

The Regents of the University of California

**COMMITTEE ON OVERSIGHT OF THE
DEPARTMENT OF ENERGY LABORATORIES**

March 18, 1999

A Special Meeting of the Committee on Oversight of the Department of Energy Laboratories was held on the above date at UCSF - Laurel Heights, San Francisco.

Members present: Regents Atkinson, Bustamante, Davies, Johnson, Khachigian, Miura, Montoya, Nakashima, and Preuss

In attendance: Regents Connerly, Hopkinson, Kozberg, Lansing, Leach, Lee, Sayles, and Willmon, Regents-designate Pannor, Taylor, and Vining, Faculty Representatives Coleman and Dorr, Secretary Trivette, General Counsel Holst, Provost King, Senior Vice President Kennedy, Vice Presidents Broome, Darling, and Hopper, Chancellors Cicerone, Dynes, Greenwood, Orbach, and Yang, Laboratory Director Shank, and Recording Secretary Bryan

The meeting convened at 10:20 a.m. with Committee Chair Preuss presiding.

REPORT ON LAWRENCE BERKELEY NATIONAL LABORATORY

Mr. Charles Shank, Director of the Lawrence Berkeley National Laboratory since 1989, reported that the laboratory has about 4,000 employees and a budget of about \$350 million. He recalled that the laboratory works in partnership with all the campuses, but particularly with the Berkeley campus.

Mr. Shank discussed the activities of three people who are members of the laboratory staff. Each is a leader in his or her field and leads teams that pursue exciting and interesting research. The three projects he intended to discuss cover three of the significant scientific areas at the laboratory.

The first person he described was Mr. Saul Perlmutter, who has a broad educational experience which included training as a classical violinist. As a graduate student at UC Berkeley in the 1980s, he found that astrophysics was a way to satisfy his penchant for asking very big questions. When he finished his Ph.D., Mr. Perlmutter set out to determine whether the universe is slowing down its expansion, if it is going to continue to expand more rapidly, or if it is a stable entity. He measured the brightness and color of stars to determine how fast they were moving and how far away they were. Taking this information, he was able to come to some conclusions using various tools, including the Keck Telescope, that were described in a recent BBC documentary. Although gravity should be slowing the universe's rate of expansion, Mr. Perlmutter and his team discovered through their observations of stars that the rate of expansion of the universe was not only not slowing down, it was speeding up. Einstein

proposed some special force that might be used to balance the universe, but he did not know whether the universe would expand or contract. There seems to be a mysterious force that is not understood which is causing the universe to come apart. This observation has created international interest.

Mr. Shank commented that Mr. Perlmutter's work is essential to the laboratory's mission to understand the fundamental properties of matter and energy.

The next person Mr. Shank discussed was Ms. Mina Bissell, a native of Iran who is Associate Director of Life Sciences. Her postdoctoral work included time spent with Nobelist Melvin Calvin, whose group was using radio tracer techniques to study cancer. As she became interested in cancer, she wondered what the factors were in a cell's environment that contribute to its inability to remain normal. Her team put together a groundbreaking work that pursued this question. In 1979, she proposed that viral carcinogenesis is a multi-step process. Her recent works have emphasized that genes do not form in a vacuum, but rather their expression is affected by the signals they receive from their environment. Ms. Bissell's team discovered the concept of intracellular matrix crucial to the proper functioning and differentiation of tissues that can regulate cancer. Her work has shown that in some conditions it is possible to reverse the process of a cell's becoming cancerous by manipulating proteins in the cell's environment.

Mr. Shank reported that Ms. Bissell has received the Department of Energy's Lawrence Award and was elected to the Institute of Medicine of the National Academy of Sciences. Her team is recognized around the world, and her work has been key in advancing the laboratory's mission to understand cancer.

The final employee Mr. Shank discussed was Mr. Phil Colella, a native of Washington, D.C. who was educated at UC Berkeley and who started his career as a mathematician as a student worker at Lawrence Livermore National Laboratory. Mr. Colella has spent twenty years working at both the Livermore and Berkeley laboratories, using his mathematical skills to solve very challenging problems. His simulations turned numbers into images about important events taking place in such things as automobile engines, where a key feature of his approach in developing a capability for computing fluid flow problems was to compute high fidelity representations of fluid flows in an arbitrarily complex geometry that can be generated in a few minutes on a desktop computer. The simulations are important in understanding how combustion takes place in an engine. He is collaborating with industry to apply his techniques to problems found in ink jet printers, automobiles, and industrial boilers.

Mr. Colella leads a multidisciplinary team of mathematicians, graduate students, computer scientists, and engineers. Their current project is to develop a new generation of simulation tools for internal combustion engines. Such tools will be very important for designing less polluting and more efficient automobile engines and combustion devices. Such a team, which crosses academic departmental boundaries, is a distinctive way in which the laboratory fulfills its mission in science and technology.

Mr. Shank concluded by noting that the three employees mentioned are representative of the laboratory's scientific staff. They apply a team approach to research, a concept first developed by Ernest Lawrence, that brings scientists and engineers together. They all have a curiosity that has resulted in their finding solutions to important questions. They bring a diverse intellectual talent and training to their research efforts. He noted that the laboratory is a place that encourages complex investigations with time scales and projects of sufficient complexity that they need more than a single person working on them. The laboratory enables people like the three mentioned to fulfill their scientific dreams, and the work they do adds to the breadth of educational possibilities for students, faculty, and others at the University.

Finally, Mr. Shank acknowledged the passing of Dr. Glenn T. Seaborg, who died recently. Dr. Seaborg was a giant in science and a legend in the annals of scientific discovery.

Regent Montoya noted that the laboratory has developed innovative energy-saving technologies for home construction. She wondered whether that information is provided in a format that can be shared with general contractors. Mr. Shank responded that a computer website is about to be launched where its innovations for making both new and old homes more energy efficient will be described. Senior Vice President Kennedy noted that the University's new building in Washington, D.C. will be a model for applying the laboratory's energy-saving methods.

Regent Johnson asked how the laboratory's international supercomputer system is progressing. Mr. Shank reported that the laboratory has built one of the largest non-classified supercomputing centers in the world. It is focused primarily on laboratory activities, but it gets extensive use by UC campuses. The next stage will involve adding "terra scale" computers. One task under consideration for their use is to build a new capability for modeling climates and understanding global changes. Another task is to model combustion in an effort to control pollution.

Regent Lee asked what the Berkeley laboratory's relationship is with campuses beyond UC Berkeley. Mr. Shank responded that the laboratory has cooperative activities with all campuses in the UC system, including joint faculty appointments with UC Davis.

Regent Leach noted that there has been coverage in the press recently about security at the Department of Energy's University-managed laboratories. He asked what the University's role is in laboratory security. Committee Chair Preuss commented that the issue of national security at the DOE laboratories is the responsibility of the DOE and other federal agencies that work directly with the laboratory directors. Regent Bustamante asked whether a status report would be forthcoming on security at the Los Alamos National Laboratory. Regent Preuss responded that a closed session meeting would be scheduled in the near future to discuss security issues. President Atkinson noted that an account by the Lawrence Livermore Laboratory Director of what has transpired at the laboratory with reference to recent concerns about information leaks had been mailed to all Regents. Regent Bustamante asked whether the analysis indicates the University's degree of responsibility for security. Provost King reiterated that the Department

of Energy interacts directly with the laboratories on matters of national security. It is the role of the director and the University fully to implement, support, and carry out security measures. Investigations of security breaches are conducted by the Federal Bureau of Investigation independently. The University does have a national security panel member on its President's Council on the National Laboratories which has been asked by the Department of Energy to consider the balance and interaction between the need to carry out security and the effort to get research done. The Council has completed an analysis on the subject which will be provided to the Regents.

The meeting adjourned at 10:50 a.m.

Attest:

Secretary