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Lat-long.

MEMORANDUM

To: Kelsey L. Boltz  
From: F. X. Cannaday  
Re: Submittal of the Congress Mine (Uranium Potential). Congress Junction,  
Arizona by Barge-Butler & Co., Inc.

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Following is the review requested on this subject.

F. X. Cannaday

cc: Gene Pendery

The Uranium Potential of  
The Congress Mine - Preliminary Report  
Charles R. Butler - Edward M. Barge  
November 19, 1976

A Review By  
F. X. Cannaday, Nuclear Dynamics, Inc.  
February 14, 1977

Data in the form of private reports from the 1950's and up to date geological reports by Barge-Butler (1976) and a report (February 2, 1977) by Drs. Mills and Ritchey (professors of chemistry at Fort Lewis College) on the chemistry of the mine with a view towards chemical recovery of the uranium were submitted to Mr. E. C. Pendery.

The following is a review based on the above-mentioned data. The Congress Mine was a gold producer at the turn of the century. It is now essentially worked out. Recorded production from 1891 to 1911 was 388,427 ozs. of gold and 345,598 ozs. of silver from 692,320 tons of ore. The mill tailings amount to 426,000 tons carrying 0.07 oz./ton gold and 0.3 oz./ton silver. These tailings were worked over in 1938 to 1942. During the first uranium boom uranium was recognized in the workings. The AEC made and wrote a brief report on the occurrence (February 1, 1955).

D. W. Jaquays are presently making ready to leach tailings and dump material of remaining gold and silver values. The question appears to be whether to leach whatever uranium content is present in the dumps as well as in the mine water and the mine itself.

The gold ore occurred in a flat quartz ore shoot dipping  $25^{\circ}$  N. averaging  $2\frac{1}{2}'$  in thickness. Immediately above the quartz is a 4' to 5' thick diorite dike, having a flat fault with guage for hanging wall. Above that is granite. The uranium in the form of liebigite (secondary,  $\text{UO}_2(\text{CO}_3)_4 \cdot \text{H}_2\text{O}$ ) occurs in the hanging wall fault and downwards for about 14 inches average, more when the dike is crossfractured.

The uranium mineralization seems to be best where gold in the quartz was best.

From data, the ore shoot was 3900' by 600' and using  $2\frac{1}{2}$  inches as thickness of uranium zone (instead of 14 inches) and using an average grade of 0.05%  $U_3O_8$  we get 468,000 lbs.  $U_3O_8$  in place.

This is a very limited reserve, which may be difficult to leach in situ because of the manner in which it occurs.

The water in the workings may be in the order of 4,290,000 ft<sup>3</sup> containing by analysis (at the top of the water) 3 to 5 ppm  $U_3O_8$ , which amounts to 1068 lbs.  $U_3O_8$ , again a very small quantity.

There may be 232,000 tons of gob and backfill (I can't find room in the mine workings for 700,000 tons reported) which if given the same uranium content as the tailings (reported at 0.01%) amounts to 46,000 lbs.  $U_3O_8$ , which could conceivably be leached out but even if recovery were high, is not much of a reserve.

Finally the tailings and surface dumps add up to a reported 500,000 tons which at 0.01% grade for the tailings and assuming the same for the dumps amounts to 100,000 lbs. of  $U_3O_8$ .

#### Summary

Reserve (all types)	lbs $U_3O_8$	Assumed Recovery	Assumed Recoverable # $U_3O_8$ by leaching stopes as is
Underground in place	468,000	10%	46,800
Underground in gob	46,000	60%	27,600
Underground in water as is	1,000	100%	1,000
Surface dumps, tails	<u>100,000</u>	60%	<u>60,000</u>
Total	515,000 lbs		135,400 lbs

Gross @ \$40 = \$5,416,000

From the data supplied, the mine water has a high concentration of bicarbonate (est. 1300 ppm). The hostrock is stated to contain 6 to 9%  $\text{CaCO}_3$ . Tests on acid leaching show prohibitive consumption. Alkaline leaching is indicated to be effective slowly (only on exposed  $\text{U}_3\text{O}_8$  minerals).

It would appear that leaching with a minimum of chemicals underground reserves as is and surface materials with a minimum of handling, might be a reasonable approach. The recovery factors given of course are plain guesses.

At this moment, there is insufficient data to arrive at a ballpark cost figure for such a leaching operation.

The reserves are limited which detracts from the incentive to look into cost and recovery figures.

A handwritten signature in cursive script, reading "Francis X. Cannaday". The signature is fluid and elegant, with a long horizontal line extending from the end of the name.

Francis X. Cannaday  
Manager, Base & Precious Metals