

Office of the President

TO THE REGENTS OF THE UNIVERSITY OF CALIFORNIA:

DISCUSSION ITEM

For the Meeting of September 27, 2018

UNIVERSITY OF CALIFORNIA'S NATIONAL LABORATORIES

EXECUTIVE SUMMARY

The University of California has a long and distinguished historical relationship with the U.S. Department of Energy (DOE) National Laboratories. Three of the largest DOE Laboratories are managed either solely by UC or by a management consortium with major UC leadership: Lawrence Berkeley National Laboratory, which is focused on biosciences, high-energy and nuclear physics, energy, and environmental research for the DOE Office of Science, and Los Alamos National Laboratory and Lawrence Livermore National Laboratory, which are focused on national security including stockpile stewardship for the DOE's National Nuclear Security Administration. This enduring relationship between UC and its DOE Laboratories has produced significant benefits to the Laboratories and has strongly supported the University's teaching, research, and public service mission.

BACKGROUND

Overview

Sitting on 200 acres above the UC Berkeley campus, Lawrence Berkeley National Laboratory (LBNL) is a multi-disciplinary Laboratory supported by the Department of Energy (DOE) Office of Science that conducts unclassified research across a wide range of scientific disciplines, including biosciences, computing, energy, and earth, environmental, and physical sciences. Its mission is to foster groundbreaking fundamental science that enables transformational solutions for energy and environment challenges, using interdisciplinary teams and creating advanced new tools for scientific discovery. Its five National User Facilities – Advanced Light Source, Molecular Foundry, Energy Sciences Network, National Energy Research Scientific Computing Center, and Joint Genome Institute – provide state-of-the-art resources for scientists across the nation and around the world, hosting more than 10,000 researchers a year. LBNL has a workforce of about 4,000 and an annual budget of more than \$800 million.

Located about 50 miles southeast of the San Francisco, Lawrence Livermore National Laboratory (LLNL) is operated under a contract with DOE's National Nuclear Security Administration (NNSA) with a workforce of more than 7,000 and an annual budget of more than \$1.7 billion. LLNL has a mission of strengthening the national security through the development

and application of world-class science and technology to enhance the nation's defense; reducing the global threat from terrorism and weapons of mass destruction; and responding with vision, quality, integrity, and technical excellence to scientific issues of national importance. Its core science and technology competencies include high-energy-density science; advanced materials and manufacturing; lasers and optical science and technology; bioscience and bioengineering; earth and atmospheric science; nuclear and isotopic science and technology; and high-performance computing, simulation, and data science.

Sitting 35 miles northwest of Santa Fe, Los Alamos National Laboratory (LANL) pursues its mission of solving national security challenges through scientific excellence by deploying an 11,000-strong workforce with a budget of about \$2.5 billion. This NNSA Laboratory ensures the safety, security, and effectiveness of the nation's nuclear deterrent and reduces emerging national and global security threats. The multidisciplinary focus of LANL's mission extends to nuclear nonproliferation; counterproliferation; energy and infrastructure security; and technology to counter chemical, biological, radiological, and high-yield explosive threats.

Historical Background

Historically, the roots of the DOE National Laboratories can be traced back to the era of World War II and the research in theoretical and experimental physics conducted at UC Berkeley and other leading institutions around the country. In 1931, UC Berkeley Professor Ernest Orlando Lawrence founded what is now LBNL and pioneered the development of large and unique experimental facilities, which were designed and operated using large, multidisciplinary teams. For his invention of the cyclotron, a device that opened the door to major advances in understanding fundamental particles and the forces of nature, Professor Lawrence received the Nobel Prize for Physics in 1939.

A growing understanding of the physics of the atomic nucleus and nuclear fission raised concerns that this knowledge could be used to develop new types of weapons by Germany and other U.S. adversaries. This concern led to the creation of the Manhattan project to develop a nuclear weapon. The UC Berkeley theoretical physicist Professor Robert Oppenheimer provided the overall leadership of the project, which was based in the remote location of Los Alamos, New Mexico. This laboratory, founded in 1943, eventually became LANL. Following the war in 1952, the government requested that Professor Lawrence and physicist Edward Teller found another major laboratory in Livermore, California to strengthen the overall effort in addressing national security challenges and to promote intellectual competition and peer review. This Laboratory eventually became LLNL.

The University has continued manage and operate each of these three National Laboratories since their inception, either directly or, in the case of the current LANL and LLNL contracts, through limited liability company constructs.

Science in the National Interest as a Public Service

Today's DOE National Laboratory system largely grew out of the UC model pioneered in the 1940's. UC originally took on these roles in the spirit of its mission of public service, acting to ensure that the highest integrity and quality would be employed at these institutions as they developed science and technology that was critical to the nation. As the premier public university, UC brings its high standards of intellectual inquiry and freedom of expression to ensure that the Laboratories provide advice and support to the government that is free of political and financial conflicts of interest. UC is diligent in ensuring that the National Laboratories are apolitical and that they operate in the public interest in all aspects of their work in national security, their scientific research, and in the partnerships and programs they develop. Together with this culture, UC brings its formidable intellectual resources to bear in assessing the quality of the work at the Laboratories, ensuring best-in-class science, sustaining an excellent workforce, and ensuring that the intellectual environment is of the highest quality and integrity. UC's highest purpose in managing DOE Laboratories is to ensure the quality and integrity of their intellectual environments so they can be trusted advisors on critical national security, science, and technology questions.

The reputation of the UC-affiliated National Laboratories and their recognized myriad accomplishments are a testament to the effectiveness of this relationship over the decades. For example, LBNL scientists have been awarded 13 Nobel Prizes, 15 National Medals of Science, and 70 memberships in the National Academies of Sciences. LANL and LLNL account for four Nobel Prizes, 68 E.O. Lawrence Awards, and more than 280 R&D 100 Awards.

National Laboratories in Support of UC's Mission

It is sometimes asked how the mission of the University of California relates to the management and operation of the National Laboratories, and in particular the NNSA laboratories (LANL and LLNL). The scope of the National Laboratory programs includes not only nuclear weapons stewardship, but also a broad range of programs related to critical national and global security challenges. The fundamental missions of the University of California are teaching, research, and public service. In the University of California Academic Plan, 1974-1978, this is summed up as follows:

The distinctive mission of the University is to serve society as a center of higher learning, providing long-term societal benefits through transmitting advanced knowledge, discovering new knowledge, and functioning as an active working repository of organized knowledge. That obligation, more specifically, includes undergraduate education, graduate and professional education, research, and other kinds of public service, which are shaped and bounded by the central pervasive mission of discovering and advancing knowledge.

This mission statement refers to the advancement of knowledge and public service, two closely connected issues. The University's decisive role in the founding of LANL was during a time of grave national crisis in World War II. Advances related to studies of the fundamental forces of nature, many of which emerged from research performed at UC, had led to the realization that

powerful new weapons could potentially be created, with enormous implications for national security in an already perilous time. Rather than stepping back, the University stepped forward out of a sense of public service and duty. At that time, it was clear that the expertise and leadership of the University could well be decisive.

Currently, the United States faces a broad set of national security challenges, many of them new and emerging, in which advanced scientific and technical expertise can also be of crucial importance. In addition to issues related to the U.S. nuclear deterrent, these include the threats from nuclear proliferation, terrorism using nuclear, chemical, or biological weapons of mass destruction, missile proliferation, energy insecurity, and climate change and its consequences to name a few. On one hand, it is important that the University not allow its reputation for scientific excellence and integrity to be exploited to lend credibility in areas where there is no compelling need for its involvement. But it is also critical to recognize that there are real global security challenges and that the University of California, as the most prominent and distinguished public university system in the nation, can reasonably view it as within its responsibility to the nation to help confront these challenges. The intellectual strength of the University makes it a uniquely capable institution for this role. Thus, while there are numerous benefits to UC from its many cooperative unclassified research programs with the NNSA Laboratories, it is the service-to-the-nation aspect of the University's role that provides the most compelling argument for maintaining UC's connection to these Laboratories.

Evolving Approach to Governance of the National Laboratories

UC's National Laboratories are designated as Federally Funded Research and Development Centers (FFRDCs), which enjoy a special relationship to the federal government. Formally established under Federal Acquisition Regulation 35.017, FFRDCs are federally constituted research and development organizations that meet special, long-term needs that cannot be met effectively by existing in-house or contractor resources. They are charged with conducting their business in the public interest with objectivity and independence, remaining free of conflicts of interest, and fully disclosing their activities to the sponsoring agency. Put simply, the National Laboratories must be able to provide objective and unbiased technical advice in an environment where strong external forces, real and perceived, can sometimes be viewed as trying to influence this process. This is further structured through the contracting vehicle, the management and operating (M&O) contract, which codifies the government owned-contractor operated (GOCO) relationship.

Over the many decades, the government requirements for its M&O contractors have changed a great deal. The original relationship fully indemnified UC from financial liabilities associated with its stewardship role, enabling UC to take on this role without compensation as a public service. As the University was asked to take on more liability for issues at the Laboratories, UC began to earn a relatively modest fee for serving as an M&O contractor for the DOE.

Los Alamos National Security LLC and Lawrence Livermore National Security LLC

In the early 2000s, the government decided to open the LANL and LLNL contracts to a full and open competition, with an explicit goal of bringing private-sector expertise to bear in improving the business and operations functions at the Laboratories. To encourage competition the yearly fee available for these contracts was increased dramatically, from less than \$10 million/year to more than \$70 million/year in the case of LANL. After an extended period of reflection and consultation within the Office of the President, UC faculty, and the Board of Regents, the University decided to move forward with a bid for the LANL contract under a very different operating model.

In response to the terms laid out in the request for proposals, the UC bid for LANL proposed a fundamentally new approach to the M&O role at LANL. UC teamed with three partners from private industry to create a new stand-alone entity that would administer the contract: Los Alamos National Security, LLC (LANS). This entity ultimately was awarded the contract to manage LANL and took over this role on June 1, 2006. Subsequent to the LANL competition, the LLNL contract was competed and a similar partnership, Lawrence Livermore National Security, LLC (LLNS), was awarded the contract.

A Board of Governors was created to govern each LLC. UC retained the lead role in the partnership by virtue of appointing the Chair of the Board, who would hold tie-breaking authority, and UC maintained the responsibility of selecting the Laboratory Director.

Each Board consists of six voting Executive Committee Governors who comprise the voting members of the Board, three of whom are appointed by UC. In addition, the Boards also include non-voting Advisory Governors, who are appointed by UC and lead partner Bechtel, and Independent Governors, who are unaffiliated with the parent companies and appointed by the Executive Committee for their expertise in business; science, technology, and engineering (ST&E); and national security.

The Boards' work is largely conducted by six committees, currently Business, Operations and Security; Ethics and Audit; Mission; Science and Technology (S&T); Benefits and Investments Committee; and Nominations and Compensation (N&C). The Mission, S&T, and N&C Committees are chaired by UC appointees. The Boards meet three times per year, once at each Laboratory and once in Washington, D.C. to solicit stakeholder feedback on the performance of the Laboratories. Each of the Board Committees meets several times per year at the Laboratories to gather information on Laboratory performance and any major issues, and in Washington, D.C. to solicit stakeholder feedback on Laboratory performance.

In the original LANS and LLNS proposals, each of the parent companies took responsibility for specific areas with the Laboratory. UC assumed primary responsibility for ST&E and mission execution, while the industrial partners assumed responsibility for business functions, Laboratory operations including environment, safety and health; nuclear and high hazard operations; capital project execution; and security. This gave each company primary responsibility for providing key personnel for those organizations and appropriate levels of parent company reach-back to drive change and ensure success. Over the life of this partnership, there has been shift from

parent company ‘ownership’ of specific key positions to open competition for all leadership positions with the exception of the Deputy Director, who is still appointed by Bechtel with the concurrence of the Laboratory Director. All ST&E and mission positions, up to and including the Laboratory Director, have always been openly competed according to standard UC practice. The decision to include business and operational positions in this ‘best athlete’ model was undertaken in response to difficulties in creating a cohesive leadership team and ensuring that the best possible talent was brought to bear in these critical roles.

Today, all of the LANS and LLNS partners including UC participate fully in all aspects of governance and oversight of LANL and LLNL. UC has engaged strongly to ensure focus on enabling mission accomplishment, transparency, and accountability in all aspects of Laboratory management.

Triad

In the wake of a 2014 radiological event at the Waste Isolation Pilot Plant in Carlsbad, New Mexico, DOE/NNSA decided to again compete the LANL M&O contract and ultimately determined that the LANS contract would terminate in 2018.

The University, in identifying a new team with whom to bid on the follow-on LANL contract, focused on pursuing a public service model with partners aligned with UC’s mission, culture, and values. The University ultimately created Triad National Security, LLC with two non-profit partners Battelle Memorial Institute and the Texas A&M University System. Triad was awarded the follow-on contract in June 2018 and will take over management of LANL on or about November 1, 2018.

Triad will be governed by a Board of Directors, in a similar manner as the LANS and LLNS Boards of Governors. UC will continue to appoint the Chair of the Board and run the search and selection process for the Laboratory Director. The Triad Board will consist of eight voting Directors, two of whom are appointed by UC, and several non-voting Board Observers. The Triad Board will utilize a similar committee structure, with five initial committees: Finance, Audit and Ethics; Human Resources and Compensation (HRC); Mission; Operations; and ST&E. UC representatives will initially chair the HRC and ST&E Committees. The Triad Board and Committees will likely continue to meet at the same cadence as the LANS bodies.

While the University is currently engaged in establishing the nascent governance structure and processes for Triad, the University will also continue to have significant responsibilities associated with the ongoing governance responsibilities for LANS, including the eventual dissolution, winding up, and termination of the LLC.

Lawrence Berkeley National Laboratory

Despite the recent governance changes at LANL and LLNL, the University has largely continued to manage day-to-day operations of the Berkeley Laboratory much as it did prior to the mid-2000s, with a direct contractual relationship between UC and DOE and a “home office” within the Office of the President. However, the University now operates two governance bodies that

did not exist prior to the competitions: the LBNL Advisory Board and the LBNL Contract Assurance Council. The Advisory Board provides advice to the President and the Laboratory Director about the scientific and operational aspects of LBNL. The Board evaluates and makes recommendations on the direction of LBNL scientific programs and projects, UC oversight of LBNL management, and the effectiveness of the LBNL and UC contract assurance functions. The Contract Assurance Council advises the Vice President for National Laboratories on business and operations issues that need management attention to ensure that the Laboratory's performance meets the terms of the contract, and supports the effective and efficient operation of the Laboratory.

Because of UC's strong partnership with DOE and its local site office, and the continually improving performance of LBNL, DOE selected LBNL and UC in 2017 to participate in a reform initiative to transform the LBNL contract into a more effective instrument for mission execution. This contract reform effort provides the M&O contractor with greater autonomy for day-to-day work execution along with correspondingly greater accountability for performance. The reform contract is a step in the direction of returning to the original intent of the GOCO contracting model for FFRDCs, under which the government "owns" the mission and provides the funding, and academia and private sector contractors are responsible for mission execution, and bringing the people, experience, systems, and capabilities to perform the work. Under this model, DOE and the contractor work together as "co-trustees" of a shared enterprise. The reformed contract results in a more useful, efficient, and effective instrument for accountable mission execution, while reducing UC's overall risk exposure.

UC's Role in Governance and Oversight of its National Laboratories

Located with the Office of the President, UC National Laboratories (UCNL) has the lead responsibility for governance and oversight of the Laboratories and the Vice President for National Laboratories acts as the executive agent for the University in lab-related matters. There are three major components to UCNL's role: maintaining cognizance of operations, mission execution, and the long-term health and vitality of the Laboratories on an ongoing basis; providing honest, critical, and constructive feedback to the Laboratory Directors and their leadership team on Laboratory strategy and activities; and acting as an advocate and supporter of the Laboratories with a variety of constituencies including the University, the Regents, the government, and UC's partners. Other staff from UCOP and the campuses, as well as faculty participate in various aspects of governance and oversight. At the highest level, the President and the Board of Regents, primarily through the National Laboratories Subcommittee, remain cognizant of the major activities and risks at the Laboratories and provide guidance to the staff activities. In accordance with UC's shared governance model, UCNL also has the important function of keeping UC faculty representatives apprised of Laboratory performance and any emerging issues through engagement with the Academic Council Special Committee on Laboratory Issues.

When UC was solely managing three M&O contracts, the then Office of Laboratory Management had approximately 60 staff performing contract-related activities. As the University shifted to management of a single M&O contract and participation in two LLCs, the office downsized to approximately 12 members focused more on oversight activities than contract

management. Today, UCNL has a staff of ten organized around the main lines of work UC pursues in these roles. For LBNL, where UC retains the traditional M&O contractor role, UCNL executes all aspects of contract management and oversight. For the LLCs, UCNL staff provides all of the staff support to the Chair of the LLC Boards (Regent Tauscher), the Boards via the Corporate Secretarial function, and the Mission, S&T and N&C Committees of the Boards. UCNL staff also draw upon staff expertise in other parts of UCOP such as legal support, human resources, research grant administration, audit, and finance.

In general, staff within UCNL have extensive National Laboratory experience in research, business, and operations. Operating within the DOE environment requires highly specialized knowledge of the government environment and its specific needs. UCNL staff must understand this environment to provide effective review, feedback, and advocacy for the Laboratories. This includes understanding the specific terms of the contract, the regulatory environment, federal acquisition regulations, DOE orders and directives, UC policy, LLC operating agreements, and Laboratory policies and procedures.

UC also participates in oversight beyond the work of UCNL staff. In particular UC faculty are represented on the Laboratory Director's review committees (called External Review Committees at LLNL and Capability Review Committees at LANL). In addition, two members of the LLNS/LANS S&T Committee are assigned to attend each of these technical reviews based upon their relevant expertise to provide feedback on the quality and efficacy of the reviews and review committees. In operational areas of the Laboratories, UC provides subject matter experts for Parent Organization Functional Management Reviews. These reviews look in detail at a subset of business and operations areas each year and are often convened when significant concerns are raised about specific functions.

Benefits of UC Participation at the National Laboratories

Numerous benefits accrue to the Laboratories from UC's continued participation as an M&O contractor. The primary benefit to the nation is UC's staunch defense of the quality and integrity of the intellectual environment at the Laboratories and focus on the enduring health and vitality of the institutions, their workforces, and capabilities. UC engages in the spirit of public service to ensure that decisions are not made to optimize income for the M&O contractor entity at the expense of the fundamental principles that govern the operation of FFRDCs. Many of the attributes of a healthy Laboratory are drawn from the principles that animate academia: intellectual freedom and freedom of expression to protect against the politicization of research and development; protections against conflicts of interest either real or perceived to ensure the highest integrity in its work; robust and fair recruitment, hiring, retention, promotion, and termination to sustain the highest quality workforce; rigorous peer review to ensure excellence; and a high degree of transparency consistent with stewardship of the public trust. In this role, UC continues to ensure that the specialized needs of the Laboratories are met: appropriate controls for working with classified material; vetting of proposed work to ensure it is appropriate for an FFRDC; adequate procedures, processes, and management oversight to ensure safe conduct of high-hazard work; a physical security approach adequate to the safety and security needs of the site; and delivery of specialized mission deliverables for which the Laboratories have unique responsibilities.

The management fee earned by the University serves several important purposes although it is not a primary reason for accepting the management role. First and foremost, the fee income is used to cover the cost of UC's management and oversight activities, including the staff in UCNL and others in UCOP. UC also shares the responsibility with the LLC partners for costs at the Laboratories that cannot be charged to the government such as some executive compensation, fines and fees, and community investments such as the annual charitable giving match for employee charitable contributions. UC also maintains a reserve for contingencies such as costs associated with the termination of a contract or pursuit of a new contract such as the competition of the LANL contract. All residual fee income derived from UC's participation in LLNS and LANS is directed toward a UC Laboratory Fees Research Program. This research program has invested more than \$100 million in research activities over the decade since the LANL contract was last competed in 2006.

One of the most important shared benefits of the UC-National Laboratory relationship is the broad and deep network of connections between UC faculty, postdoctoral scholars, graduate and undergraduate students, and researchers at the Laboratories. The University has unparalleled breadth and depth of expertise across a wide range of disciplines that are important to the Laboratories. Similarly, the Laboratories provide a wide range of unique facilities and capabilities and a unique, multi-disciplinary research environment focused on tackling the biggest challenges facing the nation and the world today. For decades this relationship has provided amazing research and training opportunities and has enabled Laboratory researchers to maintain essential ties to the broader scientific community and to spend time in academia to foster their creativity and careers. Today the UC-affiliated Laboratories are home to some of the most advanced supercomputers in the world, unique experimental facilities, and research programs ranging from investigating the origins of the universe to addressing ever-evolving threats to national security. Their deep connection to UC serves as an important support to, and backstop for, these critical national programs even as they seek partnerships with other leading academic institutions.

Attachments:

[Attachment 1: LBNL Fact Sheet](#)

[Attachment 2: LLNL Fact Sheet](#)

[Attachment 3: LANL Fact Sheet](#)

Key to Acronyms

DOE	Department of Energy
FFRDC	Federally Funded Research and Development Center
GOCO	Government Owned, Contractor Operated
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
LBNL	Lawrence Berkeley National Laboratory
LLC(s)	Limited Liability Company(ies)
LLNL	Lawrence Livermore National Laboratory
LLNS	Lawrence Livermore National Security, LLC
M&O	Management and Operating
NNSA	National Nuclear Security Administration
S&T	Science and Technology
ST&E	Science, Technology and Engineering