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December 19, 1978
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Mr. G. Trager
Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Shootering Canyon Project, Docket No. 40-8698

Dear Mr. Trager:

This is to confirm and elaborate on our telephone conversation of December 18, 1978.

Tailings neutralization - Is the plan to neutralize the tailings applicable to all three disposal alternatives? Has the capacity of the containment utilized by the rock required for the neutralization been considered in the evaluation?

Response - Yes, the tailings would be neutralized with any of the alternatives. The benefits of neutralization would be independent of the disposal alternative. Neutralization would result in precipitation of a major proportion of the dissolved radioactive and toxic ions from the tailings liquid within the tailings mass, where they would be permanently contained. This action would minimize the risks to the environment from any liquid which might seep from the containment. Also, for all disposal alternatives evaluated, recirculation of tailings liquid to the process circuit would be expected. The recirculated liquid would be withdrawn from the containment, either by an underdrainage system or a decant system. Neutralization would improve the quality of the liquid with respect to reuse in the process circuit.

The estimated quantity of mine waste rock required to neutralize the tailings liquid would be about 15 tons per day, based on an ore processing rate of 750 tons per day and an assumed carbonate (or equivalent) content in the waste rock of 10 percent. Because the capacity of the natural basin with impoundment dam may be varied by changing the height of the dam the capacity utilized by the rock used for neutralization would not be a significant consideration with that alternative. For the two other alternatives the size of the excavation would have to be increased at least two percent (15/750) to accommodate the neutralization rock. It is noted that for the alternatives requiring excavation the entire excavation must be completed in advance of project operation and the capacity cannot be altered after initial utilization. For the purposes of the study

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"Evaluation of Tailings Disposal Alternatives" December 1978, no weighting was assigned to flexibility in capacity, or to capacity utilized for purposes of neutralizing the tailings liquid.

Tailings drainage - Would a tailings underdrainage system be utilized with all three disposal alternatives?

Response - We would expect that PRL would try to drain the tailings no matter which disposal alternative was selected. The benefits of drainage would be generally independent of the facility location or configuration. Drainage would reduce the volume of liquid to be contained, reduce the potential for seepage from the containment, accelerate the stabilization of the tailings mass, and increase the amount of liquid that could be withdrawn for reuse in the process circuit. The plan for tailings underdrainage was developed in greater detail for the natural basin with impoundment dam than for the two other disposal systems evaluated.

Tailings disposal costs - Economic evaluation of disposal alternatives require consideration of capital and operating costs, all discounted to a common base. Are the estimated operating costs the same for all disposal alternatives? What is the cost for the tailings drainage system?

Response - For the purposes of evaluating the disposal alternatives no significant differences in operating costs were identified. A slightly greater pumping effort would be required to move the tailings to the excavated pit alternatives than to the natural basin alternative, but the differences in pumping costs were not considered system differentiating. Also the costs for neutralization rock and for operating the underdrainage system would be equivalent for the three disposal systems evaluated.

The one important cost difference among the alternatives is the capital costs. For the excavated pit, and the combination pit with containment dike, much greater capital costs are involved than for the natural basin with impoundment dam. Also, all of the capital costs for the excavated pit alternatives must be incurred in advance of project operations, whereas for the natural basin alternative a major part of the dam may be deferred until several years of project operation have been completed.

Capital costs for the tailings underdrainage system would be equivalent for all disposal alternatives. No refined estimates have been compiled at this time, but for preliminary purposes it is expected that

about 10,000 feet of 4-inch diameter perforated drain pipe would be required and that such pipe could be installed for about $5.00 per foot. The total system cost with pump, collection sump and return pipe would probably be about $100,000 for all three alternatives.

Membrane Liner - The estimated cost of $0.50 per square foot for a membrane liner of the tailings containment seems high.

Response - The preliminary estimate presented included costs for materials, transportation to the site, installation including foundation leveling and smoothing, and a protective layer of sandy material spread on top of the in-place liner. In our judgment the estimate is the lowest that may be used for this type of investment decision.

Waterfowl - Will waterfowl use the tailings pond? How toxic will the liquid be to waterfowl? Will waterfowl be increasingly subjected to predation as a result of the project?

Response - Few waterfowl utilize the Colorado River basin as a flyway, and few birds would be attracted to an open-water facility in the Shootering Canyon vicinity. No ponding of water is expected on the Shootering tailings because the drainage system is expected to remove free liquid at the rate it is added to the disposal facility. Because the tailings surface will be continuously rising and expanding there will be little opportunity for the establishment or propagation of aquatic biota suitable for waterfowl food and for this reason the tailings pond will not attract waterfowl. Neutralization will reduce but not eliminate the toxicity of the liquid, but no waterfowl are expected to ingest fatal nor debilitating quantities of tailings liquid. Predation on waterfowl in the area will not be affected by the project.

We hope the above has satisfactorily responded to your concerns. Please call if we may be of further assistance.

Sincerely,

M B Bennedsen

M. B. Bennedsen
Senior Project Engineer

MBB:AC

cc - Messrs. Sewell, PRL
Rookstool, PRL