The Regents of the University of California

COMMITTEE ON OVERSIGHT OF THE DEPARTMENT OF ENERGY LABORATORIES
July 15, 1998

The Committee on Oversight of the Department of Energy Laboratories met on the above date in Building 170, Room 1091, Lawrence Livermore National Laboratory.

Members present: Regents Chandler, Davies, Hotchkis, Johnson, Miura, Montoya, and Preuss

In attendance: Regents Espinoza and Ochoa, Regents-designate Taylor and Vining, Secretary Trivette, General Counsel Holst, Associate Secretary Shaw, Provost King, Senior Vice President Kennedy, and Laboratory Director Tarter

The meeting convened at 9:35 a.m. with Committee Chair Preuss presiding.

1. **WELCOME**

Director Tarter welcomed the Regents to the Laboratory.

2. **PUBLIC COMMENT PERIOD**

Regent Preuss explained that this portion of the meeting was to give members of the public the opportunity to address University-related matters or items on the day's agenda. The following people addressed the Committee:

A. Ms. Marylia Kelley, Executive Director of Tri-Valley Cares, explained that her group focuses on the conversion of Lawrence Livermore National Laboratory to a "green" laboratory that does research in civilian science initiatives, such as renewable nonpolluting energy sources and new environmental cleanup technologies. She believed that LLNL was doing an excellent job in the area of toxic waste clean-up at the Lab and Site 300 but could use more funding in that area. An area in which the Lab was not doing a good job, she stated, was in its stockpile stewardship and subcritical testing programs.

B. Ms. Jackie Cabasso, Executive Director of the Western States Legal Foundation, believed that the stockpile stewardship program is an anti-disarmament program which is fundamentally incompatible with nuclear disarmament as mandated by the Nuclear Nonproliferation Treaty.

C. Ms. Ann Beier, Associate Director of the Western States Legal Foundation, read an article co-authored by former Regent Stanley Sheinbaum entitled "Abolish Nukes - It's Too Late for Control," which appeared in the *Los Angeles Times.*

D. Mr. George Craig, a physicist at LLNL spoke as a representative of the Society of Professional Scientists and Engineers, an organization at the Laboratory that views itself as an internal "check and balance" for the Lab. He expressed support for the work that the Lab is engaged in, but was concerned about issues dealing with personnel policies at Livermore and Los Alamos which are divergent from core UC policies.

E. Ms. Stephanie Erickson, a member of Tri-Valley Cares and a community representative of an advisory site team to the Livermore public health assessment currently being conducted by federal and state health agencies, believed that it is the right of citizens to know what they have been exposed to and what the likely health effects are. She asked the Regents, in their oversight role, to take an active interest in assuring that the DOE makes this health assessment a priority and funds it appropriately.

3. **LABORATORY OVERVIEW**

Director Tarter began by recounting the history of the Livermore Laboratory. The Lab was founded in 1952 on what was formerly a Naval Air Training Base during World War II. The reason the Lab has been designated an EPA Superfund site is because of the chemicals used by the Navy when it occupied the site. The Lab has been managed by the University since its inception. During its first twenty years, the Lab was almost exclusively a nuclear weapons research and development institution to create, along with Los Alamos, a strong stockpile for the United States. The most significant event at Livermore during that time and one that had far reaching implications for the country was that the Laboratory essentially figured out how to put a nuclear weapon into a submarine. The technology to do that negated the possibility of first strikes during the Cold War.

During the second phase of the Lab's history, it remained a very strong nuclear weapons-centered institution while at the same time applying the technology learned over the first twenty years to a variety of other issues throughout the government. One example is that the studies of radioactive fallout patterns has led to the establishment of the National Atmospheric Release Advisory Capability at Livermore, which is the emergency response center for the country for radioactive releases.

Since the end of the Cold War, there have been efforts in Washington to encourage the Lab to become relevant to economic competitiveness. The focus has been to take the technology that has been developed over the past forty years at the Lab and see where it can have some impact on industry. There are now a variety of technologies that have taken root as industrial applications and are being funded at LLNL almost exclusively by private industry. Among the three DOE laboratories managed by the University and, in fact, among all the DOE laboratories in the country, LLNL has the highest proportion of non-public funding, comprising about fifteen percent of its budget. Two examples of industrial applications being developed at the Lab include the very short, pulsed lasers which are used to make very sharp, precision cuts without heat, and improvements in the use of radiation in cancer therapy. The Lab, along with Sandia Laboratory, has been asked by a consortium led by the Intel Corporation to design the next generation of computer chip, a $250 million effort over the next three or four years.

In looking toward the future of the Lab, Mr. Tarter explained a program he has initiated that is based upon an experience he had about fifteen years ago when Director Roger Batzel asked former Director Michael May to look at the long range future of LLNL. Mr. May did this by gathering together about a dozen mid-career scientists who had been at the Lab a while and whom he identified as potential future leaders to think about the future of the Lab. Mr. Tarter has launched a similar exercise and has asked his group to focus on technology.

The 1998 report entitled *Creating the Laboratory's Future* describes planned activities and initiatives over the next several years. The report describes the primary mission of the Lab to ensure that the nation's nuclear weapons remain safe, secure, and reliable and to prevent the spread and use of nuclear weapons worldwide.
In 1995 President Clinton affirmed the importance of maintaining a safe and reliable nuclear stockpile for the country and directed that there be measures to ensure stockpile safety and reliability in the absence of nuclear testing. In 1996, the President signed the Comprehensive Test Ban Treaty. The stockpile stewardship program at LLNL was developed in response to these directives. The program is designed to ensure stockpile performance in an era of no new weapons development, an aging stockpile of fewer weapons and fewer types of weapons, and no nuclear testing. Director Tarter described the challenges of recreating weapons conditions in a laboratory environment, using computers for the testing rather than actual weapons testing.

Regent Montoya asked if subcritical testing has ever been done at the Lab. Director Tarter responded that, using the formal, technical definition of the term, it has not. In response to a further question from Regent Montoya, he explained that a major difference between the Livermore and Los Alamos Labs, which appear to have very

similar missions, is that Livermore uses a laser facility and Los Alamos uses a neutron facility in testing and research.

4. NOVA, NATIONAL IGNITION FACILITY (NIF), AND LASER APPLICATIONS

E. Michael Campbell, Associate Director of Laser Programs at Livermore, presented an overview of the NOVA project, which opened in 1984 as the world's largest laser. NOVA, which is comprised of ten lasers, will be disassembled in 1999 to make way for the next generation laser project, the National Ignition Facility, a 192-laser facility currently under construction at Livermore. Mr. Campbell noted that approximately 13,000 experiments have been conducted at NOVA. The National Ignition Facility, which the stockpile stewardship program will depend heavily on, also will be used for research in basic science, U.S. industrial competitiveness, and fusion energy. It is scheduled to open in 2003.

The Regents then toured the NOVA facility and viewed the NIF construction site.

5. STOCKPILE STEWARDSHIP, NONPROLIFERATION, ARMS CONTROL, AND INTERNATIONAL SECURITY

A classified presentation for Regents with security clearances was given by Director Tarter and Associate Director for National Security George Miller.

Associate Director for Defense and Nuclear Technologies Michael Anastasio gave a nonclassified presentation on the stockpile stewardship program. He described the goal of the program as basically sustaining the confidence in the stockpile into the future without any nuclear testing. Elements of the program include surveillance to anticipate problems with an aging stockpile, a manufacturing system to reproduce components in a cost effective and environmentally acceptable way, and an assessment and certification program to evaluate the effects of problems and certify that changes are acceptable. All this must be done without actual testing, but using simulations. The Livermore Lab, along with Los Alamos and Sandia Laboratory, is responsible for all stockpile stewardship for the country.

Wayne Shotts, Associate Director for Nonproliferation, Arms Control, and International Security, explained the nonproliferation program, the mission of which is to reduce the danger from foreign nuclear weapon threats. The efforts of the program include preventing weapons programs in other countries, along with

redirecting their research efforts; reversing weapons programs in other countries; and responding to foreign threats. The Lab is working to improve the control of nuclear materials worldwide and to develop remote sensor technologies to detect proliferation from offsite.

The Committee adjourned for lunch at 12:30 p.m.

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The Committee reconvened at 1:15 p.m.

6. ACCELERATED STRATEGIC COMPUTING INITIATIVE (ASCI) TOUR

Associate Director for Computations David Cooper described the role of computers in the stockpile stewardship program, which is to test through simulations the safety and reliability of the aging weapons. By the year 2004, nearly all of the weapons in the stockpile will be beyond their design life. In order to address this reality the Accelerated Strategic Computing Initiative was established at the Lab. In meeting its goal of shifting from nuclear test-based methods to computational-based methods, a significant leap in computing capabilities will result. ASCI's computational advances are accelerating the field of computing many times faster than it otherwise would have developed and will contribute to many areas of science, technology, and industry.

The Regents then toured the computer facility.

7. OPERATIONAL EVALUATION/NEW CONTRACT

Robert Kuckuck, Deputy Director for Operations, explained the impact the changing mission of the Lab from underground testing to computational testing has had on its workforce. There has been a need to restructure the workforce as different types of talents are required. In addition, as operations have been streamlined at the Lab, the accompanying downsizing of the workforce has been accomplished largely through attrition and voluntary separations.

Mr. Kuckuck informed the Regents that the Lab has conducted an aggressive program of reducing overhead costs. A high-level management team was put together to review management streamlining. The resulting cost reductions have permitted strategic reinvestment to revitalize the Lab in areas such as plant, equipment, technologies, and disciplines that are in the interest of the entire Lab. In the area of safety, he noted that while a recent DOE audit found no significant weaknesses at

LLNL, there have been several potentially serious incidents. In response, the Lab has initiated a re-emphasis on safety.

The new contracts between the University and the DOE have assisted the Lab in its transition, Mr. Kuckuck reported. He believed that the DOE laboratories' connection to the University ensures that world-class science will be performed there. In addition, this connection assists in the recruitment of scientists and codifies an academic culture at the Laboratories, rather than one constrained by a profit motive. The new contracts further provide a sound basis for performance assessment.

8. UNIVERSITY COLLABORATIONS

Charles Alcock, Director of the Institute of Geophysics and Planetary Physics (IGPP) at Livermore, described the broad range of educational collaborations on-going at the Lab, a large proportion of which are with UC campuses. There are also collaborations with schools throughout the nation and internationally. These collaborations range from informal associations with scientists at the Lab , which was the method most often used in the past, to formal collaborations, the trend of the future which began in the 1980s with the establishment at Livermore of a branch of the IGPP, a multicampus research unit. There are now five UC/LLNL institutes: the IGPP, the Center for Accelerator Mass Spectrometry, the Institute for Laser Science and Applications, the Institute for Scientific Computing Research, and the Materials Research Institute. Mr. Alcock noted that the Office of the President is involved in twelve collaborative projects. The Department of Applied Science, an academic unit of the Davis campus, has been located at Livermore since the 1960s. The Lab is also considering how it can be helpful in planning for the UC Merced campus in the areas of science and technology.

9. INDUSTRIAL PARTNERING

Ron Cochran, Laboratory Executive Officer, informed the Regents that industrial partnering is a new area of growth at LLNL, with roughly half of the budget of the Lab going to outside procurements. The factors contributing to this include congressional funding incentives for the Lab to work with industry and the culture change at the Lab in which scientists are asked to think about possible commercial applications for the technology they are developing.

The Extreme Ultra Violet (EUV) Lithography project is one example of a project with industry. The Lab has participated as a partner with three of the biggest names in the semiconductor industry, Intel, Motorola, and Advanced Micro Devices, for this

$250-million project, funded completely by corporate money, to continue developing (EUV) lithography for integrated circuit manufacturing. Another example is the Visalia Superfund site clean-up project. The original estimate to clean up the contaminated groundwater at this site was 100 years. Using technologies developed at LLNL, and in cooperation with the site's owner, Southern California Edison Company, cleanup using steam is happening in one to two years and at a much lower cost than traditional pump and treat methods. In the area of healthcare technologies, industry and the Lab are cooperating in the development and commercialization of new medical devices and treatments for the deadliest and costliest diseases, including stroke, heart disease, diabetes, and cancer.

10. **HUMANE GENOME PROJECT**

Anthony Carrano, Director of the Genome Center, informed the Regents that in 1990, the Department of Energy and the National Institutes of Health formed the joint Human Genome Project. The long-term goal of this 15-year project is to decipher the DNA of the entire human genome. The three DOE national laboratories--Lawrence Livermore, Los Alamos, and Lawrence Berkeley--are DOE centers for this project. To move the project along faster, in 1996 the DOE established the Joint Genome Institute, which integrated the three laboratories' genome centers into a virtual laboratory operated and managed by the University. There are thirteen places worldwide that are performing the sequencing of different pieces of DNA and these sequences are downloaded nightly onto the Internet. Mr. Carrano predicted that within a year LLNL will be second or third in the world in the number of sequences done. Lisa Stubbs, team leader in the mouse genomics project, displayed live mice from the program that exhibited a variety of mutant and recessive characteristics.

The meeting adjourned at 5:15 p.m.

Attest

Secretary