

# WILLIAMS & ASSOCIATES, INC.

P.O. Box 48, Viola, Idaho 83872

(208) 883-0153 (208) 875-0147

Hydrogeology • ~~MINERAL RESOURCE MANAGEMENT~~ • Geological Engineering • Mine Hydrology  
CENTER

'86 OCT 16 P2:37

October 7, 1986

Dr. Phil Justus  
Division of Waste Management  
Mail Stop 623-SS  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Phil:

Jeff asked me to provide you with a comment on the Buckley, Tiktinsky, Mataraja trip report to the Lucky Friday Mine. The trip report is dated September 9, 1986.

I have been underground myself in the Lucky Friday Mine on several occasions. Consequently I am reasonably familiar with it. In addition, one of my colleagues worked on the engineering design of the 6,200 foot level shaft that was completed in 1983. I can't see much of a problem with the analogy that the trip report draws between the Lucky Friday Mine and the BWIP site as far as the rock mechanics is concerned. The Cohassett flow interior, which is the expected horizon to be mined at the BWIP site, presumably is in tight indurated rock. Its properties would be expected to be similar to those of quartzite, which is the rock in which the Lucky Friday is located. It is true that the Lucky Friday has a genuine rock burst problem as a consequence of the high ratio of horizontal to vertical stress (the ratio is about 2). Our University and the Bureau of Mines Spokane Mining Research Center personnel in Spokane, Washington, have been trying to devise a technology for predicting rock bursts for quite a few years. We are trying to expand that activity this year via a special appropriation from the Senate Interior Committee. A few people are killed every year in the Lucky Friday by rock bursts.

The temperature distribution at the BWIP site and at the Lucky Friday site probably will turn out to be similar. The BWIP temperatures as reported currently are higher, but this is probably a consequence of the fact that the mine ventilation system at the Lucky Friday Mine has lowered the rock temperatures over the decades of operation of the mine.

The real difference between the two sites lies in the type of rock through which the shafts must penetrate. The two shafts at the Lucky Friday site are restricted essentially to quartzite rock. At some scale it is effectively homogeneous. The rock is reasonably tight (low permeability) all the way down to the base of the mine. Both rock properties and hydrogeologic properties are relatively constant with depth at the Lucky Friday site. The BWIP shafts on the other hand will encounter layers of material with a great variety of rock mechanics properties and

WM-RES  
WM Record File  
D1020  
WEA

WM Project 10,11,16  
Docket No.

PDR ✓  
LPDR ✓ (B,N,S)

Distribution:  
P Justus J Buckley  
T Pohle M Tiktinsky  
(Return to WM, 623-SS) Nataraja See

8611190399 B61007  
PDR WMRES EECWILA PDR  
D-1020

3473

Dr. Phil Justus  
Page 2  
October 7, 1986

hydrogeologic properties. The shafts must penetrate flow tops that are fractured and highly permeable. They must penetrate interbeds that are unconsolidated and unstable. They must penetrate 800 feet of overburden above the basalt sequence that contains everything from glacial outwash boulders to lake sediments. They must penetrate rocks whose permeabilities range from that of confining layers to highly prolific aquifers. These conditions that are expected to be encountered at the BWIP site constitute the rationale for blind boring the BWIP shafts. The DOE investigators have concluded that it would be very difficult to construct the shafts by the conventional methods (drill, blast, and muck) that were used at the Lucky Friday shafts.

I hope this comparison is useful to you. I also hope things are going well for you as Branch Chief. If you need additional information about the differences or similarities between the two sites, please call. I wish I had known that John, David, and Raja were going to be in the area; I would have arranged to take them underground in our research mine where we are studying acid mine drainage and fracture controlled hydrogeology. It is only a few miles away from the Lucky Friday.

Sincerely,



Roy E. Williams

REW:s1

cc: Jeff Pohle