

Memorandum (11/16/05)

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Subject: Letter of Intent - Homestake Mine, DUSEL

This “letter of intent” is in response to a notice posted on the internet and a brief exchange with Dr. J. Wang and LBL. We propose a study of the state of stress and rock properties of the Yates member of the Poorman (Homestake?) at the Homestake Mine site. This work would be done on the 4850 Level that connects the Yates and Ross Shafts. The Yates member is accessible along the route. The work would be a cooperative effort by personnel from the Homestake Mine, the Spokane Research Laboratory of NIOSH (formerly the U.S. Bureau of Mines) and the Department of Mining Engineering at the University of Utah. The investigation could be of some importance to design of large, deep excavations for neutrino detector caverns at the mine that have been proposed in the Yates member at depth (7400 ft).

1) Title: “Yates Member Study at the Homestake Mine”

2) Participants: Participants include personnel from the Spokane Research Laboratory including Tom Brady and Doug Tesarik, who are familiar with prior studies at the mine, and Bill Pariseau at the University of Utah. However, the research interest of personnel at the Spokane Research Laboratory should not be construed as official policy favoring one DUSEL site over the other. There are other potential participants, for example, students possibly from South Dakota School of Mines and Technology and the University of Utah. We would need the assistance and guidance of a geologist or engineer familiar with the mine and one who knows the 4850 Level and where the Yates Member is located. We would also need mine personnel to assist in transport of materials to and from the study site, presumably by rail on the 4850 Level.

3) Proposal: In brief, we wish to gain access to the 4850 Level between the Yates and Ross Shafts where the Yates Member is exposed for the purposes of making stress measurements and in situ modulus measurements, and for acquiring drill core for laboratory measurements of rock properties including elastic moduli and strengths, for example. Other properties of interest are P- and S-wave speeds. Preliminary numerical analyses of neutrino cavern stability and safety are encouraging but are based on very

limited data, tests on three core. Reliable design requires a much larger data set. The proposed deep site off the 7500 Level or thereabouts is inaccessible and would, in any event, require considerable exploratory drilling. By studying the Yates Member on the 4850 Level, we gain considerable time and potentially could remove much uncertainty about the suitability of the Yates Member well in advance of deep design. The study would also be of some benefit to deep stress measurements in the Yates Member, which surely would be necessary, because of the nuts-and-bolts experience doing stress and modulus measurements in this particular rock type. We have experience in doing stress measurements at the Homestake Mine using different techniques and we (Spokane Research Laboratory) has the equipment.

- 4) Space Requirements: We would need some staging area at the mine, probably at the hoist collar of the Ross Shaft and also some storage space for equipment, core boxes and so on. We do not anticipate unusual conditions.
- 5) Access Underground: The sooner we are able to gain access underground to the 4850 Level, the more beneficial will be the study results in advance of DUSEL planning and design. For this reason, access in 2006 is desirable. We would need ventilation, air, water and electrical power, mainly for drilling. We would also need assistance in moving equipment in and out of the mine.
- 6) Other: We have two other projects under consideration that would involve much the same personnel. In this regard, we are very much interested in student and young investigator involvement. In particular, we see a need to pass the skills associated with doing underground rock mechanics work to the next generation of engineers and scientists.