

*Act/041/002*  
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September 22, 1987

TO: FILE

FROM: Kent Wheeler, Reclamation Hydrologist *KW*

RE: Initial Completeness Review of Southern Utah Fuel Company  
Proposed Waste Rock Disposal Site, dated August 3, 1987,  
ACT/041/002, Sevier County, Utah

SUMMARY

This proposal is not complete at this time. The required baseline data has not been presented. Since the urgent need for a waste rock disposal site this data could be collected during the first years of operation. If the waste rock is shown to be non-toxic and non-acid forming the Division would be willing to allow the collection of the data during the start up and operation of the site. If the data is collected during operation the applicant will have to take preventative measures to ensure that the operation does not influence the baseline data.

A preliminary technical analysis was also performed on the hydrologic structures. There are serious problems with the calculation of peak flows and channel velocities for all diversions at the site. These problems are noted under the appropriate sections in the following document.

UMC 783.13 Description of Hydrology and Geology: General Requirements

This section has been partially addressed, however there are several concerns that the Division has that have not been addressed.

The location and uses of the local ground water aquifer has not been identified. This is important because of the possibility for degradation of the groundwater by leaching of the fill material even if it has been shown to be non-toxic and non-acid forming. The waste rock site is located in an area with several summer residences and the possibility exists that these residences use the same aquifer that the waste rock disposal site could impact.

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During the onsite visit by Division personnel on 9-19-87 an inspection of the wells suggested that the local groundwater aquifer was quite close to the surface in the area of the proposed sediment pond. This could present a problem during the spring recharge period when groundwater levels could be significantly higher, interfering with the storage capacity of the incised sediment pond.

The level of ground water investigation at the site is dependant on the results of the analysis of the waste rock. The applicant has four monitoring wells on site, these may or may not be sufficient for determining the ground water hydrology in the area. At a minimum two years of baseline monitoring of the water quality and groundwater levels are needed.

#### UMC 783.25 Cross-Sections, Maps, and Plans

In order to evaluate culvert capacities and undisturbed diversion designs a map of the entire undisturbed drainage is needed. This map should be of sufficient detail to delineate drainage boundaries, watershed slopes, and channel slopes in the undisturbed watersheds.

To help facilitate the hydrology review and eliminate unnecessary and outdated information Map 2 from the MPR and the site plan from SHB report should be combined and updated. This map should show the location of each completed well, all diversion ditches, correct location of the culverts, correct location of the sediment pond, and each proposed monitoring station for ground water and surface water.

These and all maps submitted should be properly prepared and certified as required by the respective sections in the UMC.

#### UMC 784.14 Reclamation Plan: Protection of Hydrologic Balance

A detailed cross-section is needed showing the waste rock area after it is completed. This should show the terraces, slopes, and location of the terrace diversions. This cross-section should be of sufficient detail to evaluate the average slope, how the surface runoff from the area will be collected, and the height and steepness of the terraces.

UMC 817.42 Hydrologic Balance: Water Quality Standards and Effluent Limitations

In order to show compliance with this section and with the hydraulic structure designs specifications the applicant needs to commit to the installation and maintenance of a standard large capacity 8 inch rain gage or a standard Fergusson type weighting rain gage. Since precipitation in this area comes in the form of snow with little immediate runoff the rain gage does not need a snow shield and does not need to be maintained during the winter season.

UMC 817.43 Hydrologic Balance: Diversions and Conveyance of Overland Flow, Shallow ground Water Flow, And Ephemeral Streams

The designs for all of the diversions in the disturbed area need to be corrected and channel protection provided in the areas where channel velocities are greater than 3.5 ft/sec. Problems with the diversion include the following:

- 1)The incorrect area was used for calculating peak flows from the disturbed area.
- 2)For the terrace diversions  $T_c$  was incorrectly calculated.
- 3)The designs for all diversions and channels found the use of a Mannings 'n' value of 0.045, although the channels may eventually become vegetated, they will initially be barren straight and clean; therefore, the designs should reflect this condition. A Mannings 'n' of 0.035 is more appropriate for non-riprapped channels.

The use of a Curve Number (CN) of 80 is acceptable; however it should be noted that this is a weighted CN. The disturbed areas should have a CN of 90 and the areas that are undergoing concurrent reclamation have various lower values.

The applicant proposes using the existing channel for Ditch # 2. Since the upper section is deeply incised the applicant needs to show how they will convey the water from the terrace diversions into the incised channel. The Division recommends designing and emplacing a separate channel to convey the water off of the steep area, this channel could join the existing channel at a

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point below where the channel is incised. If the applicant chooses to follow this course of action then the maps requested in section 783.25 of this document should show the diversion channel separate from the existing channel.

The applicant designs for the undisturbed drainages could not be checked at this time due to the insufficient maps, however a cursory check showed the use of 6 ft/sec as the permissible velocity in the grassed waterway (Diversion for area 1). Due to the erosive soils the Division feels that this value is too high and a more correct value would be 4 ft/sec.

The applicant back calculated channel designs by using a limiting velocity approach and estimating channel slopes. This approach works well on relatively flat land; however, at the waste rock disposal site some reaches of the proposed channel have twenty percent slopes. For these steeper sections the back calculations can produce unacceptably wide shallow channels. It appeared from the calculations that the applicant used a more average channel slope rather than the maximum channel slope. The maximum and minimum slopes should be calculated using the steepest and shallowest channel reaches that are easily estimated from the contour map (between 10 ft contours).

The Division calculations show that the applicant significantly underestimated peak flows in the disturbed area diversions. Upon recalculation the applicant may find that some reaches of the diversions may need to be riprapped. Using a standard channel design the applicant should calculate the slope at which the velocities become erosive and commit to riprap any reaches of channel that are steeper than the critical slope.

The present MPR does not show any design details for energy dissipators at the outlets of the culverts and diversions into and out of the sediment pond. The energy dissipator and spreader designs are critical especially at the outlet of the culvert in the grass swale. Since the proper performance of a grassed waterway is dependant on the water not being concentrated this spreader design is critical to ensure that the flow is not concentrated at a single point.

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UMC 817.46 Hydrologic Balance: Sedimentation Ponds

The review of the sediment pond could not be completed because of insufficient details of the pond. The Division needs a contour map (2 ft C.I.) or further cross-sections to be able to evaluate the capacity of the pond. Furthermore, the elevations in technical analysis (SBH report) of the sediment pond should be corrected to show the current pond location.

The calculations of sediment yield for the pond are incorrect. The applicant choose to use 0.1 ac-ft per acre of disturbed area for the sediment yield. When using this method the entire disturbed area must be considered not the area disturbed in 1 year.

The emergency spillway design was not evaluated at this time however the Division recommends that this spillway be located at the front of the sediment pond to eliminate the bend in the channel and the necessity of designing riprap diameters and flow depth to account for this bend.

UMC 817.52 Hydrologic Balance: Surface and Groundwater Monitoring

The MRP does not address a proposed monitoring plan. This plan should include all baseline, operational and reclamation period water monitoring stations, parameters that will be monitored as per DOGM guidelines, dates of sampling, and a commitment to a date at which to have the water monitoring data submitted to the Division. The application must also commit to E.P.A. certified laboratory analysis for all samples.

The applicant also needs to show that it is attempting to obtain a NPODES permit for the sediment pond.

cc  
S. Linner  
R. Summer  
1239R-56