

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 time-dependent deformation at the Homestake Mine site. The study would be a continuation of work started in 1994, but subsequently paused in March, 2003. This work was 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 long-life design of large, deep excavations for neutrino detector caverns at the mine.

1) Title: “Time-dependent Deformation 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, possibly from RE/SPEC and the South Dakota School of Mines and Technology with whom we have worked in the past. However, no discussions have been held with these groups at this time.

3) Proposal: In brief, we wish to gain access to the 3350 Level of the Ross Shaft where we left 6 operational MPBX’s in March, 2003. These instruments can be read manually, but we would also like to reinstall our data acquisition system (DAS) that is currently stored by RE/SPEC in Rapid City for semi-continuous acquisition of data. This action would require restoration of ventilation, at least for the time it takes for manual readings, and power for the DAS. A readings set can be done easily in a morning, no more than several hours counting cage time.

This data set is unique because it shows an almost pure time-dependent component of rock mass motion because of the long intervals between blasting when the mine was operating, and the

several years that have elapsed since the last blast. In consideration of the 25-yr minimum life of some proposed neutrino detector caverns, these time-dependent data should be of considerable help in long-life design of these unprecedented excavations. Few, if any, such data sets are available anywhere in the world of hardrock mining for even general guidance. As we collect the data, we propose to exercise various numerical models of time-dependent rock mass motion with the goal of determining the most appropriate and practical model for Homestake conditions. The result would be a model of choice for long-life (time-dependent) cavern design.

- 4) Space Requirements: We would need only minimal space at the mine. We do not anticipate unusual conditions.
- 5) Access Underground: The sooner we are able to gain access underground to the instrumentation site on the 3350 Level, the more beneficial will be the study results in advance of DUSEL planning and design. For this reason, access in early 2006 is desirable.
- 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.