

## **Deep Underground Science and Engineering Laboratory: DUSEL-Cascades**

### **Project Proponent**

The University of Washington, acting on behalf of 130 collaborating scientists from 39 educational and research institutions.

### **Project Description**

To create a deep-underground site for doing basic science research in physics, astrophysics, earth sciences, geomicrobiology, and related fields. The laboratory rooms, 7400 feet underground, will be connected to the surface by two tunnels, each approximately 3 miles in length. In addition to the underground laboratory, the project includes a surface campus for detector development and data analysis, and a Visitor Experience Center for public outreach and education.

### **Project Requirements**

- Laboratory must be at least 6000 (preferably 7000) feet underground to be free from cosmic rays and other natural radioactivity.
- Subsurface rock must be uniform and competent, suitable for large excavations.
- Location must be reasonably accessible.
- Location must allow a related surface campus for research and administration, and a Visitor Center within a reasonable distance (e.g., within 10 miles).
- Power and other services must be available at a reasonable cost.

### **Efforts to date**

The original DUSEL proposal was submitted by the University of Washington to the National Science Foundation in 2001. The preferred location was the now-closed Homestake Mine in South Dakota, but that site was later flooded by the mine owner.

An effort to identify alternatives began in 2003 and yielded 12 candidate sites. Each site was evaluated for geotechnical suitability. A site near Leavenworth, Cashmere Mountain, was identified as the outstanding candidate. Site attributes include location in a granite batholith with an extensive history of tunneling, a short tunneling path, good separation from active crustal faults, and accessibility.

Discussions were initiated with landowners, regulatory agencies, interest groups and neighbors to assess whether the University of Washington should propose Cashmere Mountain as the laboratory site. A pre-proposal was released to the public in May, 2004, to help in community discussions. A four-month public study by the Port of Chelan led to a resolution supporting a UW proposal for DUSEL-Cascades.

A conceptual design proposal for DUSEL-Cascades was submitted to the National Science Foundation on February 28, 2005. If this proposal is approved, the Foundation is expected to fund a full engineering proposal, with final site selection occurring by the end of 2006. If the Cascades site is selected, steps will be taken to secure all permits, agreements, environmental review, and land acquisition. Underground construction would be completed in three years. DUSEL would be fully operational five years after first funding.

### **Project Impacts**

The laboratory would be the leading facility worldwide for deep underground physics, earth science, and engineering. It will contribute to graduate and undergraduate education and promote science outreach to K-12 teachers, their students, and the public.

The project construction costs are approximately \$300 million, and the yearly scientific activity would be approximately \$50 million. The lifetime of the laboratory is expected to be at least 40 years. Approximately 200 permanent or visiting faculty, postdoctoral researchers, graduate students, and support staff would work within the surface campus. Roughly two-thirds of the construction and support staff would come from Chelan County. The typical economic multiplier for such projects is a factor of three.

***A more detailed description is available.***