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T/015/019 #2

utah power
& LIGHT COMPANY
MINING DIVISION
P.O. Box 310
Huntington, Utah 84528

October 18, 1989

Mr. Rick Smith
Permit Supervisor
Division of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

Dear Mr. Smith:

Re: Amendment to Undisturbed Area Runoff Control Facilities - Cottonwood/Wilberg Mine

During the Permit Renewal of the Cottonwood/Wilberg Mine the undisturbed and disturbed runoff control ditches, culverts, sediment ponds, and sediment basins were designed by Hanson, Allen and Luce, Consulting Engineers of Salt Lake City, Utah. The Division approved these designs. The calculations and designs are at the Division office in Salt Lake City. Appendix XIII contains maps showing this drainage control.

Map sheet 1 of the Appendix XIII designates the undisturbed culvert CU-2 as an 18 inch diameter culvert which conveys the undisturbed runoff from area UA-2 to the inlet of the undisturbed culvert CU-1 at the "waterfall". The design flow of the culvert CU-2 is 4 cubic feet per second based on the analysis described in the Appendix. The 18 inch pipe size was based on the inlet control condition with headwater depth less than one pipe diameter.

The pipeline designated as CU-2 will actually have an inlet located on the sandstone ledges above the mine water storage tank and will convey the collected runoff along the escarpment above the mine portal access road. This elevated pipeline will be supported from hangers installed in the rock face. UP&L proposes revising the size of the pipeline to utilize a smaller diameter steel pipe which will reduce the number and load bearing requirements of the pipe hangers allowing for a safer and more

efficient design.

According to Manning's Equation, a 12 inch diameter smooth steel pipe, Manning's n= 0.012, the required slope to convey 4 cfs is 1.07%.

Manning's Equation

$$Q = \frac{1.49}{n} A \cdot R^{2/3} S^{1/2}$$

Q = flow, cfs

n = Manning's roughness coefficient
= 0.012 for steel pipe.

A = cross sectional area, ft^2

R = Hydraulic Radius = A divided by the wetted perimeter, ft.

S = Slope, ft/ft

Solving for S

$$S = \left(\frac{nQ}{1.49\ AR^{2/3}}\right)^2$$

for Q = 4 cfs

for 12" Pipe, $A = \pi D^2/4 = \pi/4$ (D = 1 ft)

$$R = \frac{\pi D^2/4}{\pi D} = D/4 = 1/4$$

$$S = \left[\frac{(0.012)\ (4)}{1.49\ (\frac{\pi}{4})\ (\frac{1}{4})^{2/3}}\right]^2$$

$$= 0.0107 \text{ ft/ft or } 1.07\ \%$$

An 18 inch inlet will be maintained to collect the runoff and get it into the pipe. A Reducer will be installed at 5 feet below the inlet (5 foot vertical drop) to overcome the inlet losses to the 12 inch pipe. The 12 inch smooth steel pipe will then be run at a minimum 1.1% grade to the discharge point above the inlet of the CU-1 culvert.

This modification will comply with the requirements for surface drainage facilities and represents sound engineering practice.

Upon Division approval Map 1, revised 10/20/89, and Figure 1 will be inserted into the permit in Appendix XIII. It is recommended that upon Division approval that a copy of this letter be attached to the Hanson, Allen & Luce report in the Division file.

Sincerely,

David Smaldone
Director of Permitting,
Compliance and Services

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