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SENATE

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NATIONAL LABORATORIES PARTNERSHIP IMPROVEMENT ACT OF 2001

JUNE 5, 2001.—Ordered to be printed

Mr. MURKOWSKI, from the Committee on Energy and Natural
Resources, submitted the following

REPORT

[To accompany S. 517]

The Committee on Energy and Natural Resources, to which was referred the bill (S. 517) to authorize funding the Department of Energy to enhance its mission areas through technology transfer and partnerships for fiscal years 2002 through 2006, and for other purposes, having considered the same, reports favorably thereon without amendment and recommends that the bill do pass.

PURPOSE OF THE MEASURE

The purpose of S. 517 is to improve scientific and technical collaborations between the Department of Energy's national laboratories and institutions of higher education, technology-related business concerns, nonprofit institutions, and state, tribal and local government agencies.

BACKGROUND AND NEED

The national security and economic growth of the United States rests, in large measure, on our leadership in science and technology. The Department of Energy (DOE), working through its system of national laboratories, is not only responsible for the development and stewardship of the Nation's nuclear arsenal but is also the third largest government sponsor of basic scientific research in the United States. The research and development (R&D) conducted by DOE through the national laboratories is critically important to the national security, economic growth, and quality of life of the United States.

Since the end of the Cold War, however, the private sector has eclipsed the Federal Government in R&D. Between 1987, when Federal funding for R&D peaked, and 1999, Federal funding for R&D dropped by around 20 percent in real terms, while private sector funding for R&D doubled. As a result, private industry now funds about 70 percent of our national R&D.

For DOE and its national laboratories to continue to fulfill their national security, energy, science, and environmental missions, DOE and the national laboratories must take advantage of the scientific and technological expertise that exists in colleges and universities, private nonprofit institutions, non-Federal government agencies, and technology-related business concerns in the private sector.

The Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.) attempted to encourage collaboration between Federal laboratories and the private sector through, among other things, cooperative research and development agreements, known as "CRADAs." CRADAs allow the Federal Government, through its laboratories, to share personnel, services, facilities, equipment, intellectual property, and other resources with non-Federal parties in the conduct of R&D that supports the laboratories' missions. Although CRADAs have been successful, funding for them within DOE's defense programs has been cut dramatically in recent years and the number of new CRADAs has been cut in half between 1995 and 1998.

Additional legislation is needed to ensure adequate funding for national security CRADAs and to improve the CRADA process generally, to make it faster, more flexible, and more attractive to non-Federal participants. In addition, legislation is needed to promote closer scientific and technological cooperation between the national laboratories and non-Federal institutions, and to stimulate the development of "technology clusters" of technology-related businesses and academic institutions around the national laboratories, similar to the technology clusters found in the Silicon Valley.

LEGISLATIVE HISTORY

S. 517 is similar to S. 1756 in the 106th Congress.

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S. 1756. S. 1756 was introduced by Senator Bingaman for himself and Senator Murray on October 20, 1999. Senators Domenici and Gorton were later added as cosponsors. The Committee on Energy and Natural Resources held a field hearing on S. 1756 in Albuquerque, New Mexico on February 14, 2000. On September 20, 2000, the Committee on Energy and Natural Resources adopted an amendment in the nature of a substitute to S. 1756, and ordered the bill favorably reported, as amended.

S. 2549. On July 11, 2000, the Senate adopted legislation similar to S. 1756, as reported by the Committee on Energy and Natural Resources, as Amendment No. 3770 to S. 2549, the National Defense Authorization Act for Fiscal Year 2001. Amendment No. 3770 added subtitle E (sections 3161–3169) to title XXXI of S. 2549. The amendment was sponsored by Senators Bingaman, Domenici, Mur-

ray, Gorton, Thompson, Frist, and Murkowski, and was agreed to by voice vote.

H.R. 4205. On July 13, 2000, the Senate passed H.R. 4205, the House counterpart to S. 2549, after striking all after the enacting clause and inserting the text of S. 2549, including subtitle E.

Public Law 106-398. On October 30, 2000, H.R. 4205, including subtitle E, was enacted as the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (Public Law 106-398). Section 3161 of Public Law 106-398 directed the Administrator for Nuclear Security to establish a Technology Infrastructure Pilot Program at the national security laboratories and nuclear weapons production facilities. Section 3161 of Public Law 106-398 is similar to section 3 of S. 517, which directs the Secretary of Energy to establish a broader Technology Infrastructure Pilot Program that includes non-national security laboratories and non-nuclear-weapons facilities. Section 3196 of Public Law 106-398 amended section 12 of the Stevenson-Wylder Technology Innovation Act of 1980 (15 U.S.C. 3710a) to permit the National Nuclear Security Administration to waive any license retained by the Government on inventions resulting from research at an NNSA laboratory to facilitate commercialization of the invention. Section 3196 of Public Law 106-398 is similar to section 9 of S. 517, which further amends the Stevenson-Wylder Act to permit the Department of Energy to waive licenses for inventions at all DOE national laboratories.

Public Law 106-404. On November 1, 2000, Congress enacted the Technology Transfer Commercialization Act of 2000 (Public Law 106-404). Section 11 of the Public Law 106-404 (42 U.S.C. 7261c.) provides for the appointment of a technology partnership ombudsman at each DOE national laboratory. Section 11 of Public Law 106-404 is similar to section 5 of S. 517.

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S. 517. S. 517 was introduced by Senator Bingaman for himself and Senators Domenici and Murray on March 12, 2001. Senator Crapo was added as a cosponsor on March 20, 2001. At a business meeting on May 16, 2001, the Committee on Energy and Natural Resources ordered S. 517 favorably reported without amendment.

COMMITTEE RECOMMENDATION

The Committee on Energy and Natural Resources, in open business session on May 16, 2001, by a unanimous vote of a quorum present, recommends that the Senate pass S. 517.

COMMITTEE AMENDMENTS

During the consideration of S. 517, the Committee did not adopt any amendments.

SECTION-BY-SECTION ANALYSIS

Section 1 designates the short title.

Section 2 defines terms used in the Act.

Section 3(a) directs the Secretary of Energy to establish a Technology Infrastructure Program.

Subsection (b) provides that the purpose of the program is to stimulate the development of technology clusters around the na-

tional laboratories to support their missions; to improve the ability of the national laboratories to benefit from commercial research, technology, products, processes, and services; and to encourage the exchange of scientific and technological expertise between the national laboratories and non-federal institutions.

Subsection (c) authorizes the Secretary to divide up to \$10,000,000 per year for three years equally among up to ten national laboratories or facilities.

Subsections (d), (e), and (f) provide applicable requirements and selection criteria for the program.

Subsection (g) requires the Secretary to report to Congress within three years of the program's start on whether the program should be continued beyond the pilot stage and to recommend any legislation that may be needed to implement a follow-on program.

Section 4 requires the Secretary to direct the Director of each national laboratory to establish a small business advocacy office to increase small businesses' participation in procurement, collaborative research, and technology licensing and transfer.

Section 5 requires the Secretary to direct the Director of each national laboratory to appoint an ombudsman to resolve complaints or disputes over technology partnerships, patents, and licensing.

Section 6 requires the Secretary to direct the Laboratory Operations Board to study and report on: (1) employee mobility among the national laboratories; and (2) the need for changes in indemnification requirements, royalty and fee schedules, patent licensing procedures and rights, and certain other matters related to businesses' participation in laboratory partnerships and technology licensing. The second group of study topics is particularly aimed at finding new ways to promote start-ups and stronger networks of technical collaboration near the laboratories.

Section 7 gives DOE "other transactions" for cost-shared research. Standard government contracts, grants, or cooperative agreements can be ill suited to working with a consortia of research organizations where the Government is only one investment partner among many. "Other transactions" authority cuts through that problem by giving the Secretary greater flexibility to enter into beneficial arrangements without regard to the restrictive requirements of standard funding instruments. Similar authority has been successfully used for many years by the Defense Advanced Research Projects Agency (DARPA) to manage many of its innovative relationships with industry, particular research consortia. The authority given to the Secretary of Energy in section 7 is directly modeled on the authority given to DARPA and the Defense Department in section 2371 of title 10, United States Code.

Section 8 confirms that all activities under the Act must be carried out in accordance with the existing DOE structure, including the Nuclear National Security Administration (NNSA).

Section 9 amends the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710) to streamline the approval process for CRADAs at government-owned, contractor-operated (GOCO) facilities. Subsection (a) amends section 12(a) of the Stevenson-Wydler Act to permit Federal agencies to substitute an annual strategic plan for individual joint work statements. Subsection (b) adds a new paragraph to section 12(b) of the Stevenson-Wydler Act to permit designated officials at the Department of Energy to waive li-

censes retained by the Government under enumerated provisions of the Stevenson-Wydler Act if the official finds that the retention of the license would substantially inhibit the commercialization of an invention that would otherwise serve an important Federal mission. Subsection (c) amends section 12(c)(5) of the Stevenson-Wydler Act to reduce the time allowed to approve CRADAs at government-owned, contractor-operated laboratories to 30 days.

Section 10(a) establishes CRADA funding goals for the National Nuclear Security Administration (NNSA). Subsection (b) establishes a goal of obligating 0.5 percent of the funds available to the NNSA during fiscal year 2001 and 2002 for CRADAs or similar cooperative, cost-shared research partnerships with non-Federal organizations. The Committee estimates this will amount to about \$30 million in each fiscal year. Subsection (c) requires the Administrator to submit a report to the congressional defense committees recommending an appropriate funding objective for subsequent years. Subsection (d) requires that CRADAs entered into under section 10 be consistent with and support the missions of the NNSA. Subsection (e) requires that, beginning in March 2002, and no later than the end of March of each year thereafter, the Administrator report to Congress on whether the goals of section 10 have been met in the previous fiscal year. If the goals have not been met, the provision requires the Administrator to describe what actions he or she will take to achieve such goals and recommend any legislative changes needed to achieve them.

COST AND BUDGETARY CONSIDERATIONS

The following estimate of costs of this measure has been provided by the Congressional Budget Office.

SUMMARY

S. 517 would authorize several new programs at the Department of Energy (DOE) that would foster technology partnerships between DOE and nonfederal entities. The bill would authorize the appropriation of \$10 million a year for three years for a Technology Infrastructure Pilot Program at certain DOE laboratories and facilities. It would direct the department to expand support for small businesses at those facilities and to appoint an ombudsman to facilitate the resolution of complaints or disputes. DOE also would be authorized to waive provisions in licenses that are retained by the government under cooperative research and development agreements (CRADAs) over the next five years and to develop alternative contractual arrangements for research and development projects. Finally, the bill would direct DOE to allocate a fixed percentage of the amounts appropriated for the National Nuclear Security Administration (NNSA) for CRADAs, and to prepare various reports.

Assuming appropriation of the necessary amounts, CBO estimates that implementing this bill would cost about \$50 million over the 2002–2006 period. The provisions regarding CRADAs could affect the collection and spending of royalties and other payments governed by licensing agreements, but CBO estimates that the net effect on direct spending would be negligible. Because the bill could affect direct spending, pay-as-you-go procedures would apply.

S. 517 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA) and would impose no costs on state, local, or tribal governments.

ESTIMATED COST TO THE FEDERAL GOVERNMENT

The estimated budgetary impact of S. 517 is shown in the following table. The costs of this legislation fall within budget functions 050 (national defense), 250 (general science, space and technology, and 270 (energy).

	By fiscal year, in millions of dollars—					
	2001	2002	2003	2004	2005	2006
SPENDING SUBJECT TO APPROPRIATION						
Spending under current law for technology partnerships:						
Authorization level ¹	5	5	0	0	0	0
Estimated outlays	0	1	2	2	0	0
Proposed changes:						
Estimated authorization level	0	15	15	15	5	5
Estimated outlays	0	3	11	15	13	8
Spending Under S. 517:						
Estimated authorization level	5	20	15	15	5	5
Estimated outlays	0	4	13	17	13	8

¹Public Law 106-398 authorized \$5 million in 2001 and 2002 for a technology partnership program, but no funds have yet been appropriated.

BASIS OF ESTIMATE

For this estimate, CBO assumes that the authorized and estimated amounts will be appropriated for each year, beginning in 2002. We assume outlays will follow historical spending patterns for similar programs.

Spending Subject to Appropriation

CBO estimates that implementing this bill would cost a total of \$50 million over the next five years, assuming appropriation of the necessary amounts. Most of this funding would support the pilot program, which would promote opportunities for commercial research and technology development with 10 national laboratories or facilities. The \$10 million authorized for each of the next three fiscal years would be in addition to the \$5 million already authorized for such pilot programs at the national security labs for 2002. Under the bill, the pilot program would require that at least 50 percent of the funding to be provided from nonfederal sources; we expect that spending would start slowly.

In addition, based on information from DOE, CBO estimates that the bill's requirement that DOE expand support for small businesses would cost about \$5 million annually, assuming appropriation of the necessary funds.

Direct spending

The provisions in S. 517 regarding CRADAs could affect direct spending because the federal government collects and spends royalties and other payments under these licensing agreements. Under current law, the government may grant nonfederal entities patent licenses or assignments for inventions resulting from CRADAs and

other collaborative arrangements. Federal agencies are authorized to spend any royalties or payments resulting from such licenses or assignments without further appropriation.

The provisions allowing DOE to waive license provisions could reduce royalties from existing as well as future CRADAs, but CBO estimates that the net effect would not be significant because agencies are able to spend any such collections without further appropriation. The provisions that would allocate a portion of the NNSA's funding for CRADAs could increase licensing activity and royalties at some point in the future, but the net effect would be negligible because any proceeds would be spent by DOE.

Pay-as-you-go considerations: The Balanced Budget and Emergency Deficit Control Act sets up pay-as-you-go procedures for legislation affecting direct spending or receipts. CBO estimates that the provisions in S. 517 regarding CRADAs and licensing arrangements could affect direct spending, but we estimate that the net effect would not be significant.

Estimated impact on state, local, and tribal governments: S. 517 contains no intergovernmental mandates as defined in UMRA and would impose no costs on state, local, or tribal governments. Any costs or benefits accruing to intergovernmental entities, including public universities, from participation in the Technology Infrastructure Pilot Program would be voluntary.

Estimated impact on the private sector: This bill contains no new private-sector mandates as defined in UMRA.

Estimate prepared by: Federal Costs: Kathleen Gramp. Impact on State, Local, and Tribal Governments: Victoria Heid Hall. Impact on the Private Sector: Lauren Marks.

Estimate approved by: Peter H. Fontaine, Deputy Assistant Director for Budget Analysis.

REGULATORY IMPACT EVALUATION

In compliance with paragraph 11(b) of rule XXVI of the Standing Rules of the Senate, the Committee makes the following evaluation of the regulatory impact which would be incurred in carrying out S. 517. The bill is not a regulatory measure in the sense of imposing Government-established standards or significant economic responsibilities on private individuals and businesses.

No personal information would be collected in administering the program. Therefore, there would be no impact on personal privacy.

Little, if any additional paperwork would result from the enactment of S. 517, as ordered reported.

EXECUTIVE COMMUNICATIONS

On October 4, 2000, the Committee on Energy and Natural Resources requested legislative reports from the Department of Energy and the Office of Management and Budget setting forth executive views on S. 1756 (106th Congress). These reports had not been received at the time the report on S. 1756 was filed, nor had these reports been received at the time the report on S. 517 was filed. When these reports become available, the Chairman will request that they be printed in the Congressional Record for the advice of the Senate.

The testimony provided by the Director of the Los Alamos National Laboratory and the Director of the Sandia National Laboratories at the February 14, 2000 Committee hearing on S. 1756 (106th Congress) follows:

PREPARED STATEMENT OF DR. JOHN C. BROWNE, DIRECTOR,
LOS ALAMOS NATIONAL LABORATORY

INTRODUCTION

I am pleased to have the opportunity to address this Committee today. I want to thank our Senators and the Committee for the strong support they have shown over many years for our Laboratory's mission and for industry-Laboratory partnerships and economic development. I am committed to seeing that Los Alamos National Laboratory fulfills our national security mission while also carrying out our responsibility to achieve the goals of the government's technology transfer program.

I would also like to state my support for the "National Laboratories Partnership Improvement Act of 1999." This bill will make it easier for Los Alamos to collaborate with industry and universities, especially those in the northern New Mexico region.

Los Alamos and the other DOE laboratories facilitate the exchange of new technology and advanced technical capabilities between the public and the private sectors. Such exchange helps us achieve our programmatic mission while providing our researchers with stimulating challenges. I am convinced that significant benefits derived from our technical collaborations with academia and industry.

I concur with the stated purpose of the government's involvement in technology transfer which is to make federally developed technology available to industry in a way that will provide short- and long-term benefits to the U.S. economy and the industrial competitiveness of our nation. These benefits include new and higher quality jobs, an enhanced skill base, commercialization of new technologies, and a more robust domestic economy.

However, let me state strongly that a clear benefit for Los Alamos and the DOE is the opportunity for our researcher to solve national problems in collaboration without industrial partners. Collaborations with private industry help us to assimilate "best industrial practices" to maintain and develop our skills.

While I believe that our efforts in technology transfer and industrial partnerships have been successful, the funding for these effort has dropped significantly in the last several years. The FY01 President's budget eliminates this funding entirely. If this occurs, then our programatically funded industrial partnerships will have to focus directly on DOE program deliverables.

If there is no longer identified funding for the DOE technology partnership program, it would be more efficient to conduct our mission-focused partnerships through normal contracting and funds-in arrangements. These activities

would be more timely and cost-effective by eliminating the additional DOE management processes that grew up when the government was funding a more general technology transfer program with hundreds of millions of dollars per year.

STOCKPILE STEWARDSHIP AND THE TECHNOLOGY
PARTNERSHIP PROGRAM

A major purpose of partnering with industry is to help us achieve our mission objectives more efficiently and effectively. The Nuclear Weapon Complex cannot afford to do everything itself. In many specialized areas, U.S. industry has developed experience, expertise, equipment, and technology that eclipses what exists in the Nuclear Weapons Complex. Cooperative Research and Development Agreements (CRADAs) with industry are essential to achieving our stockpile stewardship mission while refurbishing and modernizing the complex. They also provide contacts for future, innovative partnerships with industry.

Adoption of the moratorium in nuclear testing hastened the need for more powerful computing capabilities. As an element of stockpile stewardship the Accelerated Strategic Computing Initiative (ASCI) is successfully pushing the frontiers of speed and capacity with advanced hardware development at the nuclear weapons laboratories. However, a successful Stockpile Stewardship Program requires more than hardware. Sophisticated computational modeling and simulation programs are being created at Los Alamos and the other weapons laboratories to solve complex physics and materials problems. Nevertheless, a key question remains: How can we validate the results of this modeling and simulation effort? Validation of the models is essential. It requires actual data to compare with the results of calculations. While historical data are available for comparison, the fact remains that no new nuclear testing data have been generated since 1992.

The ASCI program is a good example of a government program whose goals are synergistic with industrial goals. ASCI is advancing the technological frontier for private industry while establishing needed partnerships with industry to attain its programmatic goals. We have collaborated with many U.S. companies, large and small, in which our modeling and simulation expertise has resulted in unclassified codes that have been used for commercial activities. In return, our partner companies provide data that assist the laboratories to validate our codes. Without access to the data from our industrial collaborators, millions in additional tax collars would be required to generate the additional data needed to validate our computer models.

Los Alamos National Laboratory's continuing role in Science Based Stockpile Stewardship (SBSS) relies on our ability to predict material performance over decades of material lifetime. Our partnerships with industry are designed to increase our understanding of the aging stock-

pile. Working with industry has provided us with confidence to predict changes in materials characteristics and performance and has enhanced our ability to manufacture and inspect replacement parts with increased precision, at lower cost.

The Technology Partnership Program (TPP) has been an effective tool in building awareness of and advocacy for the value of partnerships between industry and the weapons program. The Los Alamos TPP effort has successfully catalyzed and incubated more than 200 partnerships between industry and the weapons program in the following technical thrust areas: Advanced Manufacturing; Materials and Chemistry and Materials Processing; Advanced Inspection and Surveillance; Advanced Diagnostics for Dynamic Experiments; Advance Computation, Modeling, and Simulation; and Knowledge Management.

We also have successfully directed AMTEX and ACTI partnerships to provide direct support to weapons programs, and have helped several small, high-tech businesses grow and become more competitive in Northern New Mexico through R&D partnerships under our Small Business Initiative.

Los Alamos is presently collaborating with two industrial partners on polymer aging work with direct applications to weapons. These partners are world leaders in the field of research and production of urethanes, an essential element in the SBSS initiative. These collaborations encompass research in materials synthesis, advanced characterization, and predictive modeling.

One of these collaborations is studying accelerated aging methods and models to better understand the behavior of polymers when subjected to environmental degradation. Part of this research incorporates stable isotope labels into polymers, a unique laboratory capability that is advancing our materials knowledge base. The results of this research improve our understanding of lifetime predictions for the stockpile.

Los Alamos is greatly concerned about DOE's intent to eliminate the funding for the TPP program in FY2001. Loss of this funding will make it more difficult to continue the momentum gained recently in building high-quality, mission-driven partnerships with industry for the weapons program. The funding is also of value in creating the laboratory industry structures that are key to economic development in the future. We request your continued support for partnering with industry.

COMMENTS REGARDING THE PROVISIONS OF S. 1756

1. Regional technology infrastructure: Economic clusters

Los Alamos regional economic development activities

In 1997, the University of California and the Department of Energy incorporated a new Appendix into the Prime Contract for Los Alamos. Appendix M required the establishment of a new Technology Commercialization Of-

office (TCO) as a part of the Laboratory's technology transfer organization. With the support of the DOE and the University of California (UC), \$1 million annually is allocated to the Technology Commercialization Office in support of its regional business development efforts.

In addition to the \$1 million funding for the Laboratory, TPP's Small Business Initiative Regional Impact Program has provided an additional \$2 million annually to fund collaborations with regional small business. The program has supported more than 45 regional small business CRADAs, the Technical Assistance Program, and SBIR Training Workshops. The future of the SBI program is in severe jeopardy based on the demise of TPP funding for industrial partnerships. This has already resulted in the termination of some regional CRADA activity and threatens the development of future partnerships.

Since 1997, Los Alamos has diligently worked to nurture and grow new businesses in the Northern New Mexico region. The Laboratory has invested more than \$7 million to provide direct assistance to more than 80 Northern New Mexico clients. Among these clients, the Laboratory assisted seven Laboratory employees to participate in the new Entrepreneurial Leave-of-Absence program to pursue business start-ups in the region. Some major results of this program include: 34 new Northern New Mexico technology firms; 124 new jobs among those 34 firms; and external capital invested in these firms exceeds \$21M.

Los Alamos is also a partner with a growing private sector technology community in Northern New Mexico helping to create a framework for future cluster groupings. Formal working relationships have been established with numerous Northern New Mexico organizations including Northern New Mexico Small Business Development Centers, regional technology incubators and business parks, and various investor organizations.

For example, in the area of information technology and software the Laboratory is a co-founder and active participant in the NM Information Technology and Software Association (NMITSA). Similar cluster initiatives in the biosciences, materials, and optoelectronics areas are also under development.

We also are supportive of workforce training initiatives that support the information technology cluster. In January 2000, Los Alamos co-sponsored "E-Commerce 2000 Summit" with Taos La Plaza Telecommunity, the Town of Taos, the National Center for American Indian Enterprise Development and the Electronic Commerce Resource Center. This purpose of the summit was to educate the local business community on accessing the many opportunities available through the Internet.

Through Appendix M of the UC contract and the Small Business Initiative Program, the Laboratory has provided approximately \$3 million in funding annually to support these activities. The demise of TPP eliminates our ability to sustain regional CRADAs, the Technical Assistance Pro-

gram, and SBIR training. Although we will continue our efforts to promote regional business development, as required by Appendix M, passage of Senate Bill 1796 will help us to continue to collaborate with regional businesses through CRADAs.

Los Alamos Research Park project

The DOE maintains a strong commitment to regional economic development to Northern New Mexico. With the lease of 44 acres of land to the Los Alamos Commerce and Development Corporation, the Los Alamos Research Park will emerge as a preeminent location for cooperative projects to thrive amidst Los Alamos researchers and their external partners. Motorola, one of the Laboratory's strategic partners, has signed a lease as the anchor tenant in the park.

The park will facilitate strategic collaborations with industry help diversify the Northern New Mexico economy, and increase job opportunities. The park is expected to create a more business-friendly infrastructure enabling technology clusters in information technology, biotechnology, and optoelectronics to develop. Park tenants will help to generate new tax revenues for Los Alamos County over the next ten to fifteen years.

Using the model established for the Research Park, DOE is investigating other opportunities to lease unique Laboratory facilities to private industry. For example, DOE and National Institutes of Health (NIH) need carbon-13 and oxygen-18 isotopes that can be generated for advanced biomedical applications at one of the Laboratory's vacant facilities. The sublease of the facility to a private company will help the government obtain materials needed for further research and provide materials required for industrial applications. Industry analyses for projects of this nature indicate the potential need for up to 100 employees to be hired primarily from the Northern New Mexico region.

2. Improved small business procurement opportunities at Los Alamos

To promote small business in the region, Los Alamos has increased small business procurement opportunities. Several initiatives will assist small businesses in working with the Laboratory: The Small Business Office (SBO) has been elevated to report to the Director of Business Operations Division; The Small Business Office will be given procurement authority; A new Director of Small Business will be appointed to serve as a facilitator and advocate for small businesses interested in contracting opportunities with LANL; A Small Business and Contracting Ombuds function will provide a resource for small businesses with complaints and questions about procurement, technology transfer and other topics; and The Laboratory will convene a series of workshops to assist small businesses in working with the Laboratory.

Los Alamos is conducting mandatory training for purchasing agents to raise consciousness regarding the importance of subcontracting with small, minority, and woman-owned businesses. We are creating a web page to identify upcoming subcontracts and maximize small business planning efforts. A news bulletin will provide the same information to businesses without on-line access. This is consistent with Los Alamos' commitment to being a good neighbor in the region and promoting regional economic development.

With these changes, we will make the Laboratory more accessible, more consistent, and more transparent to regional small-businesses. The result will be a stronger regional economy and a more productive partnership between the Laboratory and the small business community.

3. Amendments to the Stevenson-Wydler Act

The "National Laboratories Partnership Improvement Act of 1999", introduced as Senate Bill 1756, will facilitate the stated objective to help the national laboratories work better, faster and with greater flexibility with industry. The bill will also enable Los Alamos to work more closely with regional companies, universities and other organizations in Northern New Mexico to support the Laboratory's mission and to stimulate local economic development.

The Stevenson-Wydler Technology Innovation Act of 1980 as amended, permitted the federal laboratories to transfer their technologies and provide a means for external users to access laboratory developments. In 1986, The Federal Technology Transfer Act (Public Law 99-502), mandated technology transfer as a responsibility of all federal laboratory scientists. It empowered directors of the Government Owned, Government Operated laboratories (GOGO) with the authority to enter into CRADAs and to sign them on behalf of their respective agency.

In 1989, Congress passed the National Competitiveness Technology Transfer Act. This legislation granted Government Owned, Contractor Operated (GOCO) laboratories such as Los Alamos, the opportunity to enter into CRADAs and other agreements with universities and private industry, in essentially the same ways as was provided GOCOs under the Federal Technology Transfer Act of 1986. In 1991, the Defense Authorization Act established technology transfer as a mission for the nuclear weapons laboratories.

The primary impediments in implementing technology transfer statutes at the laboratories have not resulted from legislation, but from the multitude procedural requirements partly from DOE's interpretation of federal requirements. These procedural requirements have unnecessarily burdened the labs with costly and time-consuming efforts. The ability to engage industry and academia in a timely fashion has been severely diminished.

The proposed legislation should help streamline the process while reemphasizing the goals of Stevenson-

Wydler and the National Competitive Technology Transfer Act making collaborative technology transfer arrangements between federal laboratories and the private sector easier and more attractive.

We are encouraged to see the streamlined approach this bill offers for Joint Work Statements and CRADAs. However, under the present bill, DOE has the discretion to approve CRADAs and JSWs on a case-by-case basis or to permit submission of an annual strategic plan in lieu of review. We would prefer to see the elimination of the DOE review of both Joint Work Statements and final CRADAs. The time that would be saved by eliminating case-by-case review and approval would benefit the laboratory and our CRADA partners, translating into dollar savings in almost all instances.

The maturation of the CRADA process with approximately 450 CRADAs executed at Los Alamos over the past decade suggests that it is reasonable to allow us to negotiate and adopt CRADAs and joint work statements without case-by-case review (analogous to our procurement subcontracting process). The DOE has established performance-based metrics for our technology transfer efforts that are part of our annual science and technology evaluation. These DOE audits and reviews could address concerns regarding the quality of Joint Work Statements and CRADAs prepared by the Laboratories. Our most recent audit was rated outstanding.

Recommendation: S. 1756 should be amended to allow the Department's contractors to adopt Joint Work Statements and CRADAs without the requirement of case-by-case DOE approval. Annual audits and reports would be more than sufficient to ensure that high quality Joint Work Statements and CRADAs are adopted.

4. *Other transactions*

Los Alamos supports the bill's provisions to allow DOE to utilize the method of "other transactions" as an exceptionally flexible contracting authority that allows a "clean sheet of paper" negotiation with non-federal organizations.

OTHER AREAS FOR IMPROVING DOE POLICIES AND PROCEDURES FOR ECONOMIC DEVELOPMENT

With the inclusion of Appendix M in the UC Prime Contract, the DOE has demonstrated strong support for entrepreneurial activities that enhance and diversify the economic base of Northern New Mexico and facilitate the start-up and growth of new technology based businesses in the region. The DOE can further exhibit its support for these emerging New Mexico businesses by modifying the Fairness of Opportunity policies to allow preferential consideration for regional firms interested in licensing Laboratory technologies.

The Laboratory is required to satisfy existing Fairness of Opportunity requirements prior to granting an exclusive license agreement. When the Laboratory issues an adver-

tisement for potential licensees, small regional businesses as well as large national firms typically respond to the call for proposals. Without a long-term track records or the vast resources large established firms have to commit to commercialization initiatives, small regional businesses are often placed at a disadvantage. The addition of “proximity to the Laboratory” as an additional selection criterion when advertising technology licensing opportunities would help regional firms start up, grow, and remain in the area, further complementing the cluster development objectives of S. 1756.

CONCLUDING REMARKS

We all recognize the vast scientific and technological capabilities available in federal laboratories such as Los Alamos and Sandia. The opportunity to meet our DOE mission, to benefit the federal taxpayers through the development of new partnerships, and to assist in the development of economic clusters in our region, are all part of the Los Alamos strategic plan for the coming decade. These activities allow DOE research to reach mission goals while strengthening or overall economy.

It is critical that the federal government supports a sustained effort in technology partnerships if these efforts are to continue to have a positive impact. We cannot engage our best people in these endeavors if the funding fluctuates as dramatically as it has over the past eight years. Our present economic boom in the U.S. has lowered the interest of many national leaders in technology transfer but the nation must be prepared to continue its investment in the economic engine provided by high technology developments such as those that occur at the national laboratories. Senate Bill 1756 will help the DOE, its laboratories and industry meet this challenge.

PREPARED STATEMENT OF DR. C. PAUL ROBINSON,
DIRECTOR, SANDIA NATIONAL LABORATORIES

INTRODUCTION

Mr. Chairman, members of the committee, and distinguished guests, thank you for the opportunity to testify today. I am Paul Robinson, Director of Sandia National Laboratories. Sandia is managed and operated for the U.S. Department of Energy (DOE) by Sandia Corporation, a subsidiary of the Lockheed Martin Corporation.

I am pleased to testify in support of S. 1756, the “National Laboratories Partnership Improvement Act.” The bill acknowledges that research collaborations with industry and universities are crucial to the ability of the DOE laboratories to accomplish their missions. This point is stated in the “Findings” section of the bill:

“To be able to help the Department to achieve its missions in the most cost-effective manner, the National Laboratories must take advantage, to the greatest practicable,

of the scientific and technological expertise that exists in the private sector, as well as at leading universities, through joint research and development projects, personnel exchanges, and other arrangements.”

The truth of this statement is not widely appreciated. The DOE laboratories are often regarded as prolific sources of advanced technology. And while that is often true, it must be acknowledged that we are also voracious users of technology developed in the larger community of science and engineering. We are, in a sense, hunter-gatherers of technology that can support our DOE missions. The laboratories cannot be an island; they must interact extensively with industry and universities to keep their research foundations up-to-date with the fast-moving pace of progress in technology.

A wide range of opinion exists concerning the appropriate role of technical collaboration between federal research and development (R&D) institutions and the private sector and academia. Some have claimed that cost-shared research with national laboratories amounts to corporate welfare. Although there are undoubtedly some examples of corporate welfare in federal programs, the DOE Defense Programs partnership effort is not one of them. In recent years it has become quite clear that the DOE laboratories are major beneficiaries of such collaborative research. Partnerships are an important strategic response of the science and technology enterprise as R&D budgets in both industry and government have come under stress. It has been amply demonstrated that collaborative R&D programs involving the DOE laboratories can be of great value to industry and small businesses. But there should be no misunderstanding that such partnerships are also of great benefit to the DOE laboratories in performance of their strategic mission responsibilities.

In my statement today, I will give examples of how industrial partnerships have contributed to DOE missions at Sandia National Laboratories. I will discuss the origins and intent for the partnership policies DOE adopted and the implementation of partnership programs at Sandia National Laboratories. I will then describe the negative impact of the steady decline in partnership funding since fiscal year 1996 and conclude with some observations on revitalizing the DOE partnerships program. Specific comments on the draft language of S. 1756 are offered in an appendix to my statement.

HOW INDUSTRIAL PARTNERSHIPS CONTRIBUTE TO THE DOE LAB MISSIONS

Our laboratory's core competencies have been strengthened and its capabilities enhanced through interaction with industrial and academic researchers and engineers. This interaction permits us to cultivate relationships with key suppliers and contributors, explore technical frontiers with those who have a common interest, and maintain critical mission-related competencies at world-class levels dur-

ing a period of reduced federal investment. Partnerships have directly benefited DOE missions as we have learned of new approaches and technologies and applied them to support our internal programs.

As you know, the mission responsibilities of Sandia National Laboratories and Los Alamos National Laboratory are centered on stewardship of the nation's nuclear weapons stockpile. This is a long-term obligation that requires sustained expertise in many technical disciplines. We must exercise, maintain, and continuously improve the technical competencies required for this work. Nuclear weapons stewardship requires advanced technology, some of which is specific to nuclear weapons, but much of which is common to the standard science and engineering disciplines. If we don't keep up with the advancing frontiers in electronics, materials science, computer science, nanotechnology, and so forth, we cannot perform our mission in the long term. Cooperative work with industry often helps support technologies that are strategic for the nuclear weapons program.

For example, microelectronics technology is critical to the DOE defense mission, and it is especially important for Sandia's responsibilities in component design. To meet our mission obligations, Sandia has developed a broad-based competency in microelectronics, from the fundamental science of semiconducting materials to device design and fabrication. In the past two decades, there has been explosive growth and innovation across the microelectronics industry, with advance after advance being stacked up to increase the performance of computers and other high-performance electronic systems. We can only hope to stay abreast of developments through partnerships with the leaders in this field. In the 1990s we collaborated extensively with the Sematech Consortium, as well as with several major semiconductor companies and research universities. Those arrangements have proved to be crucially important to the weapons program at Sandia.

As a result of our cooperative research and development work with Sematech, we were able to revitalize our microelectronics fabrication facility through a major donation of equipment and research instrumentation from IBM valued at over \$20 million. The facility became a dual-benefit project with industry and hosted partnership projects with U.S. microelectronics manufacturers and universities. Without the major support provided by IBM and other industrial partners through collaborative research programs, Sandia would not have a modern semiconductor fabrication facility today. And this facility is absolutely critical to our mission. We are the only government laboratory with both research and production capability supporting radiation-hardened microelectronic components for defense and space applications.

In another example, about a year ago Intel Corporation granted a royalty-free license of its Pentium processor design to Sandia so that we can develop a radiation-hard-

ened version. The Pentium offers a ten-fold increase in processing power over currently available radiation-hardened microprocessors for applications such as earth satellites, space probes, missile defense, and other military and intelligence systems. Our agreement with Intel will save U.S. taxpayers millions of dollars in research and development—costs that would have been required to emulate this capability with a new design. In addition, the savings in time and money by being able to adapt proven commercial software to operate the Pentium, rather than write new software, will be enormous. Several government agencies will participate with DOE in the radiation-hardened redesign of the pentium chip, including NASA, the Air Force, and the National Reconnaissance Office. Intel's patriotic action built on a partnering relationship that Sandia fostered over many years and involved numerous cooperative research and development projects.

It is simply wrong to label these partnerships “corporate welfare”; the government clearly got more value out of these interactions than it put in. Ironically, I have heard exchanges such as these referred to as “government welfare,” which is perhaps not far off the mark!

THE ADOPTION OF PARTNERSHIP POLICY FOR DOE DEFENSE PROGRAMS

In the late 1980s, DOE began to look favorably on the concept of R&D partnerships to attract private industrial participation with the labs in areas of mutual interest to industry and to Defense Programs. DOE had become concerned with a developing shortage of reliable component suppliers to the nuclear weapons program which began to manifest itself in the mid-1980s. This trend became more pronounced after the collapse of the Soviet Union and the subsequent decrease in spending on weapons production and the closing of many of the dedicated plants for nuclear weapon components.

Defense Programs' approach differed from the “technology transfer” model envisioned earlier for government-owned and government-operated (GOGO) federal laboratories in the Stephenson/Wydler Act. Stephenson/Wydler was intended as a vehicle for transferring government-developed technologies to the private sector for commercialization. Defense Programs, on the other hand, envisioned collaborative work on technologies of mutual interest to both the DOE and industry. There was an expectation of benefit to DOE programs as well.

Prior to 1989, only GOGO laboratories were allowed to enter into cooperative research and development agreements (CRADAs) with industrial partners (as permitted by the Federal Technology Transfer Act of 1986). Basically, the only way government-owned, contractor-operated (GOGO) labs like Sandia and Los Alamos could partner with industry was through procurements. Fortunately, the CRADA mechanism was extended to GOCO laboratories

by the National Competitiveness Technology Transfer Act of 1989.

In the FY 1991–92 time frame, Defense Programs implemented a program of R&D partnerships by creating a formal technology transfer program financed by a specific defense appropriation and conducted by an independent program initiative within Defense Programs that did not “tax” existing programs. This new program, the Technology Transfer Initiative (TTI)—later changed to the Technology Partnerships Program (TPP)—provided seed money for catalyzing new relationships with industrial entities that had never before collaborated with DOE laboratories.

Sandia’s implementation of partnerships

Sandia’s implementation of partnerships includes Cooperative Research and Development Agreements (CRADAs) with both large and small companies, large-scale strategic alliances with industry groups, expanded offerings of DOE laboratory user facilities, and direct technical assistance to small and medium-sized enterprises.

Cooperative research and development agreements

In the first few years after the National Competitiveness Technology Transfer Act of 1989, cooperative research and development agreements (CRADAs) became the preferred arrangement for undertaking collaborative research. Work under a CRADA is cost-shared with the partner, and intellectual property resulting from the collaborative work can be protected. Implementation of CRADAs was rather difficult at first, however. Companies were unhappy with bureaucratic delays and some of the contractual terms imposed by DOE’s original regulations. Fortunately, problems with the CRADA rules and processes were worked out to the general satisfaction of the labs, their partners, and DOE within the first two years.

Sandia signed CRADAs with many local firms, most of them small businesses. Many of those CRADAs led to new products and permitted the licensing of technology developed at Sandia for commercial applications. Sandia has also executed many CRADAs with some of the nation’s largest companies. With Intel Corporation, for example, we have performed 12 CRADAs since 1991 with a total value approaching \$30 million.

By fiscal year 1995, Sandia had developed the largest portfolio of industry partnerships of any federally sponsored institution. Our partnering strategy evolved beyond simple CRADAs with individual companies. We found, for example, that consortia involving industry, universities, and other labs were effective vehicles for sharing research during the precompetitive stages of a technology’s development, effectively “raising the level of all ships” and probably increasing U.S. technological competitiveness. We established or participated in several consortia in areas such as specialty metals, investment casting, computational structural analysis, and microelectronics and

optoelectronics. In the last decade, Sandia signed several multiple-partner CRADAs with consortia of companies and universities. Many of these newer CRADAs comprise a substantial segment of a specific industry or involve working with umbrella organizations that represent an entire industry.

At the same time, it was also becoming clear that CRADAs with individual companies in the private sector often went far beyond technology transfer by creating strategic benefits for both parties. An outstanding example of mutual benefits in Sandia's CRADA work with the Goodyear Tire and Rubber Company. Engineers at Sandia and Goodyear collaborated to improve a computational engineering tool for solving structural mechanics problems common to tire design and to the design of reliable neutron generators for nuclear weapons. Sandia's investment in this work was marginal, but in the process we acquired valuable improvements in our capability from Goodyear's expertise.

The benefit to Goodyear—and to the nation—was substantial. Consider that Goodyear is the only manufacturer of tires that is U.S.-based and majority-owned by U.S. investors. The company has faced aggressive technical and price competition from foreign manufacturers who are subsidized by their governments. With its healthy volume of international sales, Goodyear measurably improves the U.S. trade deficit, creates U.S. jobs, and generates profits that are taxable here or are reinvested in a U.S.-based enterprise.

DOE user facilities

Another important vehicle for collaborative research is the Department of Energy's user facility program. DOE's laboratories have distinguished themselves in the development and operation of major scientific and engineering facilities that would be difficult to reproduce in a different setting. Today, most of these facilities are operated as user facilities, and their unique capabilities are available to researchers from industry, academia, and other government agencies. Sandia has 40 such facilities representing most of the laboratory's core technical capabilities for DOE missions. One of the great advantages of the user facility concept is that it provides a physical environment conducive to collaboration. Researchers from industry, universities, and the national laboratories frequently work side-by-side in these settings on problems of mutual interest.

An example of a Sandia user facility with important collaborative programs is our Electronics Quality/Reliability Center, which supports research and development in reliability physics, reliability engineering, and failure analysis for electronic devices. Sandia has trained a great many electronics specialists from U.S. companies in the processes, techniques, and diagnostics for producing extremely high-reliability electronic systems—a hallmark of our defense work. In turn, we continuously learn of the new com-

ponents and technologies of the commercial electronic industry, to move us ahead with the ever-changing state of the art. Together, we have merged these capabilities for the advantage of our respective programs.

Sandia's Intelligent Systems and Robotics Center provides an environment for research and development on applications of intelligent systems and robotics to manufacturing, environmental cleanup, weapons production and dismantlement, and medicine. The Liquid Metal Processing and Thermal Spray Laboratories user facility features a wide range of prototype and industrial-scale furnaces, melting and investment casting facilities, thermal spray labs, and computational resources. These are just a few examples of Sandia's diverse user facilities.

Sandia's user facilities will become increasingly important for generating cooperative work with industrial partners and for building alliances involving industry, university, and government entities.

Technical assistance to small enterprises

Sandia has made a special effort to provide technical assistance directly to small business enterprises. Sandia, Lawrence Livermore, and Los Alamos national laboratories and the Y-12 production facility at Oak Ridge are partners in the Department of Energy's Small-Business Initiative. Technical assistance to small companies increases the return on the federal investment in DOE's technical assets to the tax-paying public at minimal incremental cost.

Sandia works directly with individual businesses to solve problems that are beyond the technical means of the business to resolve. Often these have been problems that—unless the troubles could be quickly diagnosed and solved—would have led to the failure of the small business. We also work with small-business associations to reach a greater number of participants by addressing common problems and opportunities and matching laboratory capabilities with the generic needs of groups of small businesses.

The Small-Business Initiative (SBI) at Sandia has four program elements: Technical Assistance: Use of Sandia expertise or equipment to solve a specific, short-term technical problem. The SBI supports individual facility costs up to \$5,000 for each transaction; Partnership Agreements: Joint, cost-shared or funds-in, dual-benefit development of technology, with SBI support limited to \$50,000; Facility Utilization: Identifies user facilities of value to small business. Helps support the costs associated with a small business' use of a user facility; and Intermediary Relationships: Linkage of Sandia to the local, regional, and national small-business communities. Intermediaries pre-qualify small business requests for Sandia.

We believe Sandia's Small-Business Initiative has had a big impact, both regionally and nationally. Sandia National Laboratories has executed 1,500 technical assistance agreements with small businesses in 45 states since its in-

ception in 1994. Our program has assisted 450 small businesses in New Mexico, helping to sustain the local industrial base and the jobs and economic benefits that it provides.

Locally, Sandia has helped many small businesses with technical problems. Here are a few examples:

Quatro Corporation: This electronics manufacturer turned to Sandia for help in developing a process for recovering solid waste from printed wiring boards during manufacture. Sandia helped the company build a prototype process for extracting and reclaiming waste material. Quatro is evaluating the patentability of the process and whether to build an environmentally safe manufacturing plant based on it. If such a facility is built, it could create approximately 50 jobs.

Radiant Technologies, Inc.: Engineers from Sandia helped Radiant Technologies develop a manufacturable prototype read/write optical disk, for commercial computer memories based on ferroelectric thin films. Under the Small-Business Initiative's technical assistance program Radiant obtained a license for this technology.

SCB Technologies, Inc.: SCB secured an exclusive license from Sandia several years ago to commercialize the semiconductor bridge igniter, which provides precise ignition of explosives. The company developed a version that is insensitive to radio frequency signals, which can cause conventional detonators to fire prematurely. Under a small-business technical assistance agreement, an SCB engineer, together with Sandia explosives experts, verified the performance of the new circuit in a radio frequency environment.

Waveront Research, Inc. (WRI): WRI requested technical assistance in demonstrating connectivity of an optical device to a digital computer interface. Sandia provided use of a special microlaser array, unavailable commercially and necessary for early prototyping. WRI credits the assistance with keeping the fledgling business afloat. In addition, the company expects successful commercialization and the creation of at least four new jobs.

Southwest Tire Processors: An example of a small-business assistance project in rural New Mexico, Southwest Tire Processors of Socorro recycles rubber tires into chunks, powders, and sprays for use as insulation, water and sound barriers, and playground/patio materials. Assistance provided by Sandia in adhesive development enabled the company and its partners to develop a new product line of full-circle waste tire recycling. In addition, a new small business, Material Recovery of North America (MRNA), was created to commercialize the equipment, process, and end products.

These are just a few examples of the many successful small-business technical assistance projects between Sandia and local companies. Unfortunately, DOE has now substantially reduced its budgetary support for the Small-Business Initiative. In fact, our small-business assistance

program will be in jeopardy in FY 2001 when DOE terminates the Technical Partnerships Program.

Expanded state support would be very helpful in strengthening Sandia's small-business assistance program. A bill entitled, "Laboratory Partnership with Small Business Tax Credit Act," is before the New Mexico state legislature at this moment. The proposed legislation would provide a limited gross receipts tax credit to national labs for assisting small businesses in New Mexico. This credit will stimulate new economic activity, new jobs, and new taxes. An analysis by Brian McDonald, former director of the Bureau of Business and Economic Research at the University of New Mexico, showed that the average business assistance project of \$4,300 yields about \$70,000 in payroll created or retained and approximately \$6,000 in additional tax revenue to the state of New Mexico in its first year. If the state legislature of New Mexico enacts this bill, it will send a positive signal to DOE and Congress that New Mexico regards the small business assistance programs of the national laboratories as very important activities that should be continued.

Entrepreneurial separations

Several years ago Sandia offered an entrepreneurial separation program for employees who wanted to venture into the private sector to start a business based on technology in their area of expertise. Entrepreneurial ventures are notoriously risky, and Sandia's entrepreneurial separation policy can permit a former employee to return if the venture fails.

Optomech Design Company is a small business owned by two former Sandia employees who elected to take advantage of our entrepreneurial leave of absence. They are trying to spin-off laser-engineered net-shaping (LENS) technology into a commercializable process. If they succeed, Defense Programs will benefit greatly, Sandia is especially interested in LENS' design flexibility and low-volume production capabilities for highly specialized nuclear weapon components, among other technical advantages. This entrepreneurial venture holds promise for developing a viable supplier of LENS services and the general enhancement of LENS technology through stimulation of interest throughout the wider industrial community.

Perhaps our most outstanding example of a successful entrepreneurial venture under this separation program is the MODE Division of EMCORE Corporation. MODE (Micro Optical Device Engineering) was founded by an employee of Sandia National Laboratories who had a vision of commercializing a new semiconductor laser based on fabrication techniques explored in Sandia's Microelectronics Development Laboratory. His start-up was acquired by EMCORE Corporation of New Jersey, a manufacturer of photovoltaic panels and other electro-optical devices. MODE's vertical-cavity surface-emitting laser (VCSEL) products have found a spectacular market in the

internet and telecommunications industries. In addition to the MODE division, EMCORE built a manufacturing plant of photovoltaic arrays in Sandia Science and Technology Park. EMCORE is the first high-tech company to locate in that development, which we hope will become the nucleus of a high-technology cluster in New Mexico.

THE IMPORTANCE OF A HIGH-TECHNOLOGY CLUSTER

Many studies have demonstrated the importance of technology clusters to the economic progress of a region. It is an unfortunate paradox that New Mexico is home to several world-class institutions of science and technology and yet it remains one of the most economically disadvantaged states in the nation. We have a vision to pilot the cluster concept to create a more integrated technological community in New Mexico that can be a stimulus for greater investment by high-technology industry. If successful, we believe this model can be propagated around the nation, ensuring that the benefits of technology innovation—a proven driver of economic prosperity—can benefit all.

Business and industry have an opportunity to tap into an extraordinary concentration of technological assets in what can be called the New Mexico Technology Corridor, stretching from Los Alamos National Laboratory in the north to New Mexico State University in the south. This corridor contains a world-class array of technology-based organizations, including Sandia and Los Alamos national laboratories, the U.S. Air Force Phillips Research Laboratory, the Santa Fe Institute, White Sands Missile Range, the Lovelace Respiratory Research Institute, the University of New Mexico, New Mexico State University, New Mexico Highlands University, and the New Mexico Institute of Mining and Technology, Sandia Science and Technology Park is situated at the crossroads of this corridor.

Sandia National Laboratories, working with Technology Ventures Corporation (TVC), the City of Albuquerque, and several landowners, is planning a 285 acre, campus-style technology center adjacent to Sandia Laboratories in southeastern Albuquerque. In a campus-like setting just outside Kirtland Air Force Base, the Sandia Science and Technology Park will be a short bike ride away from some of Sandia's outstanding user facilities, including the Microelectronics Development Laboratory, the Robotic Manufacturing Science and Engineering Laboratory, the Advanced Manufacturing Processes Laboratory, and Sandia's Integrated Materials Research Laboratory, as well as Sandia's teraflops supercomputer, currently the world's fastest scientific computer. Partners will be only a short drive away from other exceptional research facilities that are ready for collaborative projects that will not only incubate new technologies but will harness them for economic growth.

We believe the Sandia Science and Technology Park, as an intersection of a statewide high-technology cluster, will help the laboratory preserve and enhance its technical ca-

pabilities and human talent for DOE missions into the future.

THE DECLINE OF DOE PARTNERSHIP PROGRAMS

Funding for the DOE Technology Partnerships Program has been in a steep decline for the past six years: from peak funding in fiscal year 1995 of \$212 million to only \$14.5 million in FY 2000. The share of the DOE TPP funding available to Sandia National Laboratories has declined in direct proportion. From a peak of \$94 million in FY 1995, we are allocated only \$4 million for the Technology Partnerships Program in FY 2000. To adjust to this steep decline in funding, Sandia sharply reduced the number of new CRADAs it would accept in subsequent years and had to terminate many partnership agreements prematurely. The number of new CRADAs has dropped from a peak of 83 in FY 1994 to approximately 30 in FY 2000. The TPP funding problem has also forced us to dramatically cut back on the number of small-business assistance projects we can perform.

At the outset, the DOE Defense Programs Technology Transfer Initiative (later changed to Technology Partnership Program) was intended as a dual-benefit program for both industry and the laboratories. Unfortunately, when large amounts of funding were allocated for the TTI program (on the order of \$200 million in fiscal years 1994 and 1995) it attracted a significant lobbying effort by some industrial/political sectors to “get their share,” (notably the automobile, textiles, and oil and gas sectors). DOE Defense Programs was unable in some cases to prevent earmarking of TTI funds for industry sectors for which the alignment with Defense Program’s mission needs was not clear. Consequently, DOE’s Office of Defense Programs began to ramp-down the “fenced” funds (i.e., the line item allocation) for partnerships in its budget requests and pursue instead a program of partnerships controlled directly by managers of individual programs and campaigns¹ in Defense Programs.

This change in strategy has further harmed the partnership effort because of a fundamental incompatibility in operating approaches that has arisen. Managers of DP programs and campaigns have time horizons for deliverable that have caused them to refrain from investing in partnerships with only strategic, rather than immediate, value to the program. Some key DP managers would favor a paradigm of collaborative R&D only being a procurement function, rather than a strategic relationship. This is a very different approach. Sandia’s relationships with Intel, IBM, and Goodyear (mentioned earlier in my statement)—which have been of such great value to our mission—required a decade or more of CRADAs and other interactions

¹ Campaigns are technically challenging, multi-year, multi-functional efforts conducted across Defense Programs designed to develop and maintain specific capabilities.

in order to develop the trust needed for truly strategic partnerships.

Another major problem with the centralization of partnership decisions within headquarters is that laboratory directors have a greatly diminished role in the decision process. The DP campaign managers, quite appropriately, have a programmatic focus. But the laboratory directors are responsible for nourishing the institutional competencies required for their missions over the long term. They take a strategic view of their laboratories' need and use industrial partnerships as a tool for strengthening essential institutional competencies. Earlier in my statement I described how this tool has been used at Sandia to strengthen our institutional competencies in microelectronics, for example.

This strategic view of each laboratory's requirements has not been a central concern of the more narrow focus of the campaigns, which reformulated the work into deadline-driven time lines. But as a result of these changes and lower R&D budgets, the laboratories were put into a position where it was necessary to cancel CRADA commitments that had been made in good faith to industrial partners. The precipitous shrinkage of TPP funding beginning in FY 1996 forced Sandia to cancel several active CRADAs. The problem repeated itself this year as the Technology Partnerships Program at Sandia dropped from \$21 million in FY 1999 to \$4 million in FY 2000. The result was a need to cancel 21 CRADAs with work in process, affecting a total of 38 participating companies—a very painful and destructive action. You can understand that some of our industrial collaborators have now begun to question whether we can be a reliable business partner. When we do not live up to our commitments, it seriously damages our relationship with industry in general and our partner companies in particular.

DOE's budget request for FY 2001 would close out the Technology Partnerships Program line item altogether. DP's explanation is that CRADAs will be funded at approximately the same level as FY 2000 (\$14.5 million) but from general Defense Programs funds rather than a line item. But in general, the reductions in our DP budget have not allowed us to complete existing CRADA commitments from program funds. Instead, the pattern has been to leave the laboratories to dispose of any commitments they can no longer fund. If we get a TPP budget of zero in FY 2001, I expect that Sandia National Laboratories will be forced to terminate as many as 30 additional in-process CRADAs again next year.

Thus, I see the future of Defense Programs partnerships at a crossroads. The mission benefit of our CRADA portfolio is undeniable. Yet, since FY 1996, almost all TPP-funded partnerships have been more narrowly driven by immediate Defense Programs needs rather than by a strategic view of the essential role that partnerships play in keeping the laboratories' technologies robust and at the

state-of-the-art over the long term. The present course will close down the partnership programs as currently administered by individual laboratories.

Interestingly, while we have fewer CRADAs today than five years ago, there is a greater percentage of industry funds-in with many of our new CRADAs. This trend is encouraging to me in attesting to the value that our industrial partners place on their partnerships with us. Companies that have experience with us have increasingly been willing to foot a larger percentage of the bill for joint R&D as changes in our program approach and funding have occurred.

Unfortunately however, companies that have never had experience with the DOE laboratories are unlikely to enter into collaborative agreements without cost-sharing. Thus, there is a definite need for "seed money" for catalyzing the initial partnerships that can build the trust for longer-term collaborations. Yet, with the demise of TPP funds, very little seed money will be available for initiating new strategic relationships with industry.

OBSERVATIONS ON REVITALIZING THE DEFENSE PROGRAMS PARTNERSHIPS PROGRAM

I was encouraged that Secretary Richardson accepted the recommendations of DOE's Research and Development Council Technology Transfer Working Group, which issued a report in August 1999, offering several suggestions for strengthening DOE's technology transfer program. Those suggestions included streamlining CRADA procedures, promoting public awareness of opportunities for technology partnerships, developing clear guidance on intellectual property, and implementing management reforms. The Secretary also appointed a high-level advisor to provide leadership on technology transfer issues in the Department. I applaud these actions; they are steps that are certainly needed.

It is doubtful in the absence of an explicit appropriation for partnerships whether sufficient support for strategic industrial partnerships will be afforded from within the Defense Programs campaigns. Funding on the level of approximately \$60 million is required for a really useful Technology Partnerships Program. The total value of the partnerships portfolio at Sandia in any year will total approximately twice Sandia's TPP allocation when industry funds-in are added in. Moreover, as he has already been demonstrated with the TPP program of the 1990s, the seed money provided by DOE's investment will often mature into long-term alliances that will materially benefit the program for many years to come.

Small business technical assistance is now funded solely from the Defense Programs Technology Partnerships Program and must also meet DP expectations for mission benefit. These are in fact often incompatible, and it places on the table the question of how such activities should be funded. Perhaps technical assistance efforts should be

funded outside of Defense Programs; or by recognizing that the small dollar volume required for this worthwhile activity provides sufficient benefit to the overall health of the laboratories, it should agree that DP support for such effort is appropriate. S. 1756 is very important in this respect. It specifies that small business technical assistance is to be conducted for all DOE mission areas, although the funding source is not identified. Without this legislation, the laboratories would have no legal authority to conduct small business technical assistance if TPP funding is ultimately zeroed-out.

To revitalize the Technology Partnerships Program, line item funding will be required. I would hope that a supplemental appropriation will not be necessary. You and other committees of Congress can legitimately argue why a \$60 million partnerships effort—in light of its demonstrated value in the past—cannot be provided from within a \$4.6 billion program. As shown by DOE's own study, the 30-Day Review of the Stockpile Stewardship Program, Defense Programs is perhaps over-committed and its resources "stretched too tightly" to carry out all of its responsibilities. The recent Report of the Panel to Assess the Reliability, Safety, and Security of the United States Nuclear Stockpile, commissioned by Congress in the Defense Authorization Act of 1999, expressed similar concerns for resource shortfalls. I believe it is important to very seriously review funding requirements, particularly when an effort with as much demonstrated success and promise as the Partnership activities hangs in the balance.

CONCLUSION

I support S. 1756, the "National Laboratories Partnership Improvement Act." This legislation will permit the national laboratories to continue to benefit from working collaboratively with the private sector. In addition, it will improve the laboratories' flexibility to enter into partnership agreements and reduce the time required to negotiate, approve, and execute agreements. I am particularly encouraged that it will also help the laboratories foster the regional technology clusters that provide a local technology base synergistic with DOE institutions.

The success that we have had working with industry during the last decade has amply demonstrated the value of industrial collaborations for DOE laboratories in support of their missions. It is clearly good public policy to support and encourage these mutually beneficial, cost-shared partnerships. National statistics show that the balance has shifted: a majority of R&D funds are provided by the private sector for their commercial needs, rather than by federal government for defense. Increasingly the national laboratories must take advantage of the scientific and technological advances that are occurring in the private sector if they are able to be successful in accomplishing their missions cost-effectively.

APPENDIX—SPECIFIC COMMENTS ON LANGUAGE, SENATE
BILL 1756, “NATIONAL LABORATORIES PARTNERSHIP IM-
PROVEMENT ACT”

SECTION 4: REGIONAL TECHNOLOGY INFRASTRUCTURE
PROGRAM

4(c)(1) Pilot Phase: The funding source for the \$1 million pilot project is not defined. Therefore, the required funding will reduce funding available for programs. Providing independent funding would be helpful.

4(e)(1) Minimum Participants: Requiring that every agreement include a minimum of three parties may slow the implementation significantly. It is generally easier and faster to enter into multiple two-party agreements and still meet the full intent of the legislation. We recommend providing for that option.

4(e)(3) Competitive Selection: We recommend that this section be modified to allow for the competitive selection process to be determined by the laboratory and approved by the Secretary or his designee. This could be accomplished by inserting the words “by the Laboratory Director” between “selected” and “using” and by adding the words “or his designee” after “the Secretary”.

SECTION 5: SMALL BUSINESS ADVOCACY AND ASSISTANCE

This section is well aligned with initiatives we are currently pursuing at Sandia, and we fully support the objectives. However, we have concerns about placing into federal statute a requirement for an organizational office and function for small business advocacy, rather than to leave to the laboratories how to best meet that need. We strongly support the language that will provide for small business technical assistance within our full mission space, expanding it beyond our defense mission alone and, thereby, increasing our ability to provide value to the U.S. small business community.

5(a) Advocacy Function: Sandia already has initiatives in place that fully meet the intent and objectives of this section. We believe it is important that national laboratories be allowed to have flexibility in how to best accomplish the small-business advocacy function in view of rapidly changing environments, and we believe that there is no need to prescribe by statute the detailed approach or organizational structure.

5(b) Establishment of Small Business Assistance Program: This is a valuable and important piece of this legislation that will formally authorize and institutionalize our small business assistance program. However, it is unclear what funding source(s) can be used for this effort. If DOE DP/TPP funding goes away in FY 2001, the Defense Programs laboratories will have no authorized funding for small business assistance. Therefore, it would be helpful to indicate that the Secretary and the laboratories are authorized to use existing programmatic funding for this ac-

tivity, through some type of overhead charge, or better still, to provide specific funding for this program.

SECTION 6: TECHNOLOGY PARTNERSHIPS OMBUDSMAN

Sandia strongly supports this action and has implemented this initiative at the request of the Secretary. However, we believe the required organizational structure [(6)(a)(2) wherein the ombuds “reports to the Director of the National Laboratory or facility”] is best if not prescribed by federal statute and should be left to the laboratories to determine.

SECTION 7: MOBILITY OF TECHNICAL PERSONNEL

While we support the concept embodied in this section, we believe that implementation will be extremely problematic. We support the idea of a study [(7)(c)] to determine feasibility. However, we believe that moving personnel between government laboratories, private companies, and universities with their significant differences in benefits and salary practices may not be practical. We suggest that this may best be left to the free market activity of parties negotiating their own employment contracts. However, if this section of the legislation remains, we feel that it should not exclude non-technical staff members. Therefore, we suggest that “scientific and technical personnel” be changed to “scientific, technical, and business personnel.”

SECTION 8: OTHER TRANSACTIONS AUTHORITY

This authority will be of substantial value in increasing our partnership agreement flexibility. However, it will undoubtedly require that the Secretary and DOE General Counsel issue guidelines and an implementation order. It would be helpful to include a timetable that would drive the schedule for implementing this new authority within DOE and the laboratories.

SECTION 9: AMENDMENTS TO STEVENSON-WYDLER ACT

We fully support the intent and proposed improvements in expediting the agreement process between federal agencies (DOE), the national laboratories, and our private sector partners. However, the revised language still indicates that two separate documents (the Joint work Statement (JWS) as well as the CRADA) must receive agency approval. With the experience base now in place in federal agencies and national laboratories, we believe that should no longer be necessary. We recommend that approval by the agency of the CRADA alone would meet all necessary reviews and oversight requirements.

9(a) Strategic Plans: The language, “or, if permitted by the agency, in an agency approved strategic plan,” is undoubtedly driven by the need to obtain DOE support for this innovative legislation; that is, to allow the laboratory directors authority to approve JWSs and CRADAs after DOE approves an annual strategic plan. We fully support

this strategy. Removing the current requirement for case-by-case approval for every partnership agreement offers the potential for a significant time and work reduction in negotiating agreements. Therefore, it would also be helpful to require DOE to grant that authority on at least a pilot basis at one or more laboratories so that it could be implemented and evaluated on a timely basis.

9(b) Federal Waivers: We are unsure what is driving this part of the legislation. Sandia has never had a CRADA partner walk away because of the government's reserved rights. This has the potential to raise issues (an expectation that the government's right to "make or have made" using the CRADA-developed intellectual property should be given up) where now there are none. In addition, even if the government's rights are waived, we believe it would not be wise for the laboratory to waive its rights, because of our need to continue to perform programmatic responsibilities requiring the technology. Unless there is additional information of which we are unaware, we would recommend that this clause be removed. We note, however, that the legislation does indicate that this is expected to be a fairly rare occurrence, and we can live with the language if other sites have found this to be an issue.

9(c) Time Required for Approval: 9(c)(4)(v): This is a particularly progressive and encouraging clause and we endorse it most heartily. We would look forward to an open negotiation and DOE that would establish the boundaries and ground-rules under which the laboratories would be allowed to fully negotiate and approve partnership agreements.

CHANGES IN EXISTING LAW

In compliance with paragraph 12 of rule XXVI of the Standing Rules of the Senate, changes in existing law made by the bill S. 517, as ordered reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, existing law in which no change is proposed is shown in roman):

DEPARTMENT OF ENERGY ORGANIZATION ACT

Public Law 95-91, as Amended

AN ACT To establish a Department of Energy in the executive branch by the reorganization of energy functions within the Federal Government in order to secure effective management to assure a coordinated national energy policy, and for other purposes.

* * * * *

CONTRACTS

SEC. 646. (a) The Secretary is authorized to enter into and perform such contracts, leases, cooperative agreements, or other similar transactions with public agencies and private organizations and persons, and to make such payments (in lump sum or installments, and by the way advance or reimbursement) as he may deem to be

necessary or appropriate to carry out functions now or hereafter vested in the Secretary.

* * * * *

(g) *OTHER TRANSACTIONS AUTHORITY.*—(1) *In addition to other authorities granted to the Secretary to enter into procurement contracts, leases, cooperative agreements, grants, and other similar arrangements, the Secretary may enter into other transactions with public agencies, private organizations, or persons on such terms as the Secretary may deem appropriate in furtherance of basic, applied, and advanced research functions now or hereafter vested in the Secretary. Such other transaction shall not be subject to the provisions of section 9 of the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5908).*

(2)(A) *The Secretary of Energy shall ensure that—*

(i) *to the maximum extent practicable, no transaction entered into under paragraph (1) provides for research that duplicates research being conducted under existing programs carried out by the Department of Energy; and*

(ii) *to the extent that the Secretary determines practicable, the funds provided by the Government under a transaction authorized by paragraph (1) do not exceed the total amount provided by other parties to the transaction.*

(B) *A transaction authorized by paragraph (1) may be used for a research project when the use of a standard contract, grant, or cooperative agreement for such project is not feasible or appropriate.*

(3)(A) *The Secretary shall not disclose any trade secret or commercial or financial information submitted by a non-federal entity under paragraph (1) that is privileged and confidential.*

(B) *The Secretary shall not disclose, for five years after the date the information is received, any other information submitted by a non-federal entity under paragraph (1), including any proposal, proposal abstract, document supporting a proposal, business plan, or technical information that is privileged and confidential.*

(C) *The Secretary may protect from disclosure, for up to five years, any information developed pursuant to a transaction under paragraph (1) that would be protected from disclosure under section 552(b)(4) of title 5, United States Code, if obtained from a person other than a federal agency.*

THE STEVENSON-WYDLER TECHNOLOGY INNOVATION ACT OF 1980

Public Law 96–480, as Amended

AN ACT To promote United States technological innovation for the achievement of national economic, environmental, and social goals, and for other purposes

* * * * *

SEC. 12. COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS.

(a) *GENERAL AUTHORITY.*—Each Federal agency may permit the director of any of its Government-operated Federal laboratories, and, to the extent provided in an agency-approved [joint work statement,] *joint work statement or, if permitted by the agency, in an agency-approved annual strategic plan, the director of any of its Government-owned, contractor-operated laboratories—*

(1) to enter into cooperative research and development agreements on behalf of such agency (subject to subsection (c) of this section) with other Federal agencies; units of State or local government; industrial organizations (including corporations, partnerships, and limited partnerships, and industrial development organizations); public and private foundations; nonprofit organizations (including universities); or other persons (including licensees of inventions owned by the Federal agency); and

(2) to negotiate licensing agreements under section 207 of title 35, United States Code, or under other authorities (in the case of a Government-owned, contractor-operated laboratory, subject to subsection (c) of this section) for inventions made or other intellectual property developed at the laboratory and other inventions or other intellectual property that may be voluntarily assigned to the Government.

(b) ENUMERATED AUTHORITY.—

(1) Under an agreement entered into pursuant to subsection (a)(1), the laboratory may grant, or agree to grant in advance, to a collaborating party patent licenses or assignments, or options thereto, in any invention made in whole or in part by a laboratory employee under the agreement, for reasonable compensation when appropriate. The laboratory shall ensure, through such agreement, that the collaborating party has the option to choose an exclusive license for a pre-negotiated field of use for any such invention under the agreement or, if there is more than one collaborating party, that the collaborating parties are offered the option to hold licensing rights that collectively encompass the rights that would be held under such an exclusive license by one party. In consideration for the Government's contribution under the agreement, grants under this paragraph shall be subject to the following explicit conditions:

(A) A nonexclusive, nontransferable, irrevocable, paid-up license from the collaborating party to the laboratory to practice the invention or have the invention practiced throughout the world by or on behalf of the Government. In the exercise of such license, the Government shall not publicly disclose trade secrets or commercial or financial information that is privileged or confidential within the meaning of section 552(b)(4) of title 5, United States Code, or which would be considered as such if it had been obtained from a non-Federal party.

(B) If a laboratory assigns title or grants an exclusive license to such an invention, the Government shall retain the right—

(i) to require the collaborating party to grant to a responsible applicant a nonexclusive, partially exclusive, or exclusive license to use the invention in the applicant's licensed field of use, on terms that are reasonable under the circumstances; or

(ii) if the collaborating party fails to grant such a license, to grant the license itself.

(C) The government may exercise its right retained under subparagraph (B) only in exceptional circumstances and only if the Government determines that—

(i) the action is necessary to meet health or safety needs that are not reasonably satisfied by the collaborating party;

(ii) the action is necessary to meet requirements for public use specified by Federal regulations, and such requirements are not reasonably satisfied by the collaborating party; or

(iii) the collaborating party has failed to comply with an agreement containing provisions described in subsection (c)(4)(B). This determination is subject to administrative appeal and judicial review under section 203(2) of title 35, United States Code.

(2) Under agreements entered into pursuant to subsection (a)(1), the laboratory shall ensure that a collaborating party may retain title to any invention made solely by its employee in exchange for normally granting the Government a nonexclusive, nontransferable, irrevocable, paid-up license to practice the invention or have the invention practiced throughout the world by or on behalf of the Government for research or other Government purposes.

(3) Under an agreement entered into pursuant to subsection (a)(1), a laboratory may—

(A) accept, retain, and use funds, personnel, services, and property from a collaborating party and provide personnel, services, and property to a collaborating party;

(B) use funds received from a collaborating party in accordance with subparagraph (A) to hire personnel to carry out the agreement who will not be subject to full-time equivalent restrictions of the agency;

(C) to the extent consistent with any applicable agency requirements or standards of conduct, permit an employee or former employee of the laboratory to participate in an effort to commercialize an invention made by the employee or former employee while in the employment or service of the Government; and

(D) waive, subject to reservation by the Government of a nonexclusive, irrevocable, paid-up license to practice the invention or have the invention practiced throughout the world by or on behalf of the Government, in advance, in whole or in part, any right of ownership which the Federal Government may have to any subject invention made under the agreement by a collaborating party or employee of a collaborating party.

(4) A collaborating party in an exclusive license in any invention made under an agreement entered into pursuant to subsection (a)(1) shall have the right of enforcement under chapter 29 of title 35, United States Code.

(5) A government-owned, contractor-operated laboratory that enters into a cooperative research and development agreement pursuant to subsection (a)(1) may use or obligate royalties or other income accruing to the laboratory under such agreement with respect to any invention only—

(A) for payments to inventors;

(B) for purposes described in clauses (i), (ii), (iii), and (iv) of section 14(a)(1)(B) [15 USCS 3710c(a)(1)(B)(i), (ii), (iii), and (iv)]; and

(C) for scientific research and development consistent with the research and development missions and objectives of the laboratory.

(6)(A) In the case of a Department of Energy laboratory, a designated official of the Department of Energy may waive any license retained by the Government under paragraph (1)(A), (2), or (3)(D), in whole or in part and according to negotiated terms and conditions, if the designated official finds that the retention of the license by the Department of Energy would substantially inhibit the commercialization of an invention that would otherwise serve an important federal mission.

(B) The authority to grant a waiver under subparagraph (A) shall expire on the date that is 5 years after the date of the enactment of the National Defense Authorization Act for Fiscal Year 2001.

(C) The expiration under subparagraph (B) of authority to grant a waiver under subparagraph (A) shall not effect any waiver granted under subparagraph (A) before the expiration of such authority.

(c) CONTRACT CONSIDERATIONS.—

(1) A Federal agency may issue regulations on suitable procedures for implementing the provisions of this section; however, implementation of this section shall not be delayed until issuance of such regulations.

(2) The agency in permitting a Federal laboratory to enter into agreements under this section shall be guided by the purposes of this Act.

(3)(A) Any agency using the authority given it under subsection (a) shall review standards of conduct for its employees for resolving potential conflicts of interest to make sure they adequately establish guidelines for situations likely to arise through the use of this authority, including but not limited to cases where present or former employees or their partners negotiate licenses or assignments of titles to inventions or negotiate cooperative research and development agreements with Federal agencies (including the agency with which the employee involved is or was formerly employed).

(B) If, in implementing subparagraph (A) an agency is unable to resolve potential conflicts of interest within its current statutory framework, it shall propose necessary statutory changes to be forwarded to its authorizing committees in Congress.

(4) The laboratory director in deciding what cooperative research and development agreements to enter into shall—

(A) give special consideration to small business firms, and consortia involving small business firms; and

(B) give preference to business units located in the United States which agree that products embodying inventions made under the cooperative research and development agreement or produced through the use of any industrial organization or other person subject to the control of a foreign company or government, as appropriate, take

into consideration whether or not such foreign government permits United States agencies, organizations, or other persons to enter into cooperative research and development agreements and licensing agreements.

(5)(A) If the head of the agency or his designee has an opportunity to disapprove or require the modification of any such agreement presented by the director of a Government-operated laboratory, the agreement shall provide a 30-day period within which such action must be taken beginning on the date the agreement is presented to him or her by the head of the laboratory concerned.

(B) In any case in which the head of an agency or his designee disapproves or requires the modification of an agreement presented by the director of a Government-operated laboratory under this section, the head of the agency of such designee shall transmit a written explanation of such disapproval or modification to the head of the laboratory concerned.

[(C)(i) Except as provided in subparagraph (D), any agency which has contracted with a non-Federal entity to operate a laboratory shall review and approve, request specific modifications to, or disapprove a joint work statement that is submitted by the director of such laboratory within 90 days after such submission. In any case where an agency has requested specific modifications to a joint work statement, the agency shall approve or disapprove any resubmission of such joint work statement within 30 days after such resubmission, or 90 days after the original submission, whichever occurs later. No agreement may be entered into by a Government-owned, contractor-operated laboratory under this section before both approval of the agreement under clause (iv) and approval under this clause of a joint work statement.

[(ii) In any case in which an agency which has contracted with a non-Federal entity to operate a laboratory disapproves or requests the modification of a joint work statement submitted under this section, the agency shall promptly transmit a written explanation of such disapproval or modification to the director of the laboratory concerned.

[(iii) Any agency which has contracted with a non-Federal entity to operate a laboratory or laboratories shall develop and provide to such laboratory or laboratories one or more model cooperative research and development agreements, for the purposes of standardizing practices and procedures, resolving common legal issues, and enabling review of cooperative research and development agreements to be carried out in a routine and prompt manner.

[(iv) An agency which has contracted with a non-Federal entity to operate a laboratory shall review each agreement under this section. Within 30 days after the presentation, by the director of the laboratory, of such agreement, the agency shall, on the basis of such review, approve or request specific modification to such agreement. Such agreement shall not take effect before approval under this clause.

[(v) If an agency fails to complete a review under clause (iv) within the 30-day period specified therein, the agency shall submit to the Congress, within 10 days after the end of that

30-day period, a report on the reasons for such failure. The agency shall, at the end of each successive 30-day period thereafter during which such failure continues, submit to the Congress another report on the reasons for the continuing failure. Nothing in this clause relieves the agency of the requirement to complete a review under clause (iv).

[(vi) In any case in which an agency which has contracted with a non-Federal entity to operate a laboratory requests the modification of an agreement presented under this section, the agency shall promptly transmit a written explanation of such modification to the director of the laboratory concerned.]

[(D)] (C) (i) Any Non-Federal entity that operates a laboratory pursuant to a contract with a Federal agency shall submit to the agency any cooperative research and development agreement that the entity proposes to enter into [with a small business firm] and the joint work statement *if* required with respect to that agreement.

(ii) A Federal agency that receives a proposed agreement and joint work statement under clause (i) shall review and approve, request specific modifications to, or disapprove the proposed agreement and joint work statement within 30 days after such submission. No agreement may be entered into by a Government-owned, contractor-operated laboratory under this section before both approval of the agreement and approval of a joint work statement under this clause.

(iii) In any case in which an agency which has contracted with an entity referred to in clause (i) disapproves or requests the modification of a cooperative research and development agreement or joint work statement submitted under that clause, the agency shall transmit a written explanation of such disapproval or modification to the head of the laboratory concerned.

(iv) *Any agency that has contracted with a non-Federal entity to operate a laboratory may develop and provide to such laboratory one or more model cooperative research and development agreements, for the purposes of standardizing practices and procedures, resolving common legal issues, and enabling review of cooperative research and development agreements to be carried out in a routine and prompt manner.*

(v) *A federal agency may waive the requirements of clause (i) or (ii) under such circumstances as the agency considers appropriate. However, the agency may not take longer than 30 days to review and approve, request modifications to, or disapprove any proposed agreement or joint work statement that it elects to receive.*

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