

HYDROLOGIC ENGINEERING SUMMARY  
SHOOTERING CANYON MINE  
GARFIELD COUNTY, UTAH

8005150520

INTRODUCTION

The Shootering Canyon uranium mine is located in Garfield County, Utah about 42 miles south of Hanksville and about 9 miles north of the Glen Canyon National Recreation Area. The applicant, Plateau Resources Limited, proposes to construct a uranium ore processing facility about 3 miles south of the mine. Tailings from this facility will be impounded in a depression which will be formed by building a dam embankment across a small tributary to Shootering Canyon. The drainage area of this small tributary upstream of the proposed dam is about 222 acres. The tailings dam will be built in two stages. The stage 1 dam will have a maximum height of 85 feet. The elevation of the crest of this dam will be 4433 feet mean sea level (msl). This dam will impound tailings discharged from the plant for about seven years, at which time the stage 2 dam will be constructed. The stage 2 dam will be formed by raising the stage 1 dam an additional 33 feet to elevation 4466 msl. This will provide storage space for an additional 13 years of plant operation.

FLOOD POTENTIAL

The applicant assessed the potential of flooding from the 222 acre drainage area upstream of the proposed dam. Also considered was water run-up on the dam embankment due to wind generated waves.

We have evaluated the applicant's analysis and conclude that a minimum free-board of 13 feet for the stage 1 dam and 11 feet for the stage 2 dam, as proposed by the applicant, provides an adequate margin to allow for wind wave run-up and also provides sufficient storage space to impound the entire

volume of the Probable Maximum Flood (PMF) series and the 100 year flood as suggested in Regulatory Guide 3.11, "Design, Construction and Inspection of Uranium Mills", (Revision 2).

#### SLOPE PROTECTION

Both the upstream and downstream shells of the embankment consist of a mixture of boulders, cobbles, gravels and sand. Material larger than 12 inches in size will be raked to the outer 10 feet (horizontal measurement) of the embankment to serve as slope protection material. This will provide a slope protection rock layer that is about 4.5 feet thick. In addition, the applicant has stated that "During operation, the tailings will be distributed in the impoundment area in such a way that at no time will there be a free water surface in contact with the face of the dam." We conclude that these design and operation provisions will protect the embankment slope from wave attack and erosion.

#### GROUNDWATER AND SEEPAGE

To minimize seepage flow into the underlying strata, the applicant proposes to line the impoundment with a layer of compacted clayey soil. The thickness of this clay layer will be equal to 10 percent of the maximum hydraulic head acting on the foundation surface, or a minimum of two feet. To provide drainage for the tailings, a minimum 18 inch layer of sub-drain granular material will be placed on top of the clay liner. Within this sub-drain layer will be a underdrain collection pipe system which will route drainage from the tailings to a sump where it will be pumped back to the plant recycle

system or impoundment. In addition, the applicant has established a ground-water monitoring system to detect any seepage from the tailings area. In the seepage analysis, the applicant conservatively assumed that the underdrain system will be ineffective in collecting liquid from the tailings. This analysis shows that seepage will not occur to areas outside of the site boundary. Based on our review of the applicants analysis, we conclude that the seepage control measures proposed by the applicant meet the intent of Regulatory Guide 3.11.

## REFERENCES

1. Responses to questions on the Environmental Report, August 29, 1978.
2. Tailings Management Plan and Geotechnical Engineering Studies, Shootering Canyon Uranium Project, Garfield County, Utah, September 1978.
3. Responses to Hydrologic and Geotechnical Questions, January 19, 1979.
4. Stage I - Tailings Impoundment and Dam, Final Design Report Shootering Canyon Uranium Project, Gardfield County Utah, May 1979.
5. Contract Drawings which accompanied reference no. 4, May 24, 1979.
6. Groundwater Monitoring Wells, Shootering Canyon Uranium Project, June 1979.