. Sampling the seep at the property boundary may be included as a surface monitoring site in addition to the seep which will need to be monitored as a ground water source. A minimum of two years of baseline data collection will be required as described in the Divisions Guidelines for the Establishment of Surface and Ground Water Monitoring programs. Following two years of baseline monitoring the applicant may request to sample in accordance with the operational sampling as described in the same guidelines.

ACID AND TOXIC FORMING MATERIALS

R645-301-731.300

The seep emerging from the base of the refuse pile does indicate that acid producing material exists within the permit area. Onsite inspections of this seep in October and November 1992 showed below acidic pHs, high Total Dissolved Solids, Sulfate and Iron which are indicators of acidic conditions. Additionally the presence of "Yellow boy" in the channel bottom indicates the presence of acidic conditions which mobilize metals. The temperature of this water source was a warm 26 degrees Celsius indicating that the water is being heated by the fires within the refuse pile. A sampling and analysis program for acid and toxic potential will need to be developed to address these items as the pile is disturbed, sorted and moved during the permit term.

MAP SHOWING DIVERSIONS, CONVEYANCE AND TREATMENT FACILITIES

R645-301-731.720

The applicant indicates that this regulation does not apply to this permit. This regulation does apply to the permit area. Diversions associated with the permit area drainage system are shown on Plate 7-6. However this plate is

inadequate. The plate shows dashed lines as diversions and cross sections are provided. The diversions should be labeled, show which watershed drains into which diversions, indicate flow direction and where it discharges and indicate whether each diversion is disturbed area or undisturbed area flow. A discussion in the PAP should include but not limited to the designs for these diversion including the drainage area, channel slope, peak flows, erosion protection.

LOCATIONS OF MONITORING STATIONS

R645-301-731.730

Plate 7-2 and 7-3 show locations of water monitoring stations and UPDES points. This is poor quality and does not adequately show specific location and elevation of each site.

WATER RIGHTS

R645-301-731.800

A table and map of water rights in the permit and adjacent areas needs to be incorporated into the PAP. This information should include the source of water, the owner, the flow or amount of water and the location of each right. Baseline hydrologic data should be used to determine potential impacts to the local hydrologic system. The seep emerging from the refuse pile flows into Icelander Wash which is used for irrigation purposes. The seep does not meet water quality standards and could impact the use of this water for irrigation.

SILTATION STRUCTURES

R645-301-732.100

Siltation structures which are not sediment ponds should be included in this section. The applicant does not indicate that siltation structures other than sediment ponds and diversions exist in the permit area. Any use of alternative sediment control structures will need to be approved by the Division prior to use.

SEDIMENTATION PONDS

R645-301-732.200

A general comment regarding sedimentation ponds is that these are existing structures which were approved under old rules and regulations. An assessment of the runoff calculation was done using the OSMs TIPS system. Programs used included Geologic Surface Modeling, Interactive Surface Modeling, Sedcad, Peak and other hydrology programs. The applicant utilized Sedimot to perform simulations of precipitation events to calculate runoff

volumes and peak flows for the sediment ponds. The TIPS digitizing system was used to check watershed areas. Runoff calculations presented in Appendix 7-3 were within reason and acceptable.

Many of the design plates have inadequate contour intervals to fully evaluate the volumes of each pond in relation to precipitation events and the regulations. These ponds will be approved with the stipulation that the applicant will survey these ponds as soon as weather permits but no later than Spring 1993. The results of the survey will be used to develop adequate contour maps (1-2 foot contours) of the as built pond designs. Stage discharge and stage capacity curves should be prepared for all impoundments. The following comments include much of the information submitted to date but may not include all deficiencies.

Pasture Sediment Pond

R645-301-732, R645-301-742, R645-301-743 & R645-301-744:

Plate 7-1 was used to calculate the land area contributing flow to this sediment pond. Plate 7-1 shows the area draining into this sediment pond. This area when digitized contains about 12 acres contributing flow to this sediment pond. Runoff calculations were done using 12 acres of area.

Plate 7-9 provides cross sections for this pond through the embankment spillway and through the pond. Plate 7-9b has been submitted showing the sediment elevation, maximum water level elevation, freeboard, the principal spillway elevation, the emergency spillway elevation, the decant elevations.

Although the plate 7-9b shows a slope of 6.5 and 0.7 percent for the two discharge structures, the drawing indicates that the inlet and outlet elevations are the same. Plate 7-9b shows a 14 inch culvert whereas the discussion in the plan indicates this culvert as a 18 inch culvert. A stage capacity curve was hand drawn on plate 7-9. This curve indicates that the pond has a capacity of 1.85 acre feet. The text and design shows the capacity to be .78 acre feet. A stage discharge curve is required to show compliance with R645-301-731. Additionally, the maps do not provide adequate contours to assess the pond's capacities.

An assessment of the ponds volumetrics and ability to handle design storm events was done using the volumetric capabilities of OSM's TIPS Geologic Surface Modeling and Sedcad. No vertical scale is provided but I assumed the tick marks to represent the contour interval which was calculated

at 5 feet based on the difference of the bold contour lines. This should be indicated on the map. No north arrow is present.

The runoff volumes associated with the pasture pond watershed and the pond design were close to those described in the plan. The designs for this pond are adequate for approval since it is an existing structure.

According to plate 7-1 and 7-6 a road is scheduled to be constructed across the pasture pond watershed. The design plate, 7-9 does not show this road or any of the diversions, culverts etc associated with this road. Following permit approval and prior to this road being constructed, a road design will need to be submitted and approved showing how drainage will be affected and handled by the road construction. This should include but not be limited to the designs for the road's ditches and culverts based on peak flows, velocities, channel slopes, and erosion protection.

Borrow Area Pond

R645-301-732, R645-301-742, R645-301-743 & R645-301-744:

Much of the information required for this pond design is included on plates 7-12a and 7-12b. The contours shown on the design plate are set on 5 foot contours. Volumetric calculations were performed using OSM Interactive Surface Modeling using the contours provided. The volumes provided in the PAP based on hydrologic analysis of the watershed were acceptable. The volumes calculated from the ISM work shows that the pond can contain the 10 year 24 hour precipitation event. The spillway is designed to accommodate 26.5 CFS which is above the peak flow from the 25 year 24 hour event. This pond meets the requirements for storm volume containment.

Old Coarse Refuse Road Sediment Pond

R645-301-732, R645-301-742, R645-301-743 & R645-301-744:

Plate 7-1 was used to calculate the land area contributing flow to this sediment pond. This area when digitized shows about 9.5 acres contributing flow to this sediment pond. Runoff calculations were done using 9.36 acres of area. This degree of difference is acceptable.

The design drawing for this pond was developed using 5 foot contours. Two contours exist within the confines of this pond. I extrapolated several contours for use in the volumetric calculations. Based on this extrapolation, the pond's volumes were within reason.

The stage capacity curve prepared for this pond shows elevations about 50 feet lower than the pond elevation. The top of the embankment is set at 6400 feet. According to the stage capacity curve the embankment elevation is 6340. This should be corrected.

Plates 7-11a and 7-11b provide specifics to the design of this pond. Cross sections for this pond through the embankment and through the pond are shown on plate 7-11a. Plate 5-11b shows a generic cross section through the pond. The cross section describes the two spillways as having a 17.9 and a 12 percent slope but the inlet and outlet elevations are the same. Additionally, adequate contours, stage capacity and stage discharge curves are required to show that the pond complies with R645-301-731. No north arrow is present.

Rail Cut Sediment Pond

R645-301-732, R645-301-742, R645-301-743 & R645-301-744:

Plate 7-1 was used to calculate the land area contributing flow to this sediment pond. Three areas contribute runoff to this pond. These areas when digitized contain 8.3, 20.2, and 20.1 acres plus .56 acres for the sediment pond, totaling 49.2 including the sediment pond surface. Runoff calculations were done using 57.51 acres. Although the difference here is significant the area used to calculate runoff is greater than that digitized as contributing to the pond. The hydrologic calculations for runoff volumes and flows were within acceptable limits.

The design drawing for the pond differs from the as-built pond. An onsite visit in November 1992, revealed that this pond was level with the existing road adjacent to the pond. Looking at the design Plates 7-8a, 7-8b, and 7-8c, the cross section shows that there should be a 15 foot drop from the road to the pond bottom. The pond was either constructed out of design or the pond has filled with sediment to the point that the road is almost level with the bottom elevation.

Plate 7-8a and 7-8b and 7-8c provide the map and cross sections. The cross sections pass through the pond at various intervals. Plate 7-8c show the sediment elevation, the maximum water level elevation, freeboard, the principal spillway elevation, the emergency spillway elevation. Again the spillways do not show any slope based on the inlet and outlet elevations. Adequate contours, stage capacity and stage discharge curves are required to show compliance with R645-301-731.

Due to the uncertain nature of the as built condition of this pond an assessment of the ponds volumetrics and ability to handle the design storm events is not possible at this time without field verification and adequate contours. No scale or north arrow was present on plate 7-8b.

Coarse Refuse Toe Sediment Pond

R645-301-732, R645-301-742, R645-301-743 & R645-301-744:

The watershed contributing to this pond includes 7.5 acres based on Plate 7-1. The design information for this pond is located on Plate 7-7. The drainage area for this pond is shown inset on this plate. Cross sections for the embankment, the spillways, inlet diversions and outlet channels are presented. Elevations are presented for the embankment crest, the principle spillway and the emergency spillway. Runoff volumes and peak flows were within acceptable limits for this pond.

This map is based on 5 foot contours. The volume calculations based on these five foot contours comes up short due to the loss of volume towards the top of pond. A stage capacity was provided on plate 7-7. A stage discharge curves is required to show compliance with R645-301-731.

DIVERSIONS

R645-301-732.300 and R645-301-742.300

Diversions associated with this permit area are shown on plate 7-6. Each diversion needs to be labeled on the map. The cross sections for each diversion are shown on this plate. The watersheds, diversion slope, peak flows and velocities encountered and erosion controls need to be provided for each diversion. **This information is required to demonstrate that these diversion are adequate for the 10 year 6 hour storm event.**

ROAD DRAINAGE

R645-301-732.400 and R645-301-742.400

The majority of roads already exist within the permit area. The applicant needs to provide design details of road ditches, culverts, inlet and outlet protection, trash racks which will be installed and maintained. Additionally, the applicant has failed to identify the hydrologic design details associated with the road which is shown to cross through the pasture pond watershed. Appendix 5-3 lists culverts associated with the roads in the permit area. This table needs to be expanded to include the design information such as peak flows, velocities, erosion protection, use of trash racks for each one.

IMPOUNDMENTS

R645-301-733 and R645-301-743

Five other impoundments are included in this project. These structures are listed below and receive water from the slurry ditches. This water is dewatered in the slurry ponds. Very little runoff except for direct precipitation enters these ponds. The applicant commits to inspections of impoundments on a quarterly basis. This inspection schedule satisfies the requirements for inspections of ponds not meeting the MSHA criteria. A commitment to inspect MSHA ponds weekly should be included as required by R645-301-514.320.

These impoundments are existing structures which were approved under old rules and regulations. An assessment of the ponds runoff calculation was done using the OSMs TIPS system. Programs used included Geologic Surface Modeling, Interactive Surface Modeling, Sedcad, Peak and other hydrology programs. The applicant utilized Sedimot to perform simulations of precipitation events to calculate runoff volumes and peak flows for the sediment ponds. The TIPS digitizing system was used to check watershed areas. Runoff calculations presented in Appendix 7-3 were within reason and acceptable. Many of the design plates have inadequate contour intervals to fully evaluate the volumes of each pond in relation to precipitation events and the regulations. These ponds will be approved with the stipulation that the applicant will survey these ponds during the next construction season and develop adequate contour maps (1-2 foot contours) of the as built pond designs.

Due to the rushed and very limited timeframe associated with this permit review, a cursory overview of these impoundments was performed. As discussed in the sediment ponds section above, the approval of these impoundments will be granted with the stipulation that the structures be surveyed during the spring 1993. Results of the survey will be used to develop adequate design contour maps (1-2 foot contours).

Slurry Ponds 1

Slurry pond 2

Clear Water Pond

East Slurry Cell

West Slurry Cell

DISCHARGE STRUCTURES

R645-301-734 and R645-301-744

The applicant indicates that the discharge structures regulations do not apply to this operation. R645-301-734 indicates that discharge structures will

be constructed and maintained to comply with R645-301-744. R645-301-744 governs discharges from sedimentation ponds, permanent and temporary impoundments, coal processing waste dams and embankments and diversions. The information describing discharge structures needs to be incorporated into this section for ponds, impoundments and diversions.

DISPOSAL OF EXCESS SPOIL

R645-301-735

&

DISPOSAL OF COAL MINE WASTE

R645-301-736

Reject material which is not removed and burned will need to be disposed of in an approved area. The applicant has not provided details of the disposal area showing how runoff will be channeled and diverted away from refuse piles and from the surface of the refuse pile as required. Details of the disposal plan will need to address the R645-301-746.200 including the design and placement of underdrains and surface diversions.

DESIGN CRITERIA AND PLANS

R645-301-740

SEDIMENT CONTROLS

R645-301-742

The only sediment controls described by the applicant is the use of sediment ponds and disturbed area diversions to convey water to the ponds. No alternative sediment controls are planned.

SEDIMENTATION PONDS

R645-301-742.220

The sediment ponds designs need to include the deficiencies which are discussed in the above sections

DIVERSIONS

R645-301-742.300

Diversions designs within the permit area need to include the deficiency comments are discussed above.

IMPOUNDMENTS

R645-301-743

The impoundments designs need to address the deficiencies which are

discussed in the above sections

DISCHARGE STRUCTURES

R645-301-744

The design of discharge structures from impoundments, sediment ponds and diversions will need to include the information required in this regulation.

COAL MINE WASTE

R645-301-746

This section governs the disposal of waste material that will not be consumed by the power plant. This section should describe how waste material that is not transported to the power plant will be replaced in the existing area. The applicant discusses how the slurry ponds and refuse pile was developed. No discussion is presented as to the future of the refuse pile and slurry ponds. The applicant needs to submit details as to the design of the new refuse pile that will be constructed from the rejected material. This new pile will need to comply with R645-301-746.

RECLAMATION

R645-301-760

The final reclamation hydrology plan is inadequate. The proposed plan does not address the requirements of this regulation. The post mining reclamation map does not show the final sediment ponds, drainage channels, or other hydrologic design. This section needs to be up graded to meet the requirements of R645-301-760.

RECOMMENDATION

The hydrology section of this permit continues to remain deficient as outlined above and can not be approved at this time. A technical analysis cannot be accomplished without much of this basic information. I recommend that the permit be denied until the above identified deficient information is submitted as described above or until a timeframe for submittal and compliance can be negotiated between the applicant and the Division. The sediment ponds and diversions issue can be approved with the stipulation that they be surveyed and adequate contour maps be prepared from these surveys.

Sediment Ponds

Considering that the sediment ponds are existing structures which were approved under old rules and regulations, I recommend that the sediment ponds be approved with the stipulation that they be surveyed in the upcoming construction

Page 13
Memo to PGL
PRO/007/035
December 18, 1992

season and new design maps be drawn with adequate contours (1 or 2 foot contours) to describe the as built designs. Many of the ponds volumes can not be assessed with the existing drawings with five foot contour intervals due to the coarse . The discharge structure slopes will need to be surveyed to represent field conditions.

Diversions

An assessment of existing diversions cannot be determined without information which was not presented in the PAP. Considering that the diversions are existing structures which were approved under old rules and regulations, I recommend that they be approved with the stipulation that they be surveyed in the upcoming construction season and new maps be drawn showing the diversions as built designs. This will include channel slope, watershed areas draining into each one, peak flows used in the design, flow velocities, and erosion control structures at culvert inlets, outlets, and along steep sections.