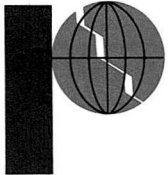


Jim Heady  
019553



**PITEAU ASSOCIATES**  
GEOTECHNICAL AND  
HYDROGEOLOGICAL CONSULTANTS

215 - 260 WEST ESPLANADE  
NORTH VANCOUVER, BC.  
CANADA V7M 3G7  
TELEPHONE (604) 986-8551  
FAX (604) 985-7286

Our file: 85-804B

December 21, 1992

DENNIS C. MARTIN  
R. ALLAN DAKIN  
ALAN F. STEWART  
FREDERIC B. CLARIDGE  
TADEUSZ L. DABROWSKI

Mr. Bill Dunn, P.Eng.  
Chief Engineer  
Curragh Inc.  
P.O. Box 1000  
Faro, Y.T.  
Y0B 1K0

Dear Mr. Dunn:

Re: AY Zone Slope Failure in Faro Pit

As requested, Piteau Associates Engineering Ltd. has completed a geotechnical assessment of the AY Zone slope failure in the Faro Pit. Mr. A. Stewart, P.Eng. visited the site on December 16 to 18, 1992. During that time, the geology was reviewed and an inspection of the area was made with Messrs. M. Wasel, W. Dunn and J. Deforest of Curragh Inc. Subsequent to this, discussions were held with Mr. J. Hogg and Mr. R. Mason. A preliminary report was issued on December 18, 1992 before Mr. Stewart left the mine.

BACKGROUND

The geology and proposed mining scheme for the AY Zone has been described in our letter of November 6, 1992 and will not be repeated herein. It is understood that mining generally progressed well until the recent failure, with the only previous slope movement occurring in the western portion of the area near the top of the zone, at about the 3800 ft elevation. In this area, a block of carbonaceous quartzite slid along the 40° dipping contact with the underlying phyllite. The block, which became detached during a blast, was subsequently removed with the mucking, leaving a horseshoe shaped backscarp. In more recent times, a crack has been observed behind the eastern side of the backscarp, with the rock in front of the crack appearing to be broken and incompetent. Mining has been suspended in the area immediately downslope. The remaining portion of the recently mined slope in the western area of the AY Zone appears stable and competent.

It is understood that the recent failure occurred on December 13, 1992. As early as December 11, a crack was observed in the ice that covered much of the face. At this time, relatively mild temperatures had resulted in a considerable amount of water flowing down the face. By December 12, personnel observed that the water flowing over the face was reduced and seeping from the face at the toe of the slope. Early on December 13, a few hours before the failure, cracking and spalling of the ice and the rock mass near the toe of the slope was observed, and all mining personnel and equipment were removed from the immediate area. Failure occurred at about 11:00 a.m. on December 13.



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Curragh Inc.

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Following the slope failure, a number of cracks approximately two inches wide were observed in the rock mass for a distance of about twenty to thirty feet west of the western edge of the failure. It is understood that these cracks have continued to widen since the failure, with the present crack width being up to about five to six inches.

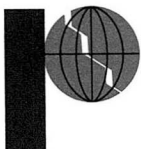
#### SITE VISIT

At the time of the site visit, it was apparent that the failure mass had been about 10 to 20 ft thick and had failed along steep dipping faults (striking approximately perpendicular to the slope) and S2 foliation in the phyllite. Widening of the cracks on the western side of the failure appeared to be continuing, albeit at a very slow rate. At the crest of the failed area, frozen rubble remained on the slope. On the afternoon of December 16, there were auditory indications that a slight amount of movement was occurring. In addition, it was observed that there was a considerable ice buildup on the pit slope in and around the area of the failure, and what sounded like a large amount of water could be heard flowing behind the ice, particularly just east of the recent failure. At one location, toward the western side of the AY Zone, water was spurting for a distance of about three feet from a crack or hole in the ice.

To monitor possible slope movement above the active mining area, four prisms have been monitored about every two or three days since mid-November. Monitoring results indicate that little movement has been recorded by these prisms, with net movement rates all being less than about 0.25mm/day.

#### CONCLUSIONS AND RECOMMENDATIONS

Based on the inspection of the AY Zone and a review of the sequence of events surrounding the recent slope failure, it is concluded that further sliding, particularly from the area immediately west of the failure, is likely. Sloughing of frozen rubble from the crest area of the recent failure could also occur, most likely when this material begins to thaw. However, as discussed with yourself and Messrs. M. Wasel and J. Deforest, it is also concluded that a portion of the presently broken ore can be safely mined at the present time. In this regard, a consensus was reached by the writer and the above personnel as to the location of a safe dig limit. The location of this limit, which was outlined in the pit with a line of survey stakes, is illustrated approximately on the attached plan.



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In general, two areas of the muck pile may be mined; west of the cracks that are just west of the failure, and east of the recent failure in front of Shovel #5. While it should be possible to mine the western area at any time of the night or day, it is recommended that the eastern area, in front of Shovel #5, be mined only during daylight hours. However, before any mining begins, it is strongly recommended that an impact berm be established along the southern edge of the muck pile between the western and eastern mining areas.

Monitoring of the four prisms above the AY Zone should be continued on a daily basis while mining the AY Zone. As before, visual monitoring of the face for signs of stress or movement (e.g. cracking and/or spalling of the ice or rock) should be carried out by operations and engineering personnel on an ongoing basis.


Following removal of the ore up to the existing dig limits, it may be possible to move the dig limits closer to the pit wall. Similarly, it may be possible to mine the remaining 10 to 15 ft of broken muck (i.e. probably by backhoe) that is close to the face at the extreme eastern of the AY Zone. However, such decisions, as with all decisions to continue mining in the area, should only be made after a careful review and inspection of the areas in question, and after engineering personnel are satisfied that the working area is safe.


With regard to the practicality of using a small explosive charge to scale the broken rock mass behind the eastern side of the horseshoe shaped backscarp at about the 3800 ft elevation, it is uncertain if such an approach will be successful. However, as no further mining activity will be allowed under this area unless the broken rock in question is removed, and the slope is stabilized to the satisfaction of mine personnel, an attempt to scale the slope should not present any risks with respect to sterilizing additional ore. Nonetheless, extreme care should be exercised during any scaling activity to ensure the safety of all personnel.

I hope the above is sufficient for your needs at this time. If you have any questions concerning the above, please do not hesitate to contact us.

Yours very truly,

PITEAU ASSOCIATES ENGINEERING LTD.

  
Alan F. Stewart, P.Eng.



AFS/ef

Att.

# CURRAGH INC.

AY TARGET DIG MAP

DECEMBER 18 1992

