DRAFT

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BEFORE THE
TECHNOLOGY TRANSFER SOCIETY

The Society's letter of invitation to speak indicated that you were aware of Commerce's activity and support of technology transfer. That is both encouraging and gratifying. This leads me to devote only a few moments to Commerce's contribution to the present state of technology transfer and more to the efforts being undertaken to apply this to the Federal laboratories.

BACKGROUND

As you know, American industry is in the midst of a major economic transition caused in part by a worldwide explosion in new technology. U.S. trade deficits are partially explained by new foreign technology which is capturing markets previously dominated by the U. S.

This challenge calls for increased efforts to deliver American inventions, whether publicly or privately created, to the marketplace as the core of new businesses and jobs.

The U.S. has been investing 110 billion dollars annually in R&D. Fifty-five billion is Federally-funded; the other half private. The magnitude of the Federal investment has raised two questions: Does it subsidize foreign competition? Does it deliver a fair return?

The first question cannot be answered conclusively, but it is agreed that American industry should have first option to the practical results of such research--but while preserving open

scientific communication. Clearly we should not continue to be the world's largest supporter of basic research without deriving maximum benefit for ourselves. Nor can we expect to be the free world's leader if we cannot generate the revenues that innovation brings to pay our national security bills.

As to the second question, the facts strongly indicate that we could get more from the Federal investment. For example, approximately 120,000 patent applications are filed annually in the PTO. Of these, less than 3,000 cover Federally sponsored research. The remainder are the result of private sector R&D--including 46 percent coming from foreign sources. Foreign filing has exploded from 26 percent a decade earlier. It is facts like these that produced the strong Commerce resolve to remove the barriers and increase the incentives to U.S. commercialization of Federally generated products and processes.

DECENTRALIZED TECHNOLOGY MANAGEMENT

Under past policy, ownership of technology was often separated from the R&D organization that created the technology, putting it in the hands of Federal managers who did not have the information to judge its value and determine the efforts required to reach the marketplace. Loss of the creator as the owner-advocate made it difficult to continue the complex process of delivering technology to the marketplace.

Commerce has been a primary force in increasing the commercialization of Federal R&D results through its advocacy of decentralized technology management which permits the creating organization to own and benefit from its technology. Ownership

brings with it incentives to identify and evaluate each new technology and determine whether it should be published, patented, copyrighted, held in confidence, trademarked or some combination of these actions. If these actions result in identification of a potentially valuable technology and its protection, ownership leads to the technology's promotion for financial return. The incentives of possible income, outside risk capital and royalty return produced by ownership has already prompted Federally-funded universities and their publication oriented employee-inventors, to identify new patentable technologies and assume the complex responsibility of managing them on to the marketplace.

Establishing the incentives of ownership are fundamental because intellectual property rights must be identified and sometimes licensed to justify the investment of private risk funding in bringing public sector technology to the marketplace. For example, failure to establish property rights in a potential pharmaceutical product by a publicly funded creating organization virtually eliminates private sector development and marketing because of the enormous costs attached to clinical trails required but not paid for by Government. It is not difficult to understand that a strategy that relies solely on the publication and dissemination of information can be a major deterrent in commercializing public sector technology.

LEGISLATION SUPPORTING DECENTRALIZED TECHNOLOGY MANAGEMENT

Accordingly, Commerce's contribution to the Dole-Bayh Act of 1980, the 1984 amendments to Dole-Bayh, and the President's 1983

patent policy memo have combined to give universities, small businesses and all other contractors the first right of ownership to their patentable inventions made with Federal funds. The Technology Transfer Act of 1986 extends our view of decentralized management to Government owned and operated laboratories by permitting Federal agencies to delegate the management of patentable laboratory technology to the laboratory director.

The success of such decentralized management of technology is being recognized by many states that are planning economic growth around R&D assets such as universities which can now more fully cooperate with the private sector. Under the 1986 Act, Federal laboratories can now be included in this asset base. Commerce's vision of leveraging Federal, state, university, and private sector resources as a primary means of maintaining technological leadership in the world is now possible for the first time.

While the laws and memo I referred to are limited to patentable inventions, the President's new Executive Order implementing the 1986 Act announced the intent to extend contractor ownership to the nonpatentable results of Federally-funded research by permitting federal contractors to own technical data, including software, made under Federal contracts. This initiative is directed to creating an incentive to commercialize ideas that cannot be protected by patent but are, nevertheless of commercial value.

THE UNIVERSITY EXPERIENCE UNDER DECENTRALIZED TECHNOLOGY MANAGEMENT

It is now unclear to what extent the 1986 Act will be

accepted and implemented by our Federal agencies and their laboratories. As you know, the Federal laboratories employ one sixth of the scientific personnel in the U.S., so the stakes of implementation are very high.

Fortunately, there is precedent for doing what the agencies and their laboratories need to do to increase private sector collaboration. As noted in 1980, acting on the example of the Department of Health, Education, and Welfare, Congress passed the Dole-Bayh Act--that allows small businesses and nonprofit organizations to own inventions that result from Federal R&D funding. The Dole-Bayh Act coincided with a general tightening of budgets, so universities were quick to recognize inventions as assets that could be licensed and converted into income.

The Dole-Bayh Act like the 1986 Act requires a portion of the royalties to be shared with the university inventors. This incentive broadened the interest of university researchers from mere publication (which ultimately destroys the patentability of an invention) to seeing that their ideas are actually commercialized.

Most of the universities established patent licensing offices which began contacting private industry to promote the universities' patented inventions. As these university-industry relationships developed, the universities found that potential industry licensees were often interested in the future work of the inventors or other investigators at the university. Sometimes this took the form of industry offers to support additional development of an invention or a research project

which in turn, offered the prospect of an invention for commercial use. Private sector interest also increased in supporting research beyond that which had led to inventions.

For many universities, (and we are hearing the same thing from the Federal laboratories now) these offers created a dilemma. The idea of direct involvement of university faculty and facilities in commercial enterprises seemed to be a violation of traditional independent study. It was feared that private sector funds provided as a result of the profit motive might influence the direction and independence of university researchers and create a conflict of commitment. Concerns existed about the clash between private industry's desire for confidentiality to protect patentability and the academics' social interest in advancing knowledge coupled with the personal desire to attain recognition--through the "publish or perish" ethic. Possible conflict of interest situations within faculties also presented concerns.

I am not diminishing the importance of these concerns when I say that the universities are not only finding ways to manage them but are having a grand time passing through this new door to the private sector. New problems to solve, new peers, and new funds are adding a happy vitality to university research. No statistic speaks louder to this than the evolution of the Society of University Patent Administrators, from 17 members in 1974 to over 600 today. Policies developed to handle the concerns I mentioned differ. But it is clear that universities have generally concluded that there is nothing inherently incompatible

with, on the one hand, accepting private sector funds from royalties on university patents or industry support for profit-motivated research consistent with the university mission, and, the training of scientists to meet society's needs and meeting other university missions.

As the universities developed policies relating to the private sector, the private sector firms found the universities to be much more business-like in two respects that are vital to effective technology transfer. First, the university patent licensing officers (most of whom are not patent attorneys as their title suggests) now negotiate from a better understanding of what the university can and cannot do. If a Government funded invention is involved, clear ownership of the patent allows the university to make agreements without the uncertainty and time loss of review by a Federal agency. This certainty is vital to successful negotiations.

Second, if continued research involvement by a university inventor or laboratory in the innovation process is desired by the industry licensee, the universities are willing to work out reasonable terms. In many cases, there is no substitute for the inventor's special knowledge, insights and dedication.

I do not wish to imply that Federal patent policy can take all the credit for bringing academia and business into closer cooperation. A few farsighted universities have pioneered the types of cooperation that have led to Silicon Valley, Route 128 and the North Carolina Research Triangle. In some happy situations, there has been close cooperation between universities

and industrial concerns for years. What the new Government patent policy did was help prod all universities to use the results of Government funded research to promote the opportunities of collaboration with industry.

THE PRINCIPLE OF DECENTRALIZED TECHNOLOGY

The Federal patent policy of the Dole-Bayh Act and now the Federal Technology Transfer Act of 1986 provide four ingredients necessary for successful transfers of public sector inventions to industry:

1. A royalty incentive for an inventor to report an invention and participate in its future development for commercial use.

2. The financial incentive for a university or Federal laboratory to allocate resources to patent and promote commercial use of a Federally-funded invention.

3. An incentive for a private firm to invest in a Federally-funded invention based on the protection provided by a university or Federal laboratory license.

4. Clear authority for a university or Federal laboratory to negotiate a license and cooperative research projects which enhance the possibility of marketable technology.

EXPECTATIONS UNDER THE 1986 ACT

The Federal laboratories are much like universities. Since they produce no products, their inventions must be transferred to industrial concerns if the public is to benefit from them. The GAO report on "Patent Policy: Recent Changes in Federal Law Considered Beneficial" (GAO/RCED-87-44) suggests what the Federal

laboratories who implement the 1986 Act might expect. GAO reports that invention reporting, licensing, and cooperative R&D arrangements at universities have all increased by large percentages since the passage of Dole-Bayh in 1980. We believe there is reason to expect even better results from the Federal laboratories because they are dealing with applied research which may generate more technology than the basic research done at universities. But this will not happen without considerable additional effort from those that make up the process of delivering new laboratory technology to the marketplace.

STATUS OF IMPLEMENTING THE 1986 ACT

To activate the cooperative agreement authority of the 1986 Act, each Federal agency must identify those laboratories it believes can manage technology and make a positive delegation of such authority. While a number of agencies have started this process, no agency has completed such a delegation.

All the agencies are troubled by the same concerns identified by universities when those universities began managing technology. In addition to these concerns, agency level officials are considering the degree of oversight they should undertake regarding a delegation to their individual laboratories. A further complication is the lack of experienced technology managers at the laboratory level. This, in turn, raises the question of whether the laboratories should be required to identify and commit resources to technology managers as part of the agency agreement to make the delegation to the laboratory.

These questions and many more are being debated across the Government agencies. In response to the priority placed on enhancing R&D cooperation between Federally-funded laboratories and the private sector by the Administration and Congress, Commerce is establishing an Office of Federal Technology Management under the Assistant Secretary for Productivity, Technology and Innovation. This new Office will be the Department focal point for implementation of the cooperative R&D and licensing activities as envisioned by the 1986 Act.

To be effective, the Act, as I noted, requires delegation of authorities from the head of each agency to its laboratories. In the Commerce Department the Secretary has made the initial delegation to the Under Secretary for Economic Affairs who has organized a Departmental Committee for further implementation. When the Department's laboratories develop their internal implementation plans and procedures, the Under Secretary will delegate operating responsibilities to them. To assist our laboratories (and those of other agencies) in developing an implementation plan our Federal Technology Management staff has created a schematic of the decision making process that a laboratory needs to successfully identify research projects and technology that have commercial potential, protect that potential and, finally, promote such projects and technology for private sector collaboration and marketing. With this schematic we believe laboratories will be alerted to the duties that need to be undertaken to manage technology and will assist their

Department management in determining the level of resources needed to implement the Act at individual laboratories.

The Act also assigns three Government-wide roles to Commerce. The first is to provide what can be called 'technical assistance' to other agencies and their laboratories. To this end, Commerce's Federal Technology Management staff has developed a preliminary model cooperative R&D agreement that laboratories can use as a guide in specific situations. Further, we are nearing completion of a set of educational materials for laboratory managers and staffs on how to take advantage of the new legislation in managing technology. These materials are scheduled to be made available to the agencies and their laboratories in July.

The second Government-wide role involves reporting to the President and Congress on agency activities under the Act. We have contacted the agencies with significant laboratory complexes, and are organizing an interagency implementation committee. One of the first things the committee will consider is the type of information that will be needed to produce a useful report. In addition to helping with the report, considering this question now will focus attention on the actions that agencies need to take in the near future.

The third Government-wide role is for the National Bureau of Standards to provide administrative support to the Federal Laboratory Consortium (FLC). A memorandum of understanding has been completed between NBS and the FLC, the FLC has appointed a

staff liaison officer, and I understand that FLC work is progressing.

In addition, the Department is reviewing other statutes to determine whether amendments are necessary to make them consistent with the 1986 Act. For example, the new Office of Federal Technology Management will be responsible for the regulations under which all agencies license inventions they own, particularly those made by Federal employees. These regulations, and perhaps their underlying statutes will be reviewed for improvement opportunities. We are also investigating ways to improve commercial use of Federal technology other than inventions such as computer software.

If you wish copies of the schematic, model cooperative R&D agreement or training materials they will be available through the Office of Technology Management at 377-0659.