

## **Personnel Addendum to our DUSEL-Cascades Report**

Attached is a summary of the events of the past two weeks, describing the favorable resolution of our Request for Reconsideration and subsequent developments. We appreciate the effort the NSF made to give our Request fair and serious consideration. Despite the decision, we found ourselves in a “catch 22”: too much time has been lost to make a second effort at Cashmere Mt., while the NSF ruled that our request to refocus on the second site discussed in our S2 proposal, the Pioneer Tunnel, was not appropriate. We accept this resolution -- please see the summary for details. While the NSF has left open the possibility of competing in S3, we think this may not be in the field’s best interests.

In the past year, while our Request for Reconsideration played out, other events have changed the DUSEL equation. Most of our group came from the original Homestake Collaboration. While we left the Black Hills quite discouraged, three years have passed. The problems I felt were insoluble in 2003 have, in fact, been solved, thanks to a lot of hard work in South Dakota. The Governor’s appointment of Dave Snyder was the first step. Mr. Snyder has been very effective, and his collegial approach has been important in building a strong partnership with the science community. He and Kevin Lesko, who was a key member of our team years ago, have moved DUSEL-Homestake forward. An agreement on mine transfer was achieved. The funding commitments South Dakota has made – first through the State, and most recently the private gift by Mr. Sanford – are more than sufficient to restore the mine to pre-2003 conditions. This support will allow DUSEL and DUSEL science to make a faster start. My discouragement over Homestake has turned to admiration for the manner and substance of South Dakota’s DUSEL accomplishments.

Our colleagues at Henderson have also made an excellent proposal. The NSF is committed, in S3, to site visits and direct interactions between proposers and panel members. This is the kind of process we can all support.

So my conclusion, despite more than a few twists and turns in this 6-year saga, is that things have turned out for the best. So my colleagues and I urge you to help the Foundation, South Dakota, and Colorado move DUSEL forward.

Wick Haxton

## **Letter to the S2 DUSEL-Cascades Collaboration (30 June 2006)**

The past two weeks have been quite a roller-coaster ride for the DUSEL-Cascades collaboration. We thought we should send a summary/status report to the collaboration. This letter describes the following:

- Our filing of a “Request for Reconsideration” to the NSF Assistant Director on 17 October 2005. The request asked the NSF to re-examine the basis for its decision not to fund the DUSEL-Cascades S2 conceptual design study.
- The notification we received on 12 June 2006 from the Assistant Director granting our request for reconsideration and recommending an award of \$500K and adequate time to prepare a conceptual design proposal, pending confirmation on funding commitments from the University of Washington (see paragraphs below). The UW responded positively June 14.
- The NSF response of 22 June 2006 to our 14 June 2006 letter in which the UW’s offer to prepare and help fund a Conceptual Design Report for the Pioneer Tunnel was turned down on the grounds that the tunnel was the secondary, not the primary, site in the original S2 proposal.
- The reasons we believe the request to the NSF to develop the secondary site was the only realistic option for us in S2, at this juncture.
- The NSF has opened up the possibility of S3 proposals from other sites, including DUSEL-Cascades. We discuss this option, but conclude it might not be the best path forward for the science community.

### **The “Request for Reconsideration”**

The steps leading to our “Request for Reconsideration” were:

- In March 2004 the NSF announced the S2 process. In October 2004 it issued the S2 solicitation, which instructed interested site groups on the criteria that would be used in allocating conceptual design funds. The solicitation indicated that 3-5 such grants would be made.
- In February 2005 the collaboration submitted its 15-page request, along with supplementary reports addressing engineering, permitting, and the geotechnical suitability of the Mt. Stuart batholith. Seven other groups made such requests.
- In July 2005 we learned that the NSF had decided to provide conceptual design report funding to two sites, Henderson and Homestake.
- The NSF summary report indicated that our proposal was not rated highly, but did not point to any failure on our part to adequately address the criteria that were detailed in the original solicitation, in our view.

The NSF offers a proposer an opportunity to submit a “Request for Reconsideration” if he or she feels an NSF decision could be in error. This procedure is described in Section 904 of the NSF Grant Policy Manual. We filed such a Request within the allowed 90-day window, asking the Assistant Director to re-examine the basis for declining our S2 proposal. The Policy Manual indicates that an NSF decision is then often made within

the next 30 days. The proposer plays no role once the “Request for Reconsideration” is filed: the process is an internal re-examination by the NSF of its own decision process.

The only unusual aspect of this Request for Reconsideration was the time required by the NSF for its re-examination, eight months. After 30 days had expired, the Assistant Director informed us that our letter had raised complex issues, and that the Foundation had established a senior committee outside the Mathematical and Physical Sciences Directorate to consider those issues. The result, as the new Assistant Director conveyed in her 12 June 2006 letter to us, was the conclusion that the NSF panel for S2 had performed well, but that other aspects of the process had not been satisfactory:

*“Nonetheless, I am granting your request for reconsideration and recommending an award of \$500,000 to you, based on my review of the record and because NSF expects its program officers to exert a level of scientific judgment that I did not see operating in this case. The rationale for placement of this proposal in the [original] rankings appears not to be based on scientific or technical issues, and the panel said little about the management questions of developing a conceptual design report. This should have signaled attention to whether the potential scientific benefits of keeping a green-field site under consideration might outweigh the potential procedural risks, given the purposes of DUSEL S2. Further attention might well have led to a different decision. Thus, your request for reconsideration is granted, contingent upon receiving a letter of commitment from other sources for the additional funding that you represented was necessary to complete the work set forth in the proposal. NSF staff will be contacting you about the details of an award, subject to the condition mentioned above.*

*As a result of this decision, I will also extend the timetable for the next DUSEL competition to allow time for you to complete your conceptual design report, assuming you still wish to proceed with this S2 proposal. I will also assure that the next stage of competition is open to all those wishing to propose a particular site for a future DUSEL, regardless of whether they receive an award at this stage.”*

We would like to offer some comments on this process:

1. A Request for Reconsideration is part of the standard grants procedure that the NSF has wisely put in place to guarantee the quality of the Foundation’s refereeing: it should not be misconstrued as a change in rules.
2. Our request was not based on technicalities – e.g., the loss by program officers of site responses to panel questions was not known to us, and thus was not part of our request – but instead on an issue that has been central to the DUSEL debate, the importance of exploring horizontal greenfield DUSEL designs. The NSF’s response focuses on this point and indicates that our specific proposal was not deficient scientifically or technically.
3. We recognize the legitimate concerns of physics community members that the 12 June 2006 decision had the potential to delay DUSEL, had it remained in effect. However, this issue was not under our control. The long wait for a response to

- our Request for Reconsideration reflected an internal NSF decision that the issues required an extended review – a call that only the Foundation can make.
4. We shared our Request for Reconsideration with the S1 leaders, but otherwise avoided publicizing our request, since no good would have been served by such publicity, had our concerns proved to be without merit. The first public announcement of the decision on our Request for Reconsideration came from the NSF: a program officer discussed the decision with the P5 Committee on the same morning the NSF faxed us the 12 June 2006 letter. The first announcement to the general public came from a press release by Henderson supporters. Because of the Henderson release, the University of Washington then asked us to make a public statement, which we limited to comments about our science plans.

The 12 June 2006 NSF statement is consistent with many past science community observations about the potential importance of horizontal greenfield sites:

*“Horizontal access allows simple and cost effective access and operation – lower operating costs”* 2001 Bahcall Committee

*“Horizontal access ... provides long-term advantages in costs of laboratory excavations, installation of detectors, and ongoing operations costs”* 2001 Bahcall Technical Subcommittee

*“The Sub-Committee suggests, again regardless of the recommendations by the full Committee, that investigation of these [horizontal] sites should continue, at least to the point of determining whether there may be clear “show-stoppers” connected with any of them”* 2001 Bahcall Technical Subcommittee

*“One advantage [of a specific horizontal greenfield site] would be the potential to develop a facility at a site unaffected by past mining activities or laboratory operations. An opportunity to develop a project from scratch is appetizing from a purely scientific research and development viewpoint, without impacts from past or existing operations.”* 2003 NSF DUSEL Site Selection Committee

### **The 14 June 2006 University of Washington Letter**

In her 14 June 2006 reply to the NSF, the University of Washington Vice Provost for Research indicated:

- That the University of Washington and DUSEL-Cascade collaboration remained keenly interested in developing a conceptual design for a horizontal access site in the Mt. Stuart batholith;
- That the University of Washington would guarantee the original S2 commitment of approximately \$400K of additional funding for the conceptual design effort;
- That we intended to focus our further effort on the second site discussed in the original S2 proposal, the Pioneer Tunnel, rather than the primary site, Cashmere Mt. Specifically, a 2000-ft deep coring would be done at the Pioneer tunnel (where a coring for stress field determination had already been planned), rather

than at Cashmere Mt. Contrary to statements we have seen elsewhere, there was no second proposal submitted by us.

The Assistant Director informed us, in her letter of 22 June 2006, that the last point was the basis for her final decision not to support the DUSEL-Cascades conceptual design study, and that this matter was now closed.

The second site was introduced in our S2 proposal in the following way: “One important advantage of DUSEL-Cascades is a second, already developed horizontal access site immediately off the Great Cascade Tunnel, connected to the DUSEL Science Campus by both rail and highway, with good depth (3200 mwe), outstanding rock quality, haulage facilities, power, water, and “broader impact” potential.” The Pioneer/Cascade tunnels are the deepest and longest in the U.S. We discussed this site as a way of staging a future large detector project, and described the development plan in two pages. In the supplementary materials, we provided a preliminary 38-page report on the geotechnical analysis and engineering plan for this site. In the general DUSEL-Cascades geotechnical report much of the discussion focused on the results of inspections of the Cascade/Pioneer tunnel complex and on laboratory analyses of rock samples taken from the tunnels. These S2 materials remain posted at <http://www.int.washington.edu/S2/>.

The decision to focus on the Pioneer Tunnel, in response to the NSF’s positive conclusion on our Request for Reconsideration, was based on three considerations:

- The site availability, unknown at the time of our S2 proposal submission, had been established. The Pioneer Tunnel site is privately owned and currently permitted for drainage, ventilation, and industrial railroad activities at the portal. When the site was first identified (September 2004), Burlington Northern & Santa Fe asked us to prepare a technical document on the impact of science use on main-tunnel operations, to help the company evaluate our use request. That report was submitted to BNSF in April 2005. BNSF’s positive response came four months later, one month after the NSF’s negative S2 decision. We then drafted a paper on the site that outlined our conceptual design for a staged DUSEL at the Pioneer tunnel, posting this in April 2006 (nucl-exp/0604004).
- The NSF’s decision on our S2 proposal effectively ended any prospects we had of developing the primary (Cashmere Mt.) site on timescales consistent with the proposed FY09 DUSEL start. As detailed in the S2 proposal and supplementary materials (Ref. 5), the permitting process for this site was originally expected to take three years, based on USFS experience with similar projects on public land. The USFS use-permit process for portal coring at Cashmere Mt. was well underway when our S2 proposal was rejected. This rejection forced us to halt further work because of the USFS use-permit “alternatives” requirement: public lands cannot be developed if, as the NSF had concluded, superior alternatives exist. While the NSF’s decision on our Request for Reconsideration removed this obstacle, we lost at least one year and, most likely, two, due to the difficulty of restarting the biological and archeological surveys (which were underway in 2005) in time to obtain a USFS use permit for fall 2006 coring.

- The NSF's response to our Request for Reconsideration notes that our original S2 proposal was rejected because of "procedural risks," rather than scientific or technical shortcomings. We believe this is a reference to the land use issue. The Pioneer tunnel is free of such procedural risks, yet would have addressed the NSF's call for exploring the scientific benefits of greenfield sites.

The Assistant Director's letter of 22 June 2006 took the view that the elevation of the secondary site to primary status was not acceptable to the Foundation for procedural reasons – too great a change in the proposed work -- and that consequently no DUSEL-Cascades award would be made. This decision left us with no practical remedy for the consequences of the NSF's July 2005 decision to eliminate DUSEL-Cascades and other greenfield horizontal sites from the S2 process. We responded that we would abide by the Assistant Director's decision, in part because we could see no other course open to us that would not further delay and add uncertainty to the DUSEL process.

### **Remaining Options**

This situation leaves us with the option of competing in the S3 process, which we understand will commence in about three months. The motivation for preparing an S3 proposal would be to make the case for greenfield horizontal designs: greater cleanliness, superior access, efficiency in mounting and maintaining experiments, lower operating costs and project lifetime costs, and the potential to complement North America's three existing (vertical-access) sites (SNOLab, Soudan, and WIPP). The specific site of interest, the Pioneer Tunnel, also offers superior safety (a parallel escape tunnel with an independent ventilation system and frequent cross cuts) and "broader impacts" due to opportunities to address critical national safety, transportation, and security issues, as discussed in nucl-ex/0604004/.

Nucl-ex/0604004/ provides the template for an S3 proposal, staged development that begins with a Stage I laboratory (a "U.S. Kamioka" with dedicated, clean access) in the existing tunnel, and culminates with a Stage III laboratory at a peak depth above 6.0 km.w.e. It discusses the cost effectiveness of such staging as well as the opportunities a horizontal site would open for cooperation with SNOLab, Soudan, and WIPP.

Despite our enthusiasm for greenfield horizontal designs, however, we have concluded that the window of opportunity for such a proposal is now closed. Rather than trying to turn back the clock at this point, we think the community would be better served by joining together in support of one of the existing proposals. This is a positive statement, an acknowledgement that great progress has been made elsewhere that has moved the field much closer to its goals, including an early start to DUSEL.

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