Testimony of

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October 24, 2007

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Before the
Senate Committee on the Judiciary
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The Role of Federally-Funded University Research in the Patent System:
A Review of Bayh-Dole and Royalty Returns

TESTIMONY OF DR. ELIZABETH HOFFMAN

Introduction

Good Morning Mr. Chairman and Distinguished Members of the Committee. I am Elizabeth Hoffman, Executive Vice President and Provost of Iowa State University. I am here first to convey our emphatic support for the Bayh-Dole Act. I am here also to propose a limited, technical fix that would eliminate a restriction that we believe has an unintended, inequitable, negative impact on small government owned, contractor operated laboratories; namely, the current limit imposed on retaining royalties resulting from technology transfer activities.

I am proud to be the chief academic and budget officer of the nation's first land grant university, which continues its tradition of putting ideas to work for the benefit of society. The motto on Iowa State University's seal is "Science with Practice." We believe the Ames Laboratory, which is operated by ISU for the United States' Department of Energy, is a model of that motto and a unique example of the positive social and economic impact of Bayh-Dole. By virtue of the number of licenses and options on technologies developed at Iowa State University, we have been called a "powerhouse" in the area of technology transfer. As you will see, the work at Ames Laboratory is a major reason we are such a powerhouse of innovation.

Bayh-Dole Works

Let me first speak generally to the success of Bayh-Dole. Those who have looked at its impact agree that it has fulfilled its promise of stimulating economic development and facilitated the more rapid and efficient translation of innovative ideas and technology to the public good.

Prior to 1980, most inventions resulting from federal funding were placed in the public domain or held in the federal patent portfolio. Few of those inventions were commercialized, and the technical and financial potential of those inventions often went unrealized. Less than 5% of federal patents were licensed, compared with 25 to 30 percent of technologies for which federal agencies released ownership of the pertinent intellectual property to the inventing organizations. Vexed by this lack of commercialization arising from federally sponsored research, Congress adopted the Bayh-Dole Act in 1980, with the belief that the intellectual property arising from research could be more effectively brought to practice by allowing small business and non-profit contractors to elect ownership and to retain royalties. The underlying idea, of course, was that with ownership would come the motivation and the resources to develop ideas more effectively.

While presenting small businesses and non-profit research organizations an opportunity to realize financial returns for intellectual property, the authors of Bayh-Dole also were careful to protect the tax-payers interest in innovations enabled with federal dollars. In return for the right to elect title to a federally-funded invention, for example, the law grants to the federal government a royalty-free right to practice the invention. It also grants to the federal government march-in rights under specified conditions.

Additionally, the law places very specific conditions on the management of inventions, including an imperative for diligent prosecution of licensing; preference for licensing to small business; and payment of part of the royalties to the inventor.

By all measures, Bayh-Dole has been a success. In December 2002, The Economist called Bayh-Dole "Possibly the most inspired piece of legislation to be enacted in America in the last half-century," adding "More than anything, this single policy measure helped to reverse America's precipitous slide into industrial irrelevance."

Bayh-Dole works because it recognizes that the hard work of bringing ideas to practice requires incentives and seed funding. By allowing institutions to retain ownership, institutions invest in the expertise needed to evaluate whether a viable product will result, and whether the market will value it. By providing incentives, Bayh-Dole assures that inventors and their sponsoring organizations continue working to bring their invention to public benefit, even after the original innovation in the laboratory and demonstration of concept.

As evidence of Bayh-Dole's effectiveness, consider that in 1980, only 250 patents were granted to universities. By 2004, this annual number had risen to 3,800. Spurred by Bayh-Dole, the nation's universities have geared up: according to the Association of University Technology Managers (AUTM), over the past nine years approximately 3,600 new products have been introduced as a direct result of university research in a broad array of fields including medicine, public safety, food and agriculture, new materials, semiconductor devices, education, and communications. Five hundred and twenty seven new products were introduced in 2005 alone. Since 1980, more than 5,000 companies have been started based on university research, contributing to the creation of more than 260,000 new jobs.

Bayh-Dole--The Experience at Iowa State University

The effectiveness of Bayh-Dole incentives can be seen in the upward trend in technology disclosures at Iowa State University. Prior to the adoption of Bayh-Dole in 1980, our researchers generated an annual average of 46 technology disclosures throughout the decade of the 1970's. In the 1980's, they generated an annual average of 61. The 1990's saw a further increase in disclosure activity, as scientists and engineers at ISU generated an average of 134 disclosures per year. Since 2000, we have leveled off at an annual average of 118 disclosures. In 2005, Iowa State University was second in the nation - behind the University of California System - in licenses and options with 218, and we were sixth nationally in the total number of active licenses, with 745.

For those who ask about the positive social benefit of this nationwide increase in technology disclosures at colleges and universities, it is essential to bear in mind that the objective - of academic institutions, in particular - is to bring useful ideas and innovations to the marketplace and the public good. Over the last eight years, ISU has licensed 322 different technologies. One half of these were the outgrowth of federal funding. And these technologies have benefited the many, rather than the wealthy. Approximately 92% of our licenses for federally funded technologies have been to small businesses. In the past 8 years alone, fully 20 new companies have been started on the basis of 41 licensed technologies; and 16 of those companies are still in existence, contributing to the economy of our state and the nation.

An Example: Lead-Free Solder

Now, I would like to turn from a broad examination of the positive impact of Bayh-Dole, to look more closely at the Ames Laboratory. No better illustration of the success of Bayh-Dole can be found than the example of lead-free solder, a result of federal support that has been developed jointly at the Ames Laboratory and Sandia National Laboratory. The research team that created this remarkable and remarkably marketable innovation was led by Ames metallurgist Iver Anderson.

Dr. Anderson's solder provides excellent properties over other solders, including a lower melting temperature and greater strength. It is used in the electronics industry within the circuitry of their products, for example, binding components to circuit boards for computers, cell phones, and other electronic devices and appliances. By some estimates, about 3,000 tons of electronic waste is discarded daily just in the U.S., and this waste contains lead from solder. By removing the lead, we protect the environment and avoid a serious health threat.

The so-called "Iver Patent" for this lead-free solder is licensed by ISU to 28 companies under very reasonable financial terms, and over 60 companies use the patent. Those companies are both small and large, domestic and international, and include a firm in Iowa whose small business has prospered from commercializing this solder.

What is important here, in evaluating the efficacy and wisdom of Bayh-Dole, is to recognize that if this technology had not been protected by a patent and vigorously defended - if Bayh-Dole did not exist - it is very likely that foreign companies would dominate the solder market with respect to our lead free alloy in the United States. The fact that the patent is available for license under reasonable terms was an important consideration for the industry in recommending that our patented alloy become the industry standard for electronic soldering. And as a result, the Iver patent - and the Ames Laboratory itself - have directly served the economic interests of our nation. In a word, at the Ames Laboratory and at Iowa State University, Bayh-Dole has made us better at our essential public mission: delivering the fruits of education and research to the public for the betterment of humanity.

A Proposed Modification--Relief for Small GOCO Laboratories

As you see, Bayh-Dole has fulfilled its promise in growing this country's technology-based economy for over 25 years. By asking the owners of federally sponsored technology to favor small businesses, it has contributed both to local economies and spurred stability in the U.S. economy by stimulating development of diverse products and approaches to problem solving. Bayh-Dole provides effective incentives to find solutions to pressing problems, and we see no reason for fundamental change in Bayh-Dole. The principles, practice, and impact of this legislation are sound.

I do, however, want to discuss with you today one technical concern we have that we believe can have an unfair impact on small government owned, contractor operated (GOCO) federal laboratories, and that has had such a inequitable impact on the Ames Laboratory at Iowa State University.

Specifically, as many of you may know, as modified in 1984 Bayh-Dole limits the earnings from royalties on federal licenses that can be retained by operators of government-owned, contractor operated laboratories to 5% of their annual budget. After reaching the limit, the contractor is required to return 75% of the remaining royalties to the federal government. This provision requires that all royalties retained by the contractor (both the 5% of budget and the 25% of the remaining 95% of royalty revenues) must be expended for research, educational and technology transfer purposes.

As indicated previously, Iowa State University operates Ames Laboratory for the Department of Energy. As a small laboratory - our budget in 2006 was $26 million - Ames Laboratory is the only federal laboratory to have reached the 5% royalty limit. Simply stated, this is because the Ames Laboratory has been disproportionately successful - compared to much larger national laboratories -- in developing and licensing technology. In other words, because we receive relatively limited funding from the government, and have such a successful patent portfolio, the Ames Laboratory alone in the nation has come up against the 5% royalty cap. Last fiscal year we returned nearly $1 million to the federal government, and this fiscal year, we anticipate returning about the same amount. Remember please, these are funds would, by law and in keeping with our non-profit, public interest mission, otherwise be used exclusively for research and educational purposes.

My contention today, which I respectfully offer for your consideration, is that the authors of Bayh-Dole and subsequent modifying legislation did not intend to incorporate a provision that would have a disparate and deleterious impact on small, successful, non-profit GOCO laboratories. Whatever their motivations - and there may have been several - I cannot believe the founders of this pivotal and uniquely American system of innovation intended to punish or to tax small, successful, non-profit institutions. Bearing in mind, again, that the royalties in question are, by law, necessarily re-invested in the research and education missions and activities of these non-profit contractors - which in

the case of the Ames Laboratory is a public university - we ask you to re-examine this technical clause and to modify the limitation in accord with the founding principle of and subsequent clarifying modifications to Bayh-Dole.

History of the 5% Limitation
As originally enacted, Bayh-Dole included a provision granting federal agencies discretion to retain title to inventions of GOCO contractors. Though President Reagan in 1983 issued a federal policy statement requiring federal agencies to exercise their discretion in favor of granting all contractors ownership and the right to retain royalties, it was not until the Trademark Clarification Act of 1984 that the law was amended to require that GOCO laboratories have the right to retain title to these inventions. At the same time the 5% limitation at issue today was added.

It reads:
(7) In the case of a nonprofit organization . . .

(E) with respect to a funding agreement for the operation of a Government-owned-contractor-operated facility, requirements (i) that after payment of patenting costs, licensing costs, payments to inventors, and other expenses incidental to the administration of subject inventions, 100 percent of the balance of any royalties or income earned and retained by the contractor during any fiscal year up to an amount equal to 5 percent of the annual budget of the facility, shall be used by the contractor for scientific research, development, and education consistent with the research and development mission and objectives of the facility, including activities that increase the licensing potential of other inventions of the facility; provided that if said balance exceeds 5 percent of the annual budget of the facility, that 75 percent of such excess shall be paid to the Treasury of the United States and the remaining 25 percent shall be used for the same purposes as described above in this clause (D); and (ii) that, to the extent it provides the most effective technology transfer, the licensing of subject inventions shall be administered by contractor employees on location at the facility.

In 1987, President Reagan issued Executive Order 12591 requiring federal agencies to grant title to inventions to all contractors, to the extent permitted by law. As a result, the 5% limitation in Bayh-Dole has become an artifact contrary to the rest of federal technology policy.

An Unfair Impact on Small GOCO Laboratories
The purpose of the extensive attention that both Congress and the Executive Branch paid to invention ownership in the 1980's was to foster innovation by providing incentives to federal contractors. As the legislative history recounted here indicates, the trend consistently has been to increase the scope of contractor rights--including GOCO contractors' rights--to retain ownership of inventions. A single important invention at a small laboratory rapidly can result in royalties that exceed the 5% budget limitation. For small laboratories, this means an atrophied incentive for innovation. This is certainly inconsistent with the purpose of Bayh-Dole and executive policy statements.

When measured by budget, Ames Laboratory is one of the smallest of the GOCO laboratories. Its annual budget ranges from approximately $26 million to $34 million per year, in comparison to the $505 million average budget of other nonprofit Department of Energy laboratories. Yet, Ames Laboratory led all other GOCO laboratories in royalty income for FY2006 (please see Appendix 1).

Beginning in fiscal year 2006, ISU returned $921,400 to the Department of Energy to be returned to the U.S. Treasury, the first time (as far as we can determine based on public data bases) that any laboratory has been required to return money to the Treasury as a direct result of successful technology transfer. With licensing income received during fiscal year 2007, ISU will return approximately the same once again. Furthermore, ISU anticipates the worldwide success of the Ames Laboratory lead-free solder technology alone likely will obligate us to return a sizeable percentage of royalty stream to the Treasury for the foreseeable future.

To bring home the inequitable impact of this technical limitation on small, successful, federally funded research centers, let me point out that Ames Laboratory's partner in the development of lead-free solder--Sandia National Laboratory-- has not had to return any of their royalty stream to the government. This is precisely because Sandia has a much larger budget - $2.27 billion - than does Ames (please see Appendix 2, Table 2). In this successful partnership, then, is a case illustration of our contention that the 5% royalty cap functions as a discriminatory penalty or a tax, in effect, on small and successful, nonprofit laboratories. Surely, this was not - and is not - Congress' intent.

Proposed Change to Legislation

As we have discussed our dilemma with friends and colleagues, some have asked what we believe would be the better limitation on the percentage of royalty income retained by contractors that manage federal laboratories. Some have asked whether we believe the limitation on retaining royalties should be jettisoned entirely.

Madam and sirs, I do not feel it is appropriate for me to suggest whether Congress's should seek to recoup some portion of the income stream generated by federal investments in research and development. Given the lack of readily available, public information on the royalty income of all federal laboratories, I am hesitant too to argue that I know what the right limitation - if a limitation is retained in future legislation - should be.

What I am comfortable stating, unequivocally, is that any such limitation must not discriminate against only a portion of government-owned, contractor-operated, non-profit entities, to whit, small non-profits. Certainly, it should not have an inequitable impact on a single, small, and successful national laboratory. And I am comfortable asserting that any limitation on royalty income should not have an effect that is contrary to the very intention of the founding legislation this subsequent statutory restriction modified. That limitation should not have the effect of setting a bar above which success - which always has a price, in terms of human and organizational resources - is counterproductive.

Accordingly, I propose for your consideration that the royalty limitation be increased to 15% of the annual budget for GOCO contractors with annual budgets of less than $40 million. If the Committee, in its wisdom, feels those exact numbers are not the right ones - but accepts our basic argument and request for relief - we will be immensely gratified.

Thank you for your attention and for your leadership in Congress.

1 Innovation Associates: Technology Transfer and Commercialization Partnerships, p. 77 (October 2007, available at http://www.innovationassoc.com/). In 2005, among the nation's universities, Iowa State University was second only to the University of California system in the number of licenses and options of its technology.
2 Government Accounting Office, Technology Transfer: Administration of the Bayh-Dole Act by Research Universities, p. 3 (May, 1998, available at http://www.gao.gov/archive/1998/rc98126.pdf).
3 Pub.L. 96-517.
4 35 U.S.C. §203.
5 35 U.S.C. §202.
6 "Innovation's Golden Goose," The Economist, December 14, 2002 Technology Quarterly Section, p. 3.
7 Stevens, A.J., Toneguzzo, F. and Bostrom, D (eds.) AUTM U.S. Licensing Survey: FY 2004 (2005, available at: http://www.autm.net/events/File/04AUTMSurveySum-USpublic.pdf).
8 Innovation Associates: Technology Transfer and Commercialization Partnerships, p. 79 (October 2007, available at http://www.innovationassoc.com/)
9 35 U.S.C §202(c)(7)(E).
10 The work at Ames Laboratory began over sixty years ago when it developed methods to purify uranium for the atomic energy program. Since then, it has continued its pre-eminence in materials development, but has expanded to such areas as non-destructive evaluation of materials, applied mathematics and bio-renewables. We are proud of the achievements of Ames Laboratory and its accomplishments in support of federal initiatives and in support of our technology-driven economy. Ames scientists have had the distinction of receiving 16 R&D 100 Awards from R&D Magazine since 1984.
11 Presidential Memorandum to the Heads of Executive Departments and Agencies, Subject: Government Patent Policy, 1983 Published Papers 248 (February 18, 1983). The law at that time contained narrow exceptions related to naval nuclear propulsion and weapons contracts. 35 U.S.C. §202(a)(iv).
12 Title V, Pub.L. 98-620, §501(3). For a history of Bayh-Dole in the context of DOE GOCO contractors, see: Edward C. Walterscheid, "The need for a Uniform Government Patent Policy: The D.O.E. Example," 3 Harvard Journal of Law & Technology 103 (1990). 13 35 U.S.C §202(c)(7)(E).
14 Executive Order 12,591, 3 C.F.R. 220. See Section 1(b)(4).
15 See Appendix 2 for a listing of the non-profit Department of Energy Laboratory budgets.