LDS 890

PATENT POLICY

HEARINGS

BEFORE THE

SUBCOMMITTEE ON SCIENCE, TECHNOLOGY, AND SPACE

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

NINETY-SIXTH CONGRESS

FIRST SESSION

ON

S. 1215

ENTITLED THE "SCIENCE AND TECHNOLOGY RESEARCH AND DEVELOPMENT UTILIZATION POLICY ACT"

JULY 23 AND 27, AND OCTOBER 25, 1979

PART 1

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PATENT POLICY

MONDAY, JULY 23, 1979

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
SUBCOMMITTEE ON SCIENCE, TECHNOLOGY, AND SPACE,
Washington, D.C.

The subcommittee met at 9:30 a.m., in room 235, Russell Senate Office Building, Hon. Adlai E. Stevenson (chairman of the subcommittee) presiding.

OPENING STATEMENT BY SENATOR STEVENSON

Senator STEVENSON. America's leadership in technology has often resulted from the Government's role as a supporter of research and development and consumer of its results. As distasteful as the notion may be to believers in the omnipotence of free enterprise and the irrelevance of Government, our most innovation and competitive industries are those which have benefited most from Government involvement—aerospace, electronics, telecommunications, and agriculture.

Now with productivity stagnating, inflation accelerating, our competitive position in world markets eroding, and the need for energy development pressing, the Government is uncertain about new technological initiatives and continues to impose barriers to Government-industry collaboration.

In May I introduced with Senator Cannon and Senator Schmitt the National Technology Innovation Act. The subcommittee held hearings in June. Today we begin hearings on the Science and Technology Research and Development Utilization Policy Act, a bill introduced by Senator Schmitt to establish a uniform policy for determining the rights of the Government, its contractors and employees to exploit publicly financed inventions.

The Federal research budget of $29 billion represents half of the Nation's total investment in R. & D. and generates more than 10,000 invention disclosures a year. The Government acquires title to the vast majority of inventions whose ownership and usage rights are determined, but less than 10 percent of the Government's portfolio has been licensed to private producers. Less than 5 percent of Government-owned inventions are used commercially.

For energy development, health care and transportation improvement, civilian applications of military and space R. & D., and a variety of other domestic purposes, the Government depends largely on private markets to commercialize the technology it develops. Government financing of the R. & D. does not eliminate the risks to private investors in turning these inventions into marketa-

ble products. The risks are especially high if competitors can legally copy an invention because the Government refuses to allow a producer exclusive rights for the period necessary to recoup his investment in development and marketing. The principle of granting temporary exclusivity in return for public disclosure is the foundation of the patent system. It should be recognized in most Government R. & D. grants and contracts.

By introducing this bill, we intend no giveaway of public property to private monopolists but rather a prudent use of private interests for the public good. The balance we are seeking will not be helped by the rhetoric that for 30 years has prevented achievement of the uniform Government patent policy that numerous commissions, studies, and Members of Congress have recommended. But with the good will of business, labor, public interest groups, and academia, we can make an important contribution, not to innovation for innovation's sake, but to a revival of America's growth, productivity, and competitiveness.

Senator Schmitt?

OPENING STATEMENT BY SENATOR SCHMITT

Senator SCHMITT. Thank you, Mr. Chairman.

I am pleased to join with you in this opportunity to hold hearings on U.S. patent policy and the patent system in general and its effect on innovation and other aspects of our economy and position in the world.

For the past 2 years, the Commerce Committee has conducted an extensive review of the state of American technology and the role of the Federal Government in promoting technology and its utilization. Mr. Chairman, I think it is important to note that in the last Congress you and I also were able to do this under the auspices of the Banking Committee, because the two issues were closely interrelated; that is, the economy and technology.

The witnesses before those two major committees have repeatedly underscored the need to stimulate the development, application, and diffusion of new products and processes to the marketplace if we are to reverse the alarming downward trend in our economic growth and productivity.

Admittedly, the problems are varied and complex—overburdensome and costly regulations, lack of a strategic capacity for trade policy, counterproductive tax policies, and inadequate funding of basic research—both public and private, to name just a few. Yet the solution seems not so much a need for new policies or expensive programs as it is a need to reexamine and adjust existing policies which have been ineffective and oftentimes counterproductive. The one exception may well be the need to completely rethink how this country conducts its overall trade policy.

Today's hearing is intended to focus on the Federal Government's policy for handling the billions of dollars of national expenditures on science and technology, and on research and development.

For more than a decade, Federal agencies have funded nearly two-thirds of this Nation's expenditures on research and development and related activities. During this past fiscal year alone, the

Federal Government provide more than $29 billion in research and development support.

As a result of this huge national investment, thousands of inventions are identified each year which form a valuable source of new products and technology development. Unfortunately, Government policies have inhibited the process by which such benefits are made available to the American consumer. Federal patent policies which were originally designed to protect the public interest by preventing the so-called give away, have in fact operated to discourage contractor bidding, eliminating incentives to innovate or disclose new ideas, and to delay the commercialization of inventions developed under Federal contract. It is ultimately the American public that suffers from these misguided policies through the failure of potentially significant inventions to reach the marketplace.

Together with Senators Stevenson and Cannon, I have introduced the bill referred to by Senator Stevenson, S. 1215, entitled "The Science and Technology Research and Development Utilization Policy Act," which would provide the framework for the establishment and implementation of a comprehensive Government patent policy.

This bill, with its somewhat cumbersome title, was drafted with the following objectives in mind:

First, the Government patent policy as well as the implementing regulations must be uniform in the sense that all agencies operate under the same general rules and procedures;

Second, the policy must permit some flexibility in policy implementation in recognition of the differing missions and statutory responsibilities of the various agencies engaged in research and development activities;

Third, the policy must be as simple as possible and avoid the heavy administrative burden and delay experienced by both the contractor and the Government under current Federal policies;

Fourth, the policy must provide the necessary incentive for private sector participation in Government contracts, and for the rapid development of new technology, in order to maximize the benefits to the public from its R. & D. investment;

Fifth, the policy must foster competition and prevent undue market concentration; and

Finally, the policy must protect the legitimate rights of the taxpayer to any inventions developed under Federal contracts where the specific nature of the research being performed demands full public access to the resulting inventions or precludes granting of exclusive rights of ownership to a private contractor.

S. 1215 is one step this country must take to reverse the national decline in industrial innovation and economic productivity. I firmly believe Americans have lost neither their willingness nor their ability to innovate. Rather, it is the system within which the innovation process functions which must be restructured, providing a more favorable climate for the traditional innovative spirit. The reform of our Government patent policy is the beginning but not the end of that process.

Mr. Chairman, we are indeed fortunate today to have this distinguished group of witnesses, most of whom have considerable practi-

cal experience working with the various Government patent policies.

I would also note that today's first witness, Mr. R. Tenney Johnson, is not only a close personal friend of mine, but a distinguished public servant, having served as General Counsel for three different Federal agencies, and Deputy General Counsel for two other agencies. Mr. Johnson's expertise in the area of Government patent policy is highlighted by his role as an advisor to the Commission on Government Procurement, and as a principal draftsman of President Kennedy's patent policy of 1963.

I look forward with great anticipation to his testimony as well as to those of other distinguished experts in this field.

Thank you, Mr. Chairman.

[The bill follows:]

96TH CONGRESS
1ST SESSION

S. 1215

Entitled the "Science and Technology Research and Development Utilization Policy Act".

IN THE SENATE OF THE UNITED STATES

MAY 22 (legislative day, MAY 21), 1979

Mr. SCHMITT (for himself, Mr. CANNON, and Mr. STEVENSON) introduced the following bill; which was read twice and referred jointly, by unanimous consent, to the Committees on Commerce, Science, and Transportation and Governmental Affairs with instructions that if one committee orders the bill reported, the other has 60 days in which to act

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A BILL

Entitled the "Science and Technology Research and Development Utilization Policy Act".

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TITLE I—POLICY

SEC. 101. FINDINGS.

The Congress, recognizing the profound impact of science, engineering, and technology policy on the economic, social, political, technological well-being, and the health and

safety of the Nation as a whole, hereby finds and declares that:

(1) The United States has recently experienced a decline in the process of industrial innovation and productivity which is integrally related to, and adversely impacts upon, domestic productivity, the rate of economic growth, the level of employment, the balance of trade, and the attainment of other national goals.

(2) The national support of scientific and technological research and development is indispensable to sustained growth and economic stability, and it is in the national interest to maximize the benefits to the general public from such investment.

(3) Scientific and technological developments and discoveries resulting from work performed with Government contracts constitute a valuable national resource which should be developed in a manner consistent with the public interest and the equities of the respective parties.

(4) Current Federal policy with respect to the allocation of rights to the results of federally sponsored research and development deters contractor participation in Government contracts, delays technological progress, and stifles the innovative process.

(5) The present United States system for the acquisition of intellectual property rights resulting from privately funded research and development, while fundamentally sound, is in need of modifications to diminish the existing uncertainty and the high costs incurred in enforcing proprietary rights.

(6) There is a need for the establishment and implementation of a flexible Government-wide policy for the management and utilization of the results of federally funded research and development. This policy should promote the progress of science and the useful arts, encourage the efficient commercial utilization of technological developments and discoveries, guarantee the protection of the public interest, and recognize the equities of the contracting parties.

SEC. 102. PURPOSE.

It is the purpose of this Act to—

(1) establish and maintain a Federal policy for the management and use of the results of federally sponsored science and technology research and development; and

(2) insure the effective implementation of the provisions of this Act, and to monitor on a continuing basis the impact of Federal science and technology policies on innovation and technology development.

SEC. 103. DEFINITIONS.

As used in this Act the term—

(1) "contract" means any contract, grant, agreement, commitment, understanding, or other arrangement entered into between any Federal agency and any person where a purpose of the contract is the conduct of experimental, developmental, or research work. Such term includes any assignment, substitution of parties, or subcontract of any type entered into or executed for the conduct of experimental, developmental, or research work in connection with the performance of that contract;

(2) "contractor" means any person or other entity that is a party to the contract;

(3) "disclosure" means a written statement sufficiently complete as to technical detail to convey to one skilled in the art to which the invention pertains a clear understanding of the nature, purpose, operation, and as the case may be, physical, chemical, or electrical characteristics of the invention;

(4) "Federal agency" means an "executive agency" as defined by section 105 of title 5, United States Code, and the military departments as defined by section 102 of title 5, United States Code;

(5) "Federal employees" means all employees as defined in section 2105 of title 5, United States Code, and members of the uniformed services;

(6) "Government" means the Government of the United States of America;

(7) "invention" means any invention, discovery, innovation, or improvement which is or may reasonably be patentable subject matter as defined in title 35, United States Code;

(8) "inventor" means any person, other than a contractor, who has made an invention under a contract but who has not agreed to assign his rights in such invention to the contractor;

(9) "made under the contract" or "made under a contract" when used in relation to any invention means the conception or first actual reduction to practice of such invention in the course of any work under the contract or under a contract, respectively;

(10) "nonprofit organization" means universities and other institutions of higher education or an organization of the type described in section 501(c)(3) of the Internal Revenue Code of 1954 (26 U.S.C. 501(c)) and exempt from taxation under section 501(a) of the Internal Revenue Code (26 U.S.C. 501(a));

(11) "person" means any individual, partnership, corporation, association, institution, or other entity;

(12) "practical application" means to manufacture in the case of a composition or product, to practice in the case of a process or method or to operate in the case of a machine or system, and, in each case, under such conditions as to establish that the invention is being worked and that its benefits are available to the public either on reasonable terms or through reasonable licensing arrangements; and

(13) "qualified technology transfer program", when used in relation to a nonprofit organization, means a program which includes—

(i) an established patent policy which is consistent with the policy set forth in this Act and is administered on a continuous basis by an officer or entity responsible to the nonprofit organization;

(ii) agreements with employees requiring them to assign either to the organization, its designee, or the Government any invention conceived or first actually reduced to practice in the course of or under Government contracts or assurance that such agreements are obtained prior to the assignment of personnel to Government-supported research and development projects;

(iii) procedures for prompt invention identification and timely disclosure to the officer or entity administering the patent policy of the nonprofit organization;

(iv) procedures for invention evaluation; and

(v) an active and effective promotional program for the licensing and marketing of inventions.

TITLE II—IMPLEMENTATION

SEC. 201. RESPONSIBILITIES.

(a) The Secretary of Commerce, hereinafter referred to as the Secretary, shall coordinate, direct, and review the implementation and administration of the Federal policy set forth in this Act with respect to the ownership of inventions resulting from federally sponsored research and development, and promote the efficient and effective utilization of the results of federally sponsored research and development.

(b) With a view to obtaining consistent application of the policies of this Act, the Secretary is authorized and directed—

(1) to consult and advise with Federal agencies concerning the effective implementation and operation of the policies, purposes, and objectives of this Act;

(2) subject to the authority of the Office of Federal Procurement Policy, to formulate and recommend to

the President such proposed rules, regulations, and procedures necessary and desirable to assure the consistent application of the provisions of this Act;

(3) to accumulate, analyze, and disseminate data necessary to evaluate the administration and effectiveness of the policies set forth in this Act;

(4) to determine with administrative finality any dispute between a Federal agency and an aggrieved party arising under title III or title IV of this Act;

(5) monitor, on a continuing basis, the rights of the Government under section 304 of this Act in any invention made under a contract of a Federal agency, and take all suitable and necessary steps to protect and enforce the rights of the Government in any such invention; and

(6) to perform such other duties as may be prescribed by the President or by statute.

(c) For the purpose of assuring the effective management of Government-owned inventions, the Secretary is authorized and directed to—

(1) assist and coordinate agency efforts to promote the licensing and utilization of Government-owned inventions;

(2) accept custody and administration, in whole or in part, of Government rights in any invention for the

purpose of protecting the United States interest therein and promoting the effective utilization of any such invention;

(3) develop and manage a Government-wide program designed to stimulate the transfer of Government-owned technology to the private sector through the development, demonstration, and dissemination of information regarding potential applications and evaluate and assist where appropriate the participation of the private sector in the technology transfer process;

(4) evaluate, with the assistance of the originating agency, Government-owned inventions in order to identify those inventions with the greatest commercial potential and to promote the development of inventions so identified;

(5) assist the Federal agencies in seeking protection and maintaining inventions in foreign countries, including the payment of fees and costs connected therewith;

(6) make market surveys and other investigations for determining the potential of inventions for domestic and foreign licensing and other utilization;

(7) acquire technical information and engage in negotiations and other activities for promoting the licensing and other utilization of Government-owned in-

ventions and to demonstrate the practicability of the inventions for the purpose of enhancing their marketability;

(8) consult and advise Federal agencies as to areas of science and technology research and development with potential for commercial utilization; and

(9) receive funds from fees, royalties, sales, or other management of Government-owned inventions authorized under this Act: *Provided, however,* That such funds will be used only for the purpose of this Act.

(d) The Secretary shall submit an annual report of its activities to Congress, including therein (1) relevant statistical data regarding the disposition of invention disclosures resulting from federally funded research and development; (2) any recommendation as to legislative or administrative changes necessary to better achieve the policy and purposes of this Act; and (3) an analysis of the impact of Federal policies on the purposes of this Act.

(e) The Secretary shall establish such interagency committees as are necessary to assist in the review and formulation of rules, regulations, and procedures implementing the provisions of this Act.

(f) There are authorized to be appropriated to the Secretary of Commerce to carry out the provisions of this title, the sum of $3,000,000 for fiscal year 1980.

SEC. 202. AGENCY TECHNOLOGY UTILIZATION PROGRAM.

To assist in the transfer of Government-owned innovative technology resulting from Federal research and development for application and use in industry, agriculture, medicine, transportation, and other critical sectors of the economy, each Federal agency supporting research and development activities shall develop and implement a technology utilization program. Specific program objectives shall include, but not be limited to—

(1) expedite and facilitate the application and use of technology by shortening the time between generation of advanced technologies and their use in the economy and provide greater incentives for use of socially beneficial innovations;

(2) encourage multiple secondary uses of technology in industry, education, and government where there is a wide spectrum of technological problems and needs; and

(3) understand more fully the technology transfer process and its impact on the economy, and to manage and optimize the process in a systematic way.

SEC. 203. EXPIRATION.

The authorities conferred upon the Secretary under this title shall expire and terminate 7 years following the effective date of this Act unless renewed by action of Congress.

TITLE III—ALLOCATION OF RIGHTS—GOVERNMENT CONTRACTORS

SEC. 301. RIGHTS OF THE GOVERNMENT.

(a) Each Federal agency shall acquire on behalf of the United States, at the time of entering into a contract, title to any invention made under the contract of a Federal agency if the agency determines—

(1) the services of the contractor are for the operation of a Government-owned research or production facility;

(2) acquisition of title is necessary because of the classified nature of the work being performed under the contract;

(3) because of the exceptional circumstances, acquisition of title by the Government is necessary to assure the adequate protection of the public health, safety, or welfare;

(4) in the case of a nonprofit organization, that such institution does not have a qualified technology transfer program as defined in section 103 of this Act; or

(5) the principal purpose of the contract is to develop or improve products, processes, or methods which will be required for use by Government regulations:

Provided, however, That the Federal agency may subsequently waive all or any part of the rights of the United States under this section to such invention in conformity with the provisions of section 303.

(b) The rights of the Government under subsection (a) shall not be exercised by the Federal agency unless it determines that one of the enumerated criteria exist and it files a determination statement with the Secretary.

SEC. 302. RIGHTS OF THE CONTRACTOR.

(a) In all other situations not specified in section 301, the contractor or inventor shall have the option of retaining title to any invention made under the contract. Such rights shall be subject to the limitations set forth in section 304 and the provisions of section 305. Said option shall be exercised by notifying the Government at the time of disclosure of the invention or within such time thereafter as may be provided in the contract. The Government shall obtain title to any invention for which this option is not exercised.

(b) When the Government obtains title to an invention under section 301, the contractor shall retain a nonexclusive, royalty-free license which shall be revocable only to the

extent necessary for the Government to grant an exclusive license.

SEC. 303. WAIVER.

A Federal agency may at any time waive all or any part of the rights of the United States under this title to any invention or class of inventions made or which may be made by any person or class of persons under the contract of the agency if the agency determines that the condition justifying acquisition of title by the Government under section 301 no longer exists or the interests of the United States and the general public will be best served thereby. The agency shall maintain a record, which shall be made public and periodically updated, of determinations made under this section. In making such determinations, the agency shall consider the following objectives:

(1) encouraging the wide availability to the public of the benefits of the experimental, developmental, or research programs in the shortest practicable time;

(2) promoting the commercial utilization of such inventions;

(3) encouraging participation by private persons in the Government-sponsored experimental, developmental, or research programs; and

(4) fostering competition and preventing undue market concentration or the creation or maintenance of other situations inconsistent with the antitrust laws.

SEC. 304. MARCH-IN-RIGHTS.

(a) Where a contractor has retained title to an invention under section 302 or 303, the Federal agency shall have the right, pursuant to regulations and subject to the provisions of subsection (b), to—

(1) require the contractor to grant a nonexclusive, partially exclusive, or exclusive license to a responsible applicant or applicants, upon terms reasonable under the circumstances, or to require an assignment of title to the Government if the agency determines such action is necessary because the contractor has not filed a patent application on the invention within a reasonable period of time or has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of the invention; or

(2) require the contractor to grant a nonexclusive, partially exclusive, or exclusive license to a responsible applicant or applicants, upon terms reasonable under the circumstances, if the agency determines such action is necessary—

(i) to alleviate a serious threat to the public health, safety, or welfare needs which is not rea-

sonably satisfied by the contractor or its licensees or otherwise required for the protection of national security;

(ii) to meet requirements for public use by Federal regulation which are not satisfied by the contractor or its licensees; or

(iii) because the actions of the contractor beyond the exercise of the exclusive rights in the invention have tended substantially to lessen competition or to result in undue market concentration in any section of the United States in any line of commerce to which the technology relates, or to create and maintain other situations inconsistent with the antitrust laws.

(b) The rights of the Federal agency under subsection (a) shall be subject to the prior approval of the Secretary who shall make a determination after a formal hearing with affected parties present and conducted in accordance with the rules, regulations, and procedures adopted by the Secretary.

SEC. 305. GENERAL PROVISIONS.

(a) Each contract entered into by the Government shall contain such terms and conditions as the agency deems appropriate for the protection of the interests of the United States and the general public, including appropriate provisions to—

(1) require periodic written reports at reasonable intervals in the commercial utilization or efforts at obtaining commercial utilization that are being made by the inventor or contractor or their licensees or assignees: *Provided,* That any such information shall be treated by the Federal agency as commercial or financial information obtained from a person and privileged or confidential and not subject to disclosure under the Freedom of Information Act;

(2) reserve to the United States at least an irrevocable, nonexclusive, paid-up license to make, use, and sell the invention throughout the world by or on behalf of the United States and States and domestic municipal governments, unless the agency determines that it would not be in the public interest to acquire the license for the States and domestic municipal governments;

(3) require the prompt disclosure by the contractor or inventor to that agency of any invention made under the contract: *Provided,* That Federal agencies are authorized to withhold from disclosure to the public, information disclosing any invention made under the contract of an agency for a reasonable time in order for a United States or foreign patent application to be filed;

(4) require an election by the contractor within a reasonable time after disclosure as to whether the contractor intends to file a patent application on any invention made under the contract;

(5) require a declaration by the contractor within a reasonable time after disclosure of the contractors intent to commercialize or otherwise achieve the widespread utilization of the invention by the public; and

(6) reserve to the United States and the contractor or inventor rights in each such invention in conformity with the provisions of this title.

(b) Agency determinations as to the rights to inventions under this title shall be made in an expeditious manner without unnecessary delay.

SEC. 306. BACKGROUND RIGHTS.

Nothing contained in this Act shall be construed to deprive the owner of any background patent or to such rights as the owner may have thereunder.

SEC. 307. GOVERNMENT LICENSING AUTHORITY.

(a) A Federal agency may grant exclusive or partially exclusive licenses in any invention to which the Government has acquired title if the agency determines that—

(1) the desired practical application has not been achieved, or is not likely to be achieved within a rea-

sonable period of time by the granting of a nonexclusive license;

(2) exclusive or partially exclusive licensing is a reasonable and necessary incentive to call forth the investment of risk capital to bring the invention to practical application; and

(3) the proposed terms and scope of exclusivity are not greater than reasonably necessary to provide the incentive for bringing the invention to practical application.

TITLE IV—ALLOCATION OF RIGHTS—FEDERAL EMPLOYEES

SEC. 401. ALLOCATION OF RIGHTS.

(a) Except as otherwise provided in subsections (b) and (c), the Government shall obtain the entire right, title, and interest in and to all inventions made by any Federal employee if the agency determines that—

(1) the invention was made during working hours;

(2) the invention was made with a contribution by the Government of facilities, equipment, materials, funds, or information, or of time or services of other Government employees on official duty; or

(3) the invention bears a direct relation to the duties of the Federal employee-inventor, or are made in consequence of his employment.

(b) Where the interest of the Government is insufficient to require acquisition of title by the Government but the invention bears an indirect relation to the duties of the Federal employee-inventor, the employee shall have the option of acquiring title to such invention, subject, however, to the reservation by the Government of a nonexclusive, irrevocable, royalty-free license in the invention with the power to grant licenses for all governmental purposes. The Government shall obtain title to any invention for which this option is not exercised.

(c) In all situations not falling within subsections (a) and (b), a Federal employee shall be entitled to retain the entire right, title, and interest in and to any invention made by the employee.

SEC. 402. PRESUMPTION OF OWNERSHIP.

(a) In applying the criteria of section 401 to the facts and circumstances relating to the making of any particular invention, it shall be presumed that an invention falls within the criteria of section 401(a) when made by a Federal employee who is employed or assigned to—

(1) invent, improve, or perfect any article, machine, manufacture process, or composition of matter;

(2) conduct or perform research or development work, or both;

(3) supervise, direct, coordinate, or review federally financed or conducted research or development work, or both; or

(4) act in a liaison capacity among Federal or non-Federal agencies or individuals engaged in such work.

(b) The presumption established by subsection (a) may be rebutted by the facts or circumstances of the conditions under which any particular invention is made.

SEC. 403. REVIEW.

Federal agency determinations regarding the respective rights of the Government and the Federal employee-inventor are to be reviewed by the Secretary in accordance with rules, regulations, and procedures adopted by the Secretary whenever—

(1) the Federal agency fails to obtain title under the provisions of section 401(a); or

(2) the Federal employee-inventor who claims to be aggrieved by the determination requests such a review.

SEC. 404. INCENTIVES AWARDS PROGRAM.

(a) Subject to the provisions of this section, the agency is authorized, upon its own initiative or upon application of any person, to make a monetary award or otherwise offer recognition, in such amount and upon such terms as it shall

deem appropriate, to any Federal employee-inventor for any scientific or technical invention determined by the agency to have significant value.

(b) Awards shall be granted pursuant to the provisions of chapter 45 of title 5 and chapter 57 of title 1 of the United States Code, and in accordance with regulations issued thereunder except as modified by this Act.

(c) In granting awards under this section, due consideration shall be given to—

(1) the extent to which the invention advances the state of the art;

(2) the amount expended by the employee-inventor for development of such invention;

(3) the importance of the invention in terms of its value and benefits to the Government and the United States;

(4) the extent to which the invention has achieved utilization by the public; and

(5) the amount of any compensation previously received by the employee-inventor for or on account of the use of such invention by the United States.

(d) If more than one applicant under subsection (a) claims an interest in the same contribution, the agency shall ascertain the respective interest of such applicants, and shall apportion any award to be made with respect to such inven-

tion among such applicants in such proportions as it shall determine to be equitable.

(e) No award may be made under subsection (a) with respect to any invention unless the applicant surrenders, by such means as the agency shall determine to be effective, all claims which such applicant may have to receive any compensation (other than the award made under this section) for the use of such invention or any element thereof at any time by or on behalf of the United States or by or on behalf of any foreign government pursuant to any treaty or agreement with the United States, within the United States or at any other place.

(f) No award may be made under subsection (a) in any amount exceeding $100,000, unless the agency has transmitted to the appropriate committees of the Congress a full and complete report concerning the amount and terms of, and the basis for, such proposed award, and 30 calendar days of regular session of the Congress have expired after receipt of such report by such committees.

(g) A cash award and expense for honorary recognition of a Federal employee-inventor shall be paid from the funds appropriated for the sponsoring Federal agency.

TITLE V—MISCELLANEOUS

SEC. 501. REPEAL OF EXISTING STATUTORY RESEARCH AND DEVELOPMENT AUTHORIZATIONS.

The following Acts are hereby amended as follows:

(a) Section 10(a) of the Act of June 29, 1935, as added by title I of the Act of August 14, 1946 (7 U.S.C. 427(a); 60 Stat. 1085) is amended by striking out the following: "Any contracts made pursuant to this authority shall contain requirements making the results of research and investigations available to the public through dedication, assignment to the Government, or such other means as the Secretary shall determine.".

(b) Section 205(a) of the Act of August 14, 1946 (7 U.S.C. 1624(a); 60 Stat. 1090) is amended by striking out the following: "Any contract made pursuant to this section shall contain requirements making the result of such research and investigations available to the public by such means as the Secretary of Agriculture shall determine.".

(c) Section 501(c) of the Federal Coal Mine Health and Safety Act of 1969 (30 U.S.C. 951(c); 83 Stat. 742) is amended by striking out the following: "No research, demonstrations, or experiments shall be carried out, contracted for, sponsored, cosponsored, or authorized under authority of this Act, unless all information, uses, products, processes, patents, and other developments resulting from such research,

demonstrations, or experiments will (with such exception and limitation, if any, as the Secretary or the Secretary of Health, Education, and Welfare may find to be necessary in the public interest) be available to the general public.".

(d) Section 106(c) of the National Traffic and Motor Vehicle Safety Act of 1966 (15 U.S.C. 1395(c); 80 Stat. 721) is repealed.

(e) Section 12 of the National Science Foundation Act of 1950 (42 U.S.C. 1871(a); 82 Stat. 360) is repealed.

(f) Section 152 of the Atomic Energy Act of 1954 (42 U.S.C. 2182; 68 Stat. 943) is repealed.

(g) The National Aeronautics and Space Act of 1958 (72 Stat. 426) is amended—

(1) by repealing section 305 thereof (42 U.S.C. 2457): *Provided, however,* That subsections (c), (d), and (e) of such section shall continue to be effective with respect to any application for patents in which the written statement referred to in subsection (c) of such section has been filed or requested to be filed by the Commissioner of Patents and Trademarks prior to the effective date of this Act;

(2) by inserting the following new section 305:

"SEC. 305. INVENTIONS AND CONTRIBUTIONS BOARD.—Each proposal for any waiver of patent rights held by the Administrator shall be referred to an Inventions and

Contributions Board which shall be established by the Administrator within the Administration. Such Board shall accord to each interested party an opportunity for hearing, and shall transmit to the Administrator its findings of fact with respect to such proposal and its recommendations for action to be taken with respect thereto.";

(3) by striking out section 306 thereof (42 U.S.C. 2458(a));

(4) by inserting at the end of section 203(b) thereof (42 U.S.C. 2478(a)); the following new paragraph:

"(14) to provide effective contractual provisions for reporting of the results of the activities of the Administration, including full and complete technical reporting of any innovation made in the course of or under any contract of the Administration.";

(5) by inserting at the end of section 203 thereof (42 U.S.C. 2478) the following new subsection:

"(e) For the purpose of chapter 17 of title 35 of the United States Code the Administration shall be considered a defense agency of the United States."; and

(6) by striking out the following in such section: "(including patents and rights thereunder).".

(h) Section 6 of the Coal Research and Development Act of 1960 (30 U.S.C. 666; 74 Stat. 337) is repealed.

(i) Section 4 of the Helium Act Amendments of 1960 (50 U.S.C. 167b; 74 Stat. 920) is amended by striking out the following: "*Provided, however,* That all research contracted for, sponsored, cosponsored, or authorized under authority of this Act shall be provided for in such a manner that all information, uses, processes, patents, and other developments resulting from such research developed by Government expenditure will (with such exceptions and limitations, if any, as the Secretary may find to be necessary in the interest of national defense) be available to the general public: *And provided further,* That nothing contained herein shall be construed as to deprive the owner of any background patent relating thereto to such rights as he may have thereunder." and by inserting in lieu thereof a period.

(j) Section 32 of the Arms Control and Disarmament Act of 1961 (22 U.S.C. 2572; 75 Stat. 634) is repealed.

(k) Subsection (e) of section 302 of the Appalachian Regional Development Act of 1965 (40 U.S.C. App. 302(e); 79 Stat. 5) is repealed.

(l) Subsection (e) of section 203 of the Solid Waste Disposal Act (42 U.S.C. 3253(c); 70 Stat. 997) is repealed.

(m) Section 216 of title 38, United States Code, is amended by striking out subsection (a)(2) thereof and by redesignating subsection (a)(3) thereof as (a)(2).

(n) Except for paragraph (1) of section 9 of the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5901; 88 Stat. 1878) is repealed.

(o) Section 3 of the Act of June 22, 1976 (42 U.S.C. 1959d, note; 90 Stat. 694), is repealed.

(p) Section 5(i) of the Tennessee Valley Authority Act of 1933 (16 U.S.C. 831d(i); 48 Stat. 61), is amended by striking both proviso clauses at the end thereof.

(q) Section 5(d) of the Consumer Product Safety Act (15 U.S.C. 2054(d); 88 Stat. 1211) is repealed.

(r) Section 3 of the Act of April 5, 1954 (30 U.S.C. 323; 58 Stat. 191), is repealed.

(s) Section 8001 of the Solid Waste Disposal Act (42 U.S.C. 6981; 90 Stat. 2892) is repealed.

(t) Section 5 of the Act of July 3, 1952 (42 U.S.C. 1954(b)) is repealed.

(u) Section 303 of the Act of July 17, 1964 (42 U.S.C. 1961c–3) is repealed.

SEC. 502. EFFECTIVE DATE.

This Act shall take effect 6 months after the date of enactment of this Act.

SEC. 503. AUTHORIZATION FOR APPROPRIATIONS.

There are authorized to be appropriated such sums as may be necessary to carry out the provisions of this Act.

Senator STEVENSON. Thank you, Senator Schmitt.

Our first witness is R. Tenney Johnson, as Senator Schmitt mentioned.

I will invite all witnesses to summarize their statements. If that is possible. Your full statements will then be entered into the record.

Please proceed.

STATEMENT OF R. TENNEY JOHNSON

Mr. JOHNSON. Thank you, Mr. Chairman.

Mr. Chairman and Senator Schmitt, I am honored to respond to your invitation to begin the testimony on Government patent policy before this subcommittee. This is the subject matter of S. 1215, the Science and Technology Research and Development Utilization Policy Act which Senator Schmitt, you and Senator Cannon have introduced.

I will provide some introductory comments on Government patent policy, try to give some idea of its complexity, outline briefly the history of how it has evolved over the past 30 years, and state some personal views on the legislation before the subcommittee.

The issue is: Who should get the commercial rights in an invention which is made in the course of performing research and development for the Government?

There are few questions of public policy which arouse more controversy. I would like to interpolate here a quotation from a former General Counsel of NASA, John Johnson, with whom I worked in the formulation of President Kennedy's patent policy of 1963. He said, "This whole field of Government patent policy lends itself to more doctrinaire overgeneralization than almost any other area of policy and law that I can think of."

There are few issues on which agencies' practices vary more widely than in patent policy, and there are few issues on which the factual background for policymaking is so relatively sparse or subject to such largely varying interpretations.

Unfortunately, Government patent policy is a subject which appears simple at first glance and which is thus susceptible to sloganeering and demagogery. Everyone is an expert on the subject, it seems, from the very beginning and yet, the more you study it the more complex it becomes and the more you become aware that there are a multitude of conflicting considerations.

Let me start with the basics: Inventions will be made in performing R. & D. and that many of these inventions will be patentable. A patent is a right to exclude others from the use of the invention for 17 years. Patents are granted by the Government under the authority of the Constitution. Their fundamental purpose is to encourage disclosure of ideas in return for an exclusive right to exploit the invention, and thereby in both ways to stimulate development of new ideas. Patents are thus little monopolies, although of course they may be licensed to others by the patent owner.

All agree that when an invention is made in performing Government R. & D. contract, the Government must always receive a comprehensive license to use the invention itself or to authorize others to use the invention in performing work for the Government.

The issue thus becomes: Whether the Government should acquire more—specifically, the rights the contractor would otherwise retain to the commercial use of the invention?

If the Government acquires all rights, its historic policy has been to allow the invention to be used freely by anyone.

In recent years, some agencies have been granting exclusive licenses to use Government-owned inventions, on the theory that only with a limited period of exclusive use will private capital be available to develop those inventions to the point of commercial application.

On the other hand, if the contractor keeps the commercial patent rights, they will function in the private sector pretty much as do the patents which are granted for inventions made in the course of private research and development.

Under those circumstances, the answer which most immediately comes when you look into the subject for the first time is that because the Government paid for the contract work it should get the fruits of that work. By taking all the patent rights, the Government can make them freely available to all and remove artificial barriers which allowing the rights to stay in private hands would impose to stifle progress.

Moreover, the argument goes, the Government will prevent the contractors from enjoying windfalls of commercial benefits from inventions paid for by the Government, keep the taxpayers from having to pay twice for the development and use of the inventions, and avoid creating industrial concentration or monopoly.

However, this answer, which has become the underpinning of much of Government patent policy, becomes less and less satisfactory the more you examine what is really at stake—how people actually behave when they have a choice, rather than how one thinks they should behave—what it takes to bring an idea to practical application so that the public can get real benefits from it.

Will the Government get the best contractors and the best talent to perform research and development on the condition that they lose commercial patent rights in their inventions?

Will industry actually invest private capital to develop ideas which are freely available to others? Or will it devote its own funds to other areas in which it can protect its investment long enough to earn a return on it? If the ideas are not developed, how will the public benefit from them?

I don't believe that the factual data accumulated on this subject to date points inexorably to one solution or another for every given case. Each new fact seems to be interpreted differently depending on one's preconceptions.

If, for example, you note reports that only 5 percent of Government-owned inventions are ever exploited commercially you might conclude that more inventions would be exploited if patent protection were available to stimulate private invention and development. I personally happen to believe that.

On the other hand, you might also conclude that probably the other 95 percent are worthless anyway.

Moreover, because the Government does not police the use of the invention it owns, many more could in fact be in use without the

Government knowing about it. As far as I know, no one has ever surveyed the whole list of Government inventions and made a judgment about the commercial potential of each one. In any event, I doubt whether anyone whose money is not actually at stake could effectively made such a judgment about commercialization.

In my view, therefore, this issue remains an issue of policy whose resolution ultimately reflects your views as to the proper roles and relationships of the Government and the private sector, as well as your views as to the nature of inventions and the proper and beneficial, or destructive and dangerous, role of self-interest in promoting the national economy.

I find in discussing this subject that people who have not thought much about it tend to form opinions quickly on the basis of several unexamined assumptions or preconceptions. I call these preconceptions "myths," because they are usually influential and widely shared, but also because they tend to be wrong.

Thus, a patent is generally thought to cover a wide area of technology, so much so that it will block out that whole area from study by others. Actually, almost every patent by itself covers only an infinitesimal area of technology and generally speaks to but one of several alternative ways of doing things.

Very few patents are seminal. It is highly doubtful, for example, that a cancer cure will be covered by a single patent, yet this possibility is always mentioned in discussion about Government patent policy.

Another related myth is that a patent blocks out development of alternatives. Actually in fact it acts as an incentive to come up with alternatives.

Another myth is that if a patented invention is freely available it will be exploited widely. Actually this tends to be true only when the invention has already been developed pretty well to the point of commercial application so that to exploit it will not require substantial private investment in development.

But for most other inventions, which are not developed to the point of commercial application under a Government contract, it is likely they will not be developed with private capital unless there is some patent protection for the investment.

Any particular company has limited funds, and will tend to choose to develop a product or an idea in which its investment can be protected by exclusivity over one which its competitors can freely copy after the company has developed it.

It is often said that if an idea is good it will be used by all, but this is not necessarily true. It depends on what has to be done to bring the idea into practical reality.

Which brings up another myth—that inventions made under a Government contract are developed under the contract to the point of commercial application. This is the origin of the slogan, "The Government pays all, the Government should own all."

In fact, this is the exceptional case. In most cases the agency is not seeking inventions, per se, it is seeking a product that can do specific defined things. If in the course of developing the product, inventions are made, well and good. If not, also well and good, as long as the product is developed.

Inventions are byproducts. They may or may not be developed in the course of carrying out the contract. And if they are not, probably they cannot be exploited without the investment of private capital. And if they are fully developed, it might well be that further private capital will be needed to put them in a commercial form for the private sector.

Defense or space work, for example, demands products which in terms of both performance and cost are well beyond what the private sector needs or can buy. So when you ask what does it take to get an invention practiced so that the public actually will obtain some benefit of it, one usually cannot say that the Government has paid all.

A related myth is that patents can be used to sit on ideas, simply to prevent any development of them altogether. Actually, it is highly unlikely that courts will grant injunctions against use of a patent when the patent owner or licensee is not exploiting the invention. Equitable remedies are generally not available, in other words, to dogs in the manger.

The last myth I will mention is that companies will readily take contracts under which they give up patent rights to the Government. Some will, it is true, expecially the big firms which are heavily dependent on Government business. But there are companies who will not, particularly if the subject matter of the contract cuts to the heart of their commercial expertise. And these may be just the companies who could do the best job. Even if a company takes the contract, it may save its best people for work with a more protectable payoff for the commercial side of the business.

In the next few pages of my prepared testimony, I summarize the history of Government patent policy. I can more briefly cover that in oral testimony than reading it. Essentially the Government patent policy questions first arose as a major issue after World War II. During the War, the predominant policy of the military departments was to leave commercial rights with the contractors.

A notable exception was the work on atomic weapons. The Atomic Energy Act of 1946 and succeeding acts clearly enunciated the policy that the Government should acquire all rights and inventions made in performing Government contracts involving atomic energy.

Only a relatively few companies actually participated in the development of this brandnew technology, and their activities were almost entirely funded by the Government. A clear concern of the statute was to assure that in these circumstances no one company would be permitted to obtain a monopoly over the future commercial exploitation of atomic energy.

In 1947 the Department of Justice performed a substantial study which recommended that the Government take title to all inventions and make the inventions available to everyone.

The Department of Defense resisted this policy largely for the reason that it feared such a policy would deter the most highly skilled contractors—those with commercial positions in the areas of technology of interest to the Department—from pursuing the Department's contracts and thereby jeopardize the success of its R. & D. programs. No statute has ever been enacted to govern Department of Defense patent policy. Its policy—to acquire only a license

of free use—was and is administrative only. Because of the size of the Department's R. & D. programs, however, the great bulk of inventions made in Government contracts have remained in the hands of contractors, at least until recent years.

At the same time, agencies with large in-house programs, such as the Agriculture Department, which had a mission to develop new products and processes for immediate use in the civilian economy, took title to the inventions made in these programs, and many of them by government employees, and offered these inventions free to the public and industry for use. Some were tremendously useful, such as frozen orange juice and the aerosol can, and received widespread application.

Thus, there was established the division which is still observed between the license agencies and the title agencies, based primarily on the difference in agency mission.

NASA was established in 1957, and its patent policies were adopted without much discussion, on the basis that space was going to be a new area of technology like atomic energy. Therefore, NASA was to take title to inventions, but the administrator could waive some rights back to the contractors. In 1959, NASA sought to have its policy changed more like the Department of Defense, and while this was being considered, other voices strongly attacked the license policy of the Department of Defense.

In 1960 and 1961, the Department reexamined its policies and reaffirmed them in the main, but revised its procurement regulations to specify instances in which contracting officers were to consider acquiring title to inventions instead of routinely only acquiring only a license. However, under the influence of the attacks on the license policy, most of the R. & D. programs with civilian applications which were enacted during the 1960's, such as the Saline Water Act or the Coal Research and Development Act, contained broad language requiring that the research results, including patents and inventions be made freely available to the general public. This language was interpreted as requiring a title policy.

The ferment over patent policy culminated in 1963 when President Kennedy issued a statement on patent policy. The statement was the first attempt to achieve a Government-wide patent policy. It is perhaps more accurate to say that the statement was an attempt to state a rationale for the diverse patent policies which were then in existence.

Thus, the statement called for a flexible policy rather than a uniform one. The policy was intended to balance all of the various themes we have noted: to stimulate research and development, attract contractors, avoid monopolization, recognize the equities of both the Government and the contractor.

Its central method was to determine what policy applied to a particular contract by referring to the purpose of the Government in entering into the contract. If the purpose was, for example, to develop a product to the point of commercial application, title to inventions should be taken because private investment will probably not be needed. Or if the contract was in a new field of technology in which the Government was the principal developer

and in which the first contractors might obtain preferred or dominant positions, title should be taken to help avoid that result.

On the other hand, if the purpose was to develop a product for the Government's use and the contractor had an established commercial position in the field of technology involved, the Government would take only a license to inventions, leaving ownership and the commercial rights to the contractor, who was thought most likely to develop the inventions for commercial use and practical benefit to the public.

In cases which did not fall into either category, the rights were to be determined only after the invention was made and reported, and the decision was to be based on the extent to which incentives were needed to bring the invention to commercial application.

Moreover, if the Government did not obtain title, it was to obtain what were called march-in rights, namely, the power to march in on the patent owner, obtain the title from the patent owner, and license others if, after a certain number of years, the patent owner was not taking active steps to commercialize the invention and if someone else wanted to do so. Thus, the march-in rights were intended to deal with the dog in the manger and prevent it from sitting on a good idea while preventing others from using it.

I have sometimes thought of the Kennedy statement as a treaty of peace. Despite its imperfections, it served that function. The debate on patent policy thereafter became quiet for a period of years. In 1971, President Nixon reaffirmed the Kennedy statement but amplified it to encourage agencies to grant exclusive licenses to Government owned patents where necessary to stimulate commercial applications of these patented inventions. In addition, agencies working in areas of public safety, health, or welfare, which were normally instructed to seek title, were encouraged to consider leaving title to contractors in exceptional circumstances. Thus, for example, the Department of Health, Education, and Welfare felt authorized to enter into a number of institutional patent agreements with universities which had established programs for licensing their inventions for commercial use on reasonable terms.

There was also carried out the Harbridge House study, which other witnesses will be able to discuss in greater detail. Suffice it to say that the results of the study, which is the most extensive ever attempted, did not conclusively resolve to everyone's satisfaction the title-license issue. Each side found something to argue about. However, the study did not identify factual harm to the public interest arising out of the policy to leave commercial rights with contractors and did support, with factual examples, certain benefits in terms of developed inventions.

The most significant recent statutory enactment is section 9 of the Non-nuclear Energy R. & D. Act of 1974. This act governs nonnuclear contracting by the Deapartment of Energy and has also been made to apply to certain other programs like water desalinification as well. Succeeding witnesses will describe this statute in greater detail. Essentially, it requires the Department to acquire title to inventions but permits the Secretary, in accordance with prescribed considerations, to waive commercial rights back to the contractor, either at the time of contracting or when individual inventions are recorded. March-in rights are provided as well as

power to issue exclusive licenses to Department-owned inventions. One of the features of the statute is that it provides detailed criteria for the division of rights between Government and contractor.

In implementing the act, the Energy R. & D. Administration and now the Department, state in the regulations that patent incentives are among the incentives made available to the Government to stimulate commercial development of new energy technologies. The regulations go on to state that it is, "Intended, therefore, that waivers will be provided in appropriate situations to encourage industrial participation and foster rapid commercial utilization in the overall best interest of the United States and the general public."

However, the waiver procedure is necessarily cumbersome, and in practice, waivers have been increasingly difficult to obtain.

In 1970-72, the Commission on Government Procurement considered Government patent policy along with the myriad other aspects of procurement policy. The Commission's judgment was that the Presidential statement of patent policy as modified in 1971 should be given more time to work.

However, the Commission considered an alternative patent policy, and the Commission staff actually drafted a statute to put it into effect. It was generally to allow contractors to retain title to their inventions but a strong Patent Control Board was provided to exercise march-in rights in the interest of assuring usage of the patents and avoidance of situations inconsistent with the antitrust laws.

This alternative was further refined by an interagency committee in 1975 and 1976 but was not introduced as a legislative proposal. Today the Congress is awaiting recommendations which may emerge from the various studies which the President has set in motion on arresting the perceived decline in American technological innovation to which Senator Schmitt has referred. Changes in patent policy may be among such recommendations.

On the basis of my own experience in Government, Senator Schmitt, I very much support the objectives and provisions of S. 1215. It carefully defines the limited instances in which agencies are to acquire title, permits waivers even in these situations, and gives the contractor the option to retain commercial rights in other situations. I would delete the requirement of title in classified situations, since patents related to national security may more properly be protected in the Invention Secrecy Act.

Were S. 1215 to be enacted, I believe the commercialization of new ideas would be stimulated while, at the same time, the public interest in competition could be protected. Needless destruction of patent incentives by taking title for the Government would be avoided, and a greater willingness to participate in Government programs on the part of industry would be promoted.

In some instances, title in the Government may be justified, but I think relatively few. One I would add is when the contractor's job is to guide and direct others. Taking title in this instance assures the other contractors of the lead contractor's disinterestedness toward their ideas.

I believe, in general, that ideas owned by all will be developed by none. I also think that trying to decide at the time of contracting whether an invention which might be made in performing the contract will later more likely be commercialized if title is kept by the Government or by contractor is not a rewarding exercise.

My personal feeling is that patent incentives generally work best if they remain in private hands. I honestly believe that most inventions made in Government contracts are not significant enough to worry about or to create bureaucracy and paper work procedures to deal with.

Furthermore, I doubt whether the procurement agencies are well suited to run licensing programs for purposes of commercializing their Government-owned inventions.

Nevertheless, I also believe that effective means should be provided to induce Government contractors to license use of their inventions to others on reasonable terms and that the Government should have, through a strong march-in procedure, power to deal with the few bad actors or dogs in the manger. Thus, I would recommend creating a Patents Board to exercise the march-in rights, rather than the procurement agency.

Would-be licensees, if turned down for a license by a patent owner, could apply to the Board for relief. Government agencies seeking to compel wider licensing of significant inventions orginated in Government R. & D. work and avoidance of situations inconsistent with the antitrust laws would make their case to the Board as well. The patent owner and its licensees would be heard in addition.

The Board would decide in accordance with statutory criteria favoring utilization of patent incentives and the equities of the particular situation. Would-be licensees would have greater ability to obtain licenses on reasonable terms, since the patent owner would in all likelihood seek to make a suitable deal and avoid a hearing before the Board.

On the other hand, patent owners would have some protection against unreasonable demands for free licenses where the considerations favoring private investment warranted protection. Thus, patent owners and potential licensees would know that inventions which were largely financed by Government funds would be the most likely to be required to be licensed widely—even royalty-free in some cases. On the other hand, inventions whose commercial application more heavily depends on private investment would receive correspondingly greater protection from the Board.

In this way, the Government could concentrate its attention on the relatively few inventions which really matter and not waste its energies in disputes at the time of contracting over inventions not yet in being whose actual significance is unknown.

I personally believe that this function of a Patents Board would be preferable to the procedure in S. 1215 where a contractor would appeal to a Board a decision of a procurement agency to take title. As I have indicated, the likelihood of sound judgments at the time of contracting as to the future significance of inventions is slight. The procedure would also introduce an extraneous third party into what is fundamentally a bargaining situation, and the third party's

primary interest would be in uniformity, rather than in accomplishment of agency mission.

I also believe that march-in rights are preferable to a policy that a contractor's exclusive rights would be extinguished after a specific number of years unless the contractor justified an extension. I think that the extinguishing of rights would make it difficult to find others willing to develop the invention, and I am skeptical that the Government would be an effective licensing agent.

In certain instances as, for example, in an energy production demonstration plan in which the Government shares costs with private industry, provision would—and I think properly should—be made to provide a recoupment of the Government investment through sharing of proceeds of the enterprise. However, to uniformly make this a requirement for every invention would simply cost more in paperwork in both industry and Government than it would return to the Public Treasury.

I also believe that Government efforts to acquire background patents—that is, privately held inventions developed outside or before the Government work but necessary to it—should be limited to those situations in which the Government is expressly trying to develop a particular technical solution to the point where it can be applied by many different people with no need for further development expense on their part. Again, I think this is best handled by having the contractor agree to license others to use the background patents for the specific technical solution, rather than having the Government acquire and distribute the rights themselves. I would handle these situations administratively, rather than by statute.

Mr. Chairman, Senator Schmitt, this concludes my statement. I would be happy to discuss any matter in more detail or respond to any questions. I wish to commend the subcommittee for focusing attention on this difficult problem in a most constructive way.

Senator SCHMITT. Thank you, Mr. Johnson.

I would just say that the bill's provisions relative to your discussion of the Patents Board are certainly tentative. Your suggestions are going to be very useful in the final markup of this measure.

S. 1215 applies to all Federal contractors regardless of the size of the contracting firm. Do you believe the distinction between large and small business is such that there should be different policies, depending on the size of the firm?

Mr. JOHNSON. Mr. Chairman, I think that distinction has little to recommend it other than that it may be possible to sell it to people. I think that giving small businesses rights to inventions while denying medium sized businesses or large businesses the rights to their inventions could be counterproductive, particularly for some of the smaller firms. And I don't mean small business as defined by the SBA, but medium sized companies of over 500 employees but not necessarily the "Fortune 500". This would put such companies in quite a difficult position.

Also the policy in implementation would become very difficult as companies pass the magic threshold as defined by the Small Business Administration for totally different purposes than inventions. So I think as a policy dividing the question of who gets rights between big business and small business is not a good policy. It does not relate to what we should be trying to do in patent policy,

namely get the most rapid commercialization of ideas for the public use, and at the same time, avoiding situations such as dogs in the manger, of which there are only a few.

Senator SCHMITT. It has been suggested that a legitimate distinction can be made in applying different patent policy approaches depending on the end use of the technology receiving Government support. That is, it is argued that when the end use is for the Government itself, as is typically the case in military R. & D. and some others, the patent should be given to the contractor; whereas if the subject of the contract is for general public use, the Government should have the option of retaining title. Do you agree with this distinction?

Mr. JOHNSON. This is the distinction made in President Kennedy's patent policy of 1963. I think the better distinction is the extent to which the inventions are developed to the point of commercial application, rather than the nature of the agency's mission. I think the rationale can be made for taking title in areas which generally concern the public welfare, but I think patent incentives are needed in that field as much as in any other. Not every invention that is made, for example, in an FAA program will be developed to the point of commercial application. But such a program, if they are developing ground control equipment that would be mandated for use at airports, I can see a reason for the Government taking title, because the very act of the FAA's creating a market for this equipment has removed the need for patent incentives.

On the other hand, I know that the Department of Health, Education, and Welfare has had a difficult time attracting the best contractors in various health fields when it followed a policy of taking only title as required by the Kennedy statement. They found it necessary and in fact desirable and defensible to allow the contractors—including universities—to keep commercial rights, where that procedure would more quickly bring about utilization of inventions.

So I think the better distinction should be the extent to which the Government intends to bring the inventions under contract to the point of commercial application without the use of additional private investment. If so, then there would be no reason to leave patent titles with contractors. However, I think a strong march-in procedure would accomplish the same goals as Government title.

It is often said, incidentally, that the march-in procedure set into effect in 1963 has been ineffective because it has never been utilized. The answer I think is that it——

Senator SCHMITT. Sometimes that is a sign of success.

Mr. JOHNSON. It never needed to be used. No one ever came up with any instance of a Government contractor retaining title to an invention and proving to be a dog in the manger. It just has not happened since that policy, but of course it took a while for that policy to come into effect, because inventions had to be made and contracts had to be written. So there was a natural lag period of between 5 and 10 years at that point.

But the main purpose of a Patents Control Board seems to me is to act as an incentive on the private sector to make suitable arrangements without involving the Government, to give both sides

an incentive to come to the bargaining table and make a suitable deal. And I think that if the invention is largely developed with Government money, there is little that the patent owner in those circumstances should be allowed to gain by holding on unreasonably to a product and not licensing others who wish to use it.

Senator SCHMITT. Senator Stevenson wanted me to ask if we might take another approach along the following lines. The contractor's exclusive rights would expire after a reasonable opportunity to market an invention unless he requested an extension of time, for example, on the grounds that he had put the invention to use but not yet recouped his investment. The Government would publish lists of the patents in order to inform potential licensees of available inventions. Would-be licensees could enforce the march-in rights by complaining to the Government that they had been refused licenses to available inventions. In other words, the march-in would be both automatic and self-enforcing, but the contractor preparing the marketed invention would be protected. Do you have any comment on that proposal?

Mr. JOHNSON. I think the danger of extinguishing rights is real under that situation. If the rights were extinguished, the Government would either have to license it on an exclusive basis and I don't think the Government is very well adapted to that, frankly, or there would be lost whatever incentive the patent provides to develop that invention.

Also, I do want to comment on a point that is made in that question. I think it is a good one. There must be a method for identifying the inventions that are made under Government contract. Of course, if patented inventions that were developed under Government contract or came into being during the course of a Government contract would be identified as such in the patent disclosure, that could be on the public record. At one time, I toyed with the notion of having a letter G be attached to all patents that were developed with Government funds in one way or another, so everybody would have a clear idea. I was told that this idea was impractical because it wouldn't fit into the Patent Office computer.

Again, I think it would be desirable that there be a means of identifying to the would-be user what patent was developed with Government funds in one way or another. Providing lists would be a perfectly good idea. The Government does that.

But I must say in my experience the lists are very uninspiring. If you have ever seen a list of patents owned by the Government, you can see how completely opaque they are, how virtually no one except possibly a few people in Japan have ever taken them and tried to find inventions they could use. I might say that NASA does the best job in this respect, because when it publishes a patents list, it includes oftentimes a picture of the invention disclosure and a copy of the first claim. It tells you at least a little bit more about the invention than just what is its title.

Senator SCHMITT. It is a little bit like trying to find inventors in a telephone book.

Mr. JOHNSON. That is right, exactly right. So providing a better means of informing would-be users about the inventions by providing a little more information would be a good role for the Government. But as for actually administering the licensing program

itself, it would be better if would-be licensees went directly to the patent owner, and they made their arrangements with each other.

Senator SCHMITT. You discussed this issue in your testimony, but we do provide in S. 1215 a list of five criteria under which it would be presumed the Government would retain title. The determination as to the Government's rights would initially be made at the time of the contract. I get the impression from your testimony you think that although it may not be unworkable, it is unnecessarily cumbersome. Do you have any other comments on that or on the appropriateness of the five criteria?

Mr. JOHNSON. I think the five criteria have much to commend them. The first refers to a contractor running a Government-owned research facility. This usually means the national laboratories and facilities run by private companies for the Department of Energy, but in practical effect these operations are quite removed from the companies that run them, and they operate very largely as extensions of the Government. Thus it makes a certain amount of sense to acquire title in that case.

I personally think that the second criterion, where title is to be acquired because of the classified nature of the work, is unnecessary because of the Invention Secrecy Act, and it might confuse people because there is a good deal of work performed in the Department of Defense that is classified in nature but as to which there is utterly no need for the Government to acquire title, because the Government would have free use, and the inventions, if they are used for commercial purposes, have got to have a lot of private investment to bring them into an area of use or a level of cost the public can afford.

Criterion number three refers to exceptional circumstances where it is necessary to assure adequate protection of public health, safety, or welfare. The current Presidential patent policy statement in effect uses some of the same language. That is, I think, reassuring to people more than it is actually necessary, in my personal opinion.

Senator SCHMITT. Sometimes reassurance is absolutely necessary.

Mr. JOHNSON. I personally think that the march-in procedure would accomplish that, although I know I am in a minority. Whenever you discuss patent policy, you very quickly come up with the question of what do you do with a cure for cancer? Are you going to let one company have that? Obviously, a priceless invention. As I say, you are likely not to have a single patent on that, but you need to have some protection against that possibility.

I think that such a possibility might arise in a contract where the work was expressly at the point of discovering whether there was an answer to cancer. The Government might need to acquire title, because that would be an exceptional circumstance.

I have to correct myself. I said this language in S. 1215 came out of the patent policy statement. Actually it is a direct reverse twist of it, because under the current statement you normally acquire title in any circumstance in which you are concerned with public health, safety, or welfare. Only in exceptional circumstances can you leave the commercial rights with the contractors. The bill would change this around. Only in exceptional circumstances would you acquire title.

In so doing, I think the new language has perhaps enlarged the possibility of more inventions being utilized by their companies that developed them, in other words greater commercialization.

Senator SCHMITT. It is an attempt to put the burden of proof on the Government rather than on the contractor.

Mr. JOHNSON. That is a good place for it to fall. At the same time, we have a strong march-in procedure to enable you to deal after the fact with the few cases that really count.

Certainly, the fourth criterion, which refers to the nonprofit organization that doesn't have a technology transfer program—it makes sense for the Government to take title in such a case, because the Government, of course, would have to provide the technology transfer.

And lastly, the fifth criterion, where the purpose of the contract is to develop processes or methods that would be required to be used by Government regulation—that is classically the FAA type of situation, and some others, perhaps the National Highway Traffic Safety Administration. That makes sense, for the act of creating by regulation a demand is enough to obviate the need for the patent incentive.

Senator SCHMITT. Do you think that specific criteria for march-in rights should be specified if we put our emphasis in that direction rather than in the contracting?

Mr. JOHNSON. Yes. I think it is very desirable that that be done, because whoever is going to exercise the march-in procedure should have a set of statutory criteria, which set out the purposes of the Congress in exercising what policy should be adopted in each case. Where somebody else wants to use the invention, there should not be an automatic assumption that that person would get it. I have suggested some criteria that would recognize the need for incentives to bring ideas into commercial utilization, the need to avoid the use of patents in a manner which is inconsistent with he antitrust laws—in other words, a series of criteria which both sides, the would-be licensee and the patent owner, can see and can make some kind of guess as to the way the Patent Board would go.

And when you can have a pretty good idea what is going to happen, you give an incentive to both sides to come together and make a contract. And that is the kind of incentive that I would like to see developed.

Also I think that the patent owner should be permitted a chance to get judicial review of the decision of the Patent Control Board, if it is adverse. And in order to provide effective judicial review, you need to have some criteria against which to measure how the Board is acting, and the court can then determine if the Board has acted capriciously or whether it has carried forward a policy which is the congressional policy.

To leave policy on title and license solely, to administrative discretion is undesirable—when you are talking about an agency as small as this one, if it ever comes into existence. One of the main reasons that people take title to inventions when they don't have to, is the fear of coming before a congressional committee 5 years later and being asked, "Why did you give away this right?"

But if the criteria——

Senator SCHMITT. It is like the X-ray.

Mr. JOHNSON. If the criteria are in place and you are carrying out congressional guidance, you are in much better shape.

Senator SCHMITT. We have to get to some other witnesses. We could discuss your experiences and suggestions all morning.

Quickly, could you make a comment on whether we should permit the acquisition of background rights?

Mr. JOHNSON. I don't think there should be a flat prohibition on it, because I think in some circumstances it is desirable that the matter be negotiated. I think setting statutory criteria in this area is dangerous, because it may cause agencies to try to seek background rights more than they should.

This is an area that is even more sensitive to the commercial companies than to take title to inventions they may or may not make. You are talking about their lifeblood. And you also have very little to give them in return for those background rights.

Nevertheless, I can visualize circumstances where it may be necessary if we are going to make the research money of the Government pay off. You may, for example, in the energy situation, be working with large companies to develop a demonstration plant. Here you have to make arrangements that when the demonstration plant is complete—your idea of demonstrating is to show it can be done—you can let other people do it as well. You wouldn't want to let that be prevented by the background patent rights that the contractor has.

So you seek to reach an agreement in that case that the contractor will agree to license others on terms that will be reasonable. That may be free, depending on the value.

But it is truly an infrequent situation in which it is necessary to seek background rights. And I think to suggest that it is desirable to enact statutory criteria for taking background in many other situations, I think would be dangerous unless the criteria themselves were very carefully drawn.

Senator SCHMITT. Another question that you might want to make a quick comment on is what should we do with the stockpile, so to speak, of Government-owned patents that already exist?

Mr. JOHNSON. I would put one agency in charge of dealing with that, rather than every procurement agency. I think that agency should borrow on the techniques that NASA has pioneered in this field. I think NASA has been most successful because it has devoted a lot of real time and attention to this and put good people on it.

Senator SCHMITT. Could we provide some kind of a surgical means by which the patents on a case-by-case basis could be reviewed when somebody said, I would like to have this patent reviewed, and retrospectively, the criteria of this measure applied to it?

Mr. JOHNSON. That is a very interesting idea. You give criteria to the Department of Commerce or whoever was going to exercise the program, and say—you would have to grant authority to the Government to give away—there is the word "give-away"——

Senator SCHMITT. Can't take you anywhere, can we?

Mr. JOHNSON. To grant title. But it may not be necessary. An exclusive license may be enough. There is a problem in granting exclusive licenses. It is largely a technical problem in the patent law. The Government normally does not enforce patents that it

owns. If you ever enter into an enforcement program, then chaos would result, because you just would be creating a lot of jobs for patent attorneys and little good for the Government.

Senator SCHMITT. I saw a lot of smiles in the audience.

Mr. JOHNSON. I hasten to say I am not a patent attorney.

But the technical problem is, when the Government does grant an exclusive license, there is a question about who can enforce the license. Technically, the patent owner has to be joined in the legal action with the exclusive licensee. This ties the Government up in issues that are truly tangential to its interests. However, I think that is a technical problem that can be worked out without undue difficulty.

Yes, I think some means of better publicizing inventions, a little more salesmanship on the part of the Government by identifying a good invention and—providing more than the bare patent disclosure, but providing the research results that go with it—these things could be quite attractive.

Senator SCHMITT. Thank you, Mr. Johnson.

Mr. JOHNSON. Thank you.

[The statement follows:]

STATEMENT OF R. TENNEY JOHNSON, PARTNER, SULLIVAN & BEAUREGARD

Mr. Chairman, I am honored to respond to your invitation to begin the testimony on Government patent policy before your subcommittee. This is the subject matter of S. 1215, the Science and Technology Research and Development Utilization Policy Act which you, Senator Cannon, and Senator Schmitt have introduced.

Introduction and background.—I will provide some introductory comments on Government patent policy, try to give some idea of its complexity, outline briefly the history of how it has evolved over the past thirty years, and state some personal views on the legislation before the Subcommittee.

I have been concerned with this subject in various roles for the past twenty years, as an attorney in the Department of Defense, Deputy General Counsel in the Army, and General Counsel of NASA and the Energy Research and Development Administration. I assisted in formulating patent policy for those agencies, drafting President Kennedy's Statement of Government Patent Policy in 1963, proposing to the Commission on Government Procurement its "alternative patent policy" in 1972, and guiding the writing of regulations to carry out the patent provisions of the Non-Nuclear Research and Development Act of 1974.

The issue.—The fundamental issue is, who should get the commercial rights in an invention which is made in the course of performing research and development for the Government?

There are few questions of public policy which arouse more controversy. There are few issues on which agencies' practices vary more widely. And there are few issues on which the factual background for policy making is so sparse or subject to such widely varying interpretations.

Unfortunately, Government patent policy is a subject which appears simple at first glance and which is thus susceptible to sloganeering and demagoguery. Everyone is an expert on the subject, it seems, from the very beginning. And yet, the more you study it, the more complex it becomes, and the more you become aware that there are a multitude of conflicting considerations.

Basics.—Let me start with the basics: inventions will be made in performing R. & D. and that many of these inventions will be patentable. A patent is a right to exclude others from the use of the invention for seventeen years. Patents are granted by the Government under the authority of the Constitution. Their fundamental purpose is to encourage disclosure of ideas in return for an exclusive right to exploit the invention, and thereby in both ways to stimulate development of new ideas. Patents are thus little monopolies, although of course they may be licensed to others by the patent owners.

All agree that when an invention is made in performing Government R. & D. contract, the Government must always receive a comprehensive license to use the invention itself or to authorize others to use the invention in performing work for the Government. The issue thus becomes whether the Government should acquire

more, specifically the rights the contractor would otherwise retain to the commercial use of the invention? If the Government acquires all rights, its historic policy has been to allow the invention to be used freely by anyone. (In recent years, some agencies have been granting exclusive licenses to use Government-owned inventions, on the theory that only with a limited period of exclusive use will private capital be available to develop those inventions to the point of commercial application.)

On the other hand, if the contractor keeps the commercial patent rights, they will function in the private sector pretty much as do the patents which are granted for inventions made in the course of private research and development.

First impression answers.—Under these circumstances, the answer which most immediately comes when you look into the subject for the first time is that because the Government paid for the contract work it should get the fruits of that work. By taking all the patent rights, the Government can make them freely available to all and remove artificial barriers which allowing the rights to stay in private hands would impose to stifle progress. Moreover, the Government will prevent the contractors from enjoying windfalls of commercial benefits from inventions paid for by the Government, keep the taxpayers from having to pay twice for the development and use of the inventions, and avoid creating industrial concentration or monopoly.

This answer, however, becomes less and less satisfactory the more you examine what is really at stake—how people actually behave when they have a choice, rather than how one thinks they should behave—what it takes to bring an idea to practical application so that the public can get real benefits from it.

Will the Government get the best contractors and the best talent to perform research and development on the condition that they lose commercial patent rights in their inventions? Will industry actually invest private capital to develop ideas which are freely available to others? Or will it devote its own funds to other areas in which it can protect its investment long enough to earn a return on it? If the ideas are not developed, how will the public benefit from them?

The data.—I don't believe that the factual data accumulated on this subject to date points inexorably to one solution or another for every given case. Each new fact seems to be interpreted differently depending on one's preconceptions. If, for example, you note reports that only 5 percent of Government-owned inventions are ever exploited commercially, you might conclude that more inventions would be exploited if patent protection were available to stimulate private invention and development. On the other hand, you might also conclude that probably the other 95 percent are worthless anyway. Moreover, because the Government does not police the use of the inventions it owns, many more could in fact be in use without the Government knowing about it. As far as I know, no one has ever surveyed the whole list of Government inventions and made a judgment about the commercial potential of each one. In any event, I doubt whether anyone whose money is not actually at stake could effectively make such a judgment.

A policy issue.—In my view, therefore, this issue remains an issue of policy whose regulations ultimately reflects your views as to the proper roles and relationships of the Government and the private sector, as well as your views as to the nature of inventions and the proper and beneficial, or destructive and dangerous, role of self interest in promoting the national economy.

Preconceptions or myths.—I find in discussing this subject that people who have not thought much about it tend to form opinions quickly on the basis of several unexamined assumptions or preconceptions. I call these preconceptions "myths", because they are usually influential and widely shared, but also because they tend to be wrong.

Thus, a patent is generally thought to cover a wide area of technology, so much so that it will block out that whole area from study by others. Actually, almost every patent by itself covers only an infinitesimal area of technology, and generally speaks to but one of several alternative ways of doing things. Very few patents are seminal. It is highly doubtful, for example, that a "cancer cure" will be covered by a single patent, yet this possibility is always mentioned in discussion about Government patent policy.

Another related myth is that a patent blocks out development of alternatives. Actually in fact it acts as an incentive to come up with alternatives.

Another myth is that if a patented invention is freely available it will be exploited widely. Actually this tends to be true only when the invention has already been developed pretty well to the point of commercial application so that to exploit it will not require substantial private investment in development. But for most other inventions, which are not developed to the point of commercial application under the Government contract, it is likely they will not be developed with private capital unless there is some patent protection for the investment. Any particular company

has limited funds, and will tend to choose to develop a product or an idea in which its investment can be protected by exclusivity over one which its competitors can freely copy after the company has developed it. It is often said that if an idea is good it will be used by all, but this is not necessarily true. It depends on what has to be done to bring the idea into practical reality.

Which brings up another myth—that inventions made under a government contract are developed under the contract to the point of commercial application. This is the origin of the slogan, "The government pays all, the government should own all." In fact, this is the exceptional case. In most cases the agency is not seeking inventions per se—it is seeking a product that can do specific defined things. If in the course of developing the product, inventions are made, well and good. If not, also well and good, as long as the product is developed. Inventions are by-products. They may or may not be developed in the course of carrying out the contract. And if they are not, probably they can not be exploited without the investment of private capital. And if they are fully developed, it might well be that further private capital will be needed to put them in a commercial form for the private sector. Defense or space work, for example, demands products which in terms of both performance and cost are well beyond what the private sector needs or can buy. So when you ask what does it take to get an invention practiced, so that the public actually will obtain some benefit of it, one usually cannot say that the Government has "paid all."

A related myth is that patents can be used to sit on ideas, simply to prevent any development of them altogether. Actually, it is highly unlikely that courts will grant injunctions against use of a patent, when the patent owner or licensee is not exploiting the invention. Equitable remedies are generally not available, in other words, to dogs in the manger.

The last myth I will mention is that companies will readily take contracts under which they give up patent rights to the Government. Some will, it is true, especially the big firms which are heavily dependent on Government business. But there are companies who will not, particularly if the subject matter of the contract cuts to the heart of their commercial expertise. And these may be just the companies who could do the best job. Even if a company takes the contract, it may save its best people for work with a more protectable pay-off for the commercial side of the business.

Evolution of government patent policy.—The patent policy question first arose as a major issue after the Second World War. Before that war, industry performed relatively little R&D for the Government. During the War, the predominant policy of the military departments was to leave commercial rights with the contractors.

Atomic energy.—A notable exception was in the classified work on atomic weapons. Following the war, the Atomic Energy Act of 1946 and its successors clearly enunciated the policy that the Government should acquire all rights in inventions made in performing Government contracts involving atomic energy. Only a relatively few companies actually participated in the development of this brand-new technology, and their activities were almost entirely funded by the Government. A clear concern of the statute was to assure that in these circumstances no one company would be permitted to obtain a monopoly over the future commercial exploitation of atomic energy.

Justice study.—At the same time, the Department of Justice was concerned that a continuing program of heavy government sponsorship of R&D in industry would lead to industrial concentration and monopoly—particularly if the bigger companies obtained patent rights in their research for the Government. The Department published a massive three-volume study in 1947, which concluded that the appropriate policy for the Government was generally to acquire all rights to inventions which contractors produce in performing Government contracts and generally to make these inventions freely available to all comers, either by not enforcing the exclusive rights of the patents or by granting free licenses to any who sought them.

Defense.—The Department of Defense resisted this policy, largely for the reason that it feared such a policy would deter the most highly skilled contractors—those with commercial positions in the areas of technology of interest to the Department—from pursuing the Department's contracts and thereby jeopardize the success of its R. & D. programs. The mission needs of the Department were thus considered paramount, and inventions made under Defense contracts would be developed only if useful for defense and not for commercial applications. The Government would acquire only a license of free use. President Truman ultimately did not force the Department to adapt the "title" position advocated by the Justice Department. No statute was enacted to govern the Department of Defense patent policy. Its policy thus was and is administrative only. Because of the size of the Defense R. & D.

programs, however, the great bulk of inventions made in Government contracts have remained in the hands of the contractors.

"Civilian" agencies.—At the same time, agencies with large in-house programs, like the Agriculture Department, with missions to develop new products and processes for immediate use in the civilian economy, took title to the inventions made in these programs and offered them freely to the public and to industry for use. Some were tremendously useful, such as frozen orange juice and the aerosol can, and received widespread application.

Thus, there was early established the division which is still to be observed between the "license" agencies and the "title" agencies, based primarily on the difference in agency missions.

NASA.—The next major development in patent policy came in 1957 with the establishment of NASA. The Congress enacted without much discussion a policy under which NASA would take title to invention made in its programs but the administrator could waive some rights back to the contractors. It was vaguely felt that "space" was a new area of technology like Atomic Energy.

However, NASA itself subsequently sought to have this statutory policy changed, on the ground that rather than being new, its technologies and contractors were parallel to those of the Department of Defense. NASA feared that its more restrictive statutory policy put it at a disadvantage in attracting contractors. NASA wanted, in other words, simply to be like DOD.

Inroads on the "license" policy.—While the Congress was considering NASA's proposals, other voices—notably that of Senator Long—strongly attacked the license policy of the Department of Defense. In 1960, the Department reexamined its policies and affirmed them in the main, but revised its procurement regulations to specify instances in which contracting officers were to consider acquiring title to inventions instead of routinely acquiring only a license.

However, under the influence of these attacks on the "license" policy, most of the new R. & D. programs with "civilian" applications which were enacted during the sixties, such as the Saline Water Act or the Coal Research and Development Act, contained broad language requiring that the research results, including patents and inventions, be made freely available to the general public. This language was interpreted as requiring a title policy.

Presidential statement on patent policy.—The ferment over patent policy culminated in 1963 when President Kennedy issued a Statement on Patent Policy. This Statement was the first attempt to achieve a Government-wide patent policy. It is perhaps more accurate to say that the Statement was an attempt to state a rationale for the diverse patent policies which were then in existence.

Thus the Statement called for a "flexible" policy rather than a "uniform" one. The policy was intended to balance all the various themes we have noted: stimulate research and development, attract contractors, avoid monopolization, recognize the equities of both the Government and the contractor. Its central method was to determine what policy to appy to a particular contract by referring to the purpose of the Government in entering into the contract. If the purpose was, for example, to develop a product to the point of commercial application, title to inventions should be taken because private investment will not be needed. Or if the contract was in a new field of technology in which the Government was the principal developer and in which the first contractors might obtain preferred or dominant positions, title should be taken to help avoid that result. On the other hand, if the purpose was to develop a product for the Government's use, and the contractor had an established commercial position in the field of technology involved, the Government would take only a license to inventions, leaving ownership and commercial rights to the contractor, who was thought most likely to develop the inventions for commercial use and practical benefit to the public.

In cases which did not fall into either category, the rights were to be determined only after the invention was made and reported, and the decision was to be based on the extent to which incentives were needed to bring the invention to commercial application. Moreover, if the Government did not obtain title, it was to obtain what were called "march-in" rights—namely, the power to march in on the patent owner and obtain the title or compel the patent owner to license others, if after a certain number of years the patent owner was not taking active steps to commercialize the invention (and if someone else wanted to do so). Thus, the march-in rights were intended to deal with the dog in the manger and prevent it from sitting on a good idea while keeping others from using it.

I have sometimes thought of the Kennedy Statement as a "treaty of peace." Despite its imperfections, it in fact served that function. The debate on patent policy thereafter became quiet for a period of years. In 1971 President Nixon reaffirmed

the Kennedy Statement, but amplified it to encourage agencies to grant exclusive licenses to Government-owned patents where necessary to stimulate commercial applications of these patented inventions. In addition, agencies working in the areas of public safety, health or welfare—which were normally instructed to seek title—were encouraged to consider leaving title with contractors in "exceptional circumstances." Thus, for example, the Department of Health, Education, and Welfare felt authorized to enter into a number of "institutional patent agreements" with universities which have established programs for licensing their inventions for commercial use on reasonable terms.

Harbridge house study.—During these years of relative calm on the patent policy front, the Federal Council on Science and Technology, in accordance with a directive in President Kennedy's Statement, contracted with Harbridge House for a study of the effects of Government patent policy on industrial participation in Government programs and commercial utilization of Government-owned inventions. This is the most comprehensive study yet attempted. I will not discuss these results of the study here. Some of your later witnesses are better able to do so. Suffice it to say that results did not conclusively resolve the title/license issue either way, and both sides found things to argue about. Nevertheless, the study did not identify factual harm to the public interest arising out of the policy to leave commercial rights with contractors and did support with factual examples certain benefits in terms of developed inventions.

Nonnuclear energy.—The most significant recent statutory enactment is Section 9 of the Non-nuclear Energy Research and Development Act of 1974, which now governs all non-nuclear R&D contracting by the Department of Energy. (It has also been made to apply to certain other programs such as Water Desalinification.) Succeeding witnesses will describe this statute in greater detail. Essentially, it requires the Department to acquire title to inventions but permits the Secretary in accordance with prescribed considerations to waive commercial rights back to the contractor either at the time of contracting or when individual inventions are reported. March-in rights are provided, as well as power to issue exclusive licenses to Department-owned inventions. One of the features of the statute is that it provides detailed criteria for the division of rights between Government and contractor.

In implementing the Act, ERDA—and now the Department—states in the regulations that patent incentives are among the incentives made available to the Government to stimulate commercial development of new energy technologies. The regulations go on to state that it is "intended, therefore, that waivers will be provided in appropriate situations to encourage industrial participation and foster rapid commercial utilization in the overall best interest of the United States and the general public" (DOE Regulations, § 9-9.107-3). However, the waiver procedure is necessarily cumbersome, and in practice waivers have been increasingly difficult to obtain.

In 1970–72, the Commission on Government Procurement considered patent policy along with the myriad other aspects of government procurement policy. The Commission's judgment was that the Presidential Statement of Patent Policy, as modified in 1971, should be given more time to work. However, the Commission considered an "alternative" patent policy, and Commission staff actually drafted a statute to put it into effect. This was generally to allow contractors to retain title to their inventions, but provide a strong Patents Control Board to exercise march-in rights in the interest of assuring usage of the patents and avoidance of situations inconsistent with the antitrust statutes. The alternative was further refined by an interagency committee in 1975–76, but was not introduced as a legislative proposal.

Today, the Congress is awaiting recommendations which may emerge from the various studies the President has set in motion on arresting the perceived decline in American technological innovation. Changes in patent policy may be among such recommendations.

Personal observations.—On the basis of my experience in Government, I very much support the objectives and provisions of S. 1215. It carefully defines the limited instances in which agencies are to acquire title, permits waivers even in these situations, and gives the contractor the option to retain commercial rights in other situations. (I would delete the requirement of title in classified situations, since patents related to national security can more properly be protected in the Patent Secrecy Act.)

Were S. 1215 to be enacted, I believe that commercialization of new ideas would be stimulated, while at the same time the public interest in competition could be protected. Needless destruction of patent incentives by taking title for the Government would be avoided, and a greater willingness to participate in government programs on the part of industry would be promoted. In some instances, title in the

Government may be justified, but I think relatively few. (One I would add is where the contractor's job is to guide and direct others. Taking title in this instance assures the other contractors of the lead contractor's disinterestedness toward their ideas.)

I believe generally speaking, that inventions owned by all will be developed by none. I also think that trying to decide at the time of contracting whether an invention which might be made in performing the contract will later more likely be commercialized if title is kept by the Government or the contractor is not a rewarding exercise.

My personal feeling is that patent incentives generally work best if they remain in private hands. I honestly believe that most inventions made in Government contracts are not significant enough to worry about or to create bureaucracy and paperwork procedures to deal with. Furthermore, I doubt whether the procurement agencies are well suited to run licensing programs for purposes of commercializing their Government-owned inventions. Nevertheless, I also believe that effective means should be provided to induce Government contractors to license use of their inventions to others on reasonable terms and that the Government should have, through a strong march-in procedure, power to deal with the few bad actors or dogs in the manger.

Thus, I would recommend creating a Patents Board to exercise the march-in rights. Would-be licensees, if turned down for a license by patent owner, could apply to the Board for relief. Government agencies seeking to compel wider licensing of significant inventions originated in Government R. & D. work and avoidance of situations inconsistent with the antitrust laws would make their case to the Board. The patent owner and its licensees would be hard as well. The Board would decide in accordance with statutory criteria favoring utilization of patent incentives and the equities of the particular situation. Would be licensees would have greater ability to obtain licenses on reasonable terms, since the patent owner would in all likelihood seek to make a suitable deal and avoid a hearing before the Board. On the other hand, patent owners would have some protection against unreasonable demands for free licenses, where the considerations favoring private investment warranted protection. Thus, patent owners and potential licensees would know that investions which were largely financed by Government funds would be the most likely to be required to be licensed widely, and even royalty-free. On the other hand, inventions whose commercial application more heavily depended on private investment would receive correspondingly greater protection from the Board.

In this way, the Government could concentrate its attention on the relatively few inventions which really matter and not waste its energies in disputes at the time of contracting over inventions not yet in being whose actual significance is unknown.

I personally believe this function of a Patents Board would be preferable to the procedure in S. 1215 where a contractor would appeal to a Board a decision of a procurement agency to take title. As I have indicated, the likelihood of sound judgments at the time of contracting as to the future significance of inventions is slight. The procedure would also introduce an extraneous third party into what is fundamentally a bargaining situation, and the third party's primary interest would be in "uniformity" rather than accomplishment of agency mission.

I also believe that march-in rights are preferable to a policy that a contractor's exclusive rights would be extinguished after a specified number of years, unless the contractor justified an extension. I think that the extinguishing of rights would make it difficult to find others willing to develop the invention, and I am skeptical that the Government would be an effective licensing agent.

In certain instances, as for example in an energy production demonstration plant, in which the Government shares costs with private industry, provision would—and I think property should—be made to provide a recoupment of the Government investment through sharing the proceeds of the enterprise. However, to uniformly make this a requirement for every invention would simply cost more in paperwork in both industry and government than it would return to the public trasury.

I also believe that Government efforts to acquire background patents—i.e., privately held inventions developed outside or before the Government work but necessary to it—should be limited to those situations in which the Government is expressly trying to develop a particular technical solution to the point where it can be applied by many different people, with no need for further development expense on their part. Again, I think this is best handled by having the contractor agree to license others to use the background patents for the specific technical solution, rather than having the Government acquire and distribute the rights itself. I would handle these situations administratively, rather than by statute.

Mr. Chairman, this concludes my statement. I would be happy to discuss any matter in more detail or respond to any questions. I commend the Subcommittee for focusing attention on this difficult problem in a most constructive way.

Senator SCHMITT. The next two witnesses, will come forward together: Mr. Gerald Mossinghoff, Deputy General Counsel of NASA, and James E. Denny, Assistant General Counsel for Patents, Department of Energy.

If it is possible, please summarize your testimony. Your entire testimony will be made part of the committee record.

Mr. Mossinghoff?

STATEMENTS OF GERALD J. MOSSINGHOFF, DEPUTY GENERAL COUNSEL, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; AND JAMES E. DENNY, ASSISTANT GENERAL COUNSEL FOR PATENTS, DEPARTMENT OF ENERGY

Mr. MOSSINGHOFF. Senator Schmitt, I appreciate very much this opportunity to appear before the subcommittee to report to you on the patent policies of the National Aeronautics and Space Administration, on how these policies evolved and how they are carried out, and on the results they have produced. I hope that my report will be helpful to the subcommittee in its consideration of Federal patent policy and of S. 1215, the Science and Technology Research and Development Utilization Policy Act. I have provided to the subcommittee a more detailed statement on NASA's patent policies, which includes for the record a number of appendices.

Since early in NASA's history, our patent program has been viewed as an integral part of NASA's overall efforts to stimulate the creation and identification of new technology in our programs and to foster the utilization of this new technology in commercial applications.

The statutory basis of NASA's patent policies with respect to contractor inventions is section 305 of the National Aeronautics and Space Act of 1958, a provision which is unique among the various Federal statutes dealing with patent policy. Essentially, under that provision, NASA acquires title to all inventions made under its contracts unless the Administrator decides that the public interest would be served by waiving title to the contractor. No congressional guidelines were provided for the exercise of the broad waiver authority included in NASA's act.

NASA is required under section 305 to retain a broad royalty-free license to all inventions under contract, so waiver of title really amounts to a waiver of commercial rights only.

In implementing section 305, NASA's policies have evolved from an early approach, patterned closely after that of the former Atomic Energy Commission, to our present policies, which apply the criteria of the 1963 and 1971 presidential policy statements in determining when the public interest will be served by a waiver of commercial rights to the contractor.

Whenever NASA waives commercial rights to the contractor, as Mr. Johnson discussed, we retain what are referred to as "march-in rights" which assure that the invention is not suppressed and that the invention will be reasonably available to serve public health and safety needs. These march-in rights are in addition to the royalty-free Government license I referred to. NASA also retains

the right to void a waiver if the contractor fails to report to NASA on the efforts it is undertaking to commercialize the invention.

Although NASA has granted approximately 75 percent of the requests for waivers, the total number of requests for waivers is comparatively low, and thus, from a statistical viewpoint, I believe it is fair to characterize NASA as being essentially a "title in the Government" agency. As pointed out in the statistics included with my detailed statement, through 1978, 31,357 contractor inventions have been reported to NASA; title has been waived to 1,254 of those inventions, less than 4 percent.

Rights to inventions made by NASA employees are allocated in accordance with the criteria of Executive Order 10096, issued by President Truman in 1950. Those criteria take into account the relationship of the invention to the employee's job, the contribution by the Government to the making of the invention, and the Government's interest in the invention.

I believe there is general agreement both in and out of Government that the allocation of rights under the Executive order is fair and that the procedures, which include review of agency decisions by the Commissioner of Patents and Trademarks, work well.

One of the unique aspects of NASA's statutory authority regarding patents is the specific grant of authority to the Administrator to issue patent licensing regulations. In part because of that authority, NASA has been one of the leaders in Government over the past several years in developing and refining a patent licensing program.

Although the resources that the Office of General Counsel applies to the licensing program are limited in comparison with commercial patent licensing programs, the NASA patent licensing program is able to rely upon our extensive technology utilization program, which disseminates information regarding NASA inventions in many ways. The detailed procedures under which we grant licenses are described in my more detailed statement.

Our preference is to grant nonexclusive licenses under NASA patents unless we become convinced that limited exclusivity is required to stimulate investment in commercializing the invention. Exclusive licenses are granted only after public notice, and only after we can negotiate with the licensee a firm plan for the licensee's investment in and commercialization of the invention.

Notwithstanding the efforts of both the technology utilization program and the Office of General Counsel, the results of our licensing program have been disappointing, particularly with respect to NASA-owned inventions which were made under contract.

As documented in the statistics appended to my more detailed statement, 1,134 NASA-owned patents and patent applications on contractor inventions are available for licensing. We have recently requested reports on commercial use under each of NASA's patent licenses in effect at the end of last year. The results of the reports we received are set forth in appendix G to my detailed statement.

Based on the reports we have received to date and on a review of patent licenses no longer in effect, we have documented commercial use of 13 NASA-owned contractor inventions under patent licenses, 11 under nonexclusive licenses, and 2 under exclusive licenses. This amounts to a commercialization rate of slightly more

than 1 percent of these patented contractor inventions under NASA licenses. We are confident that many more of these are being commercialized, but not through the mechanism of a patent license from NASA.

Senator SCHMITT. What mechanism? Would you insert here what you think the mechanism is? Osmosis or what?

Mr. MOSSINGHOFF. I think, Senator, it depends heavily upon the efforts of the NASA technology utilization program, which, as you know, in many ways disseminates information regarding inventions made in the program—inventions and innovations made in the program.

There were studies done by Denver Research Institute, I believe, in 1977, which documented any number of inventions actually being used. The users commercialized the inventions, but did not use the NASA patent program. I do not think our patent program could be viewed fairly as a stimulus to getting the inventions used.

With respect to NASA employees' inventions on which NASA owns patents or patent applications, the results are similar, but somewhat more encouraging. With respect to 2,378 such patents or patent applications available for licensing, we are able to document 47 inventions which are being commercialized under licenses, for a rate of about 2 percent.

We believe, however, that several of the NASA employee inventions will prove to be quite significant, including, for example, the energy-saving power factor control system invented by Mr. Frank J. Nola of the Marshall Space Flight Center. Also, we are now in the process of granting licenses under NASA's patent on Ms. Barbara S. Askins' method of intensifying faint photographic images. Because of that invention, Ms. Askins, who is also from the Marshall Space Flight Center, was named the 1978 Inventor of the Year by the Association for the Advancement of Invention and Innovation.

The data which I have discussed refer to the number of inventions which have been commercialized under licenses. In many cases one invention is licensed to more than one company. There are, for example, 22 companies which have been licensed to practice Frank Nola's power factor controller. Through 1978, a total of 94 licensees have reported commercial use of 60 NASA-owned patented inventions.

As pointed out in appendix C to my more detailed statement, the commercialization rate of waived patented inventions—where the contractor has acquired title, commercial rights, to patents—is much higher than that of NASA-owned patented inventions and has been running at a consistent rate of about 18 to 20 percent.

Senator Schmitt, this concludes my summary statement. I would be pleased to respond to any questions you and the subcommittee may have.

[The statement follows:]

STATEMENT OF GERALD J. MOSSINGHOFF, DEPUTY GENERAL COUNSEL, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Mr. Chairman and members of the subcommittee, I appreciate this opportunity to appear before the Subcommittee to report to you on the patent policies of the National Aeronautics and Space Administration, on how these policies evolved and how they are now carried out, and on the results they have produced. I hope that

my report will be helpful to the Subcommittee in its consideration of Federal Patent Policy and of S. 1215, the "Science and Technology Research and Development Utilization Policy Act."

Since early in NASA's history, our patent program has been viewed as an integral part of NASA's overall efforts to stimulate the creation and identification of new technology in our programs and to foster the utilization of this new technology in commercial applications.

The NASA patent policies and the procedures implementing those policies are based on Section 305 of the National Aeronautics and Space Act of 1958 (the "Act") and to the extent not inconsistent with that section, on the Presidential Memorandum and Statement on Government Patent Policy (Appendix A) and Executive Order 10096.

Essentially, Section 305(a) of the Act provides that any invention conceived or first actually reduced to practice in the performance of any work under any NASA contract, upon prescribed determinations by the Administrator of NASA, becomes the exclusive property of the Government unless the Administrator determines that the interests of the United States will be served by waiving all or any part of the Government's rights under the provisions of Section 305(f) of the Act. Rights to inventions made by NASA employees are determined pursuant to Executive Order 10096, January 23, 1950, applied and administered by NASA in the same manner as other agencies covered by its provisions.

Other important sections of the Act include Section 305(b), which provides that each contract of NASA for the performance of any work shall contain effective provisions for the reporting of any invention, discovery, improvement or innovation made under the contract. This is the basis for the contract clauses (principally the "New Technology Clause") which specify the rights to inventions made under NASA contracts. Such clauses also include the reporting requirements for inventions and innovations made under contract to provide an input to NASA's patent and technology utilization programs.

NASA is also authorized, under Section 305(h) of the Act, to take all suitable and necessary steps to protect any invention or discovery for which it holds title, and to require contractors and persons who retain title to protect any license rights retained by NASA. Further, under Section 305(g) of the Act, NASA is authorized to license, pursuant to regulation, any invention which the Administrator holds title on behalf of the United States. Because this was one of the earliest grants of specific licensing authority, NASA has been one of the leading Government agencies in developing a patent licensing program.

NASA's waiver policy under Section 305(f) of the Act is implemented by the NASA Patent Waiver Regulations (Appendix B) which adopt the objectives and criteria set forth in the Presidential Memorandum and Statement. Among the important goals of our waiver policy are to provide an incentive to foster inventiveness and encourage reporting of inventions made under NASA contracts, to provide for the widest practicable dissemination of new technology resulting from NASA contracts, and to encourage the expeditious development of this new technology for commercial purposes.

Waiver of rights by the Administrator, which may be to an individual invention or a class of inventions, is granted upon recommendations of an Inventions and Contributions Board (ICB) established by the Administrator under Section 305(f) of the Act. The ICB consists of a Chairman and no less than six members appointed by the Administrator from within NASA. The ICB members are senior program officials, with background knowledge and experience in various scientific and technical disciplines. The ICB meets on a regular basis, at least monthly, to formulate recommendations on waivers, on the licensing of NASA inventions, and on monetary awards under Section 306 of the Act.

Historically, the first NASA waiver regulations, issued in 1959, were patterned to some extent after the approach followed by the former Atomic Energy Commission, which also was subject to similar statutory provisions in the nuclear energy field. In line with this approach, NASA's initial regulations provided generally that the Government would take title to inventions closely related to the new field of space technology.

As experience was gained, and NASA's concepts of how to best transfer technology emanating from its programs matured, the waiver criteria were reevaluated. For example, it became obvious that the fields of technology involved in the space program are of great breadth and diversity, involving the entire spectrum of science and technology. It also became apparent that, unlike the nuclear field, many of these fields of technology were not primarily funded or developed by the Government. Consequently, NASA initiated steps in 1962, including holding public hear-

ings, to revise its waiver regulations to provide more positive incentives for commercial utilization of inventions made under its contract. About the same time, however, efforts were undertaken to develop a Government-wide policy (which was ultimately announced in the 1963 Presidential Memorandum and Statement), and NASA decided to postpone revision to its waiver regulations to be able to assess the outcome of such efforts. In 1964, after determining that it had the authority under the waiver provisions of the Act, NASA issued regulations which adopted the criteria of the Presidential Memorandum and Statement. Similarly, when the Presidential Memorandum and Statement was revised in 1971, NASA also revised its waiver regulations.

All requests for waivers are considered by the NASA Inventions and Contributions Board and the ICB's findings and recommendations to grant or deny the waiver request are made for the Administrator, NASA. Two types of domestic waivers are possible: advance waivers, applicable to any or all inventions which may be made under a given contract (§ 1245.104 of the Patent Waiver Regulations); or waivers for individually identified inventions subsequently reported under a contract (§ 1245.105 of the Patent Waiver Regulations).

In general, the ICB will recommend grant of an advance waiver unless the contract work falls in one of the four areas proscribed by Section 1(a) of the Presidential Memorandum and Statement, and there is also a finding that the work called for under the contract is of the nature set forth in Section 1(b) of the Presidential Memorandum and Statement. The critieria for advance waivers also take into account the "exceptional circumstances" and "special situations" provisions of Sections 1(a) and 1(c), respectively, of the Presidential Memorandum and Statement.

The following examples of exceptional circumstances are further delineated in the NASA Patent Waiver Regulations (§ 1245.104(b)(2)): a contract where participation of the contractor may only be secured through the grant of waiver and such contractor is deemed essential to a NASA program; a contract having as a principal objective the application of aerospace related technology to other uses in accordance with an established NASA technology application program and where the grant of the waiver would materially advance this objective; or, a cooperative endeavor where the contract calls for a significant contribution of funds by the contractor to the work to be performed. Also, in the case of an individual invention identified prior to contract execution, exceptional circumstances may be found where waiver is a necessary incentive to call forth risk capital and expenditures to bring the invention to the point of practical or commercial application and where either the contractor has established substantial equities at his own expense in the development of the invention; or, the grant of an advance waiver will significantly advance availability of the invention to the general public.

Examples of special situations set forth in the Patent Waiver Regulations (§ 1245.104(d)(2)) include; a newly formed company having a definite program for establishing a nongovernmental commercial position in the field of the contract or an area directly related thereto; an established company lacking an established nongovernmental commercial position in the field of the contract or a directly related field, but having established plans and programs for achieving such a position; and an educational or nonprofit institution having a promulgated policy and an effective program for acquiring rights to inventions and for acting by itself or through others to bring the results of such inventions to commercial application.

The ICB will recommend grant of a waiver for an identified invention after reporting, providing it is able to make the specified findings (of § 1245.105 of the Patent Waiver Regulations) which are consistent with the guidelines of Section 1(a) of the Presidential Memorandum and Statement. Where such findings cannot be made, the ICB still may recommend grant for an identified invention where it finds that such waiver is a necessary incentive to call forth risk capital and expenditures to bring the invention to the point of practical or commercial application, or that the Government's contribution to the invention is small compared to that of the contractor.

Also, NASA will normally grant waiver of foreign rights when such waiver is consistent with the economic interests of the United States, and such waiver is either consistent with the grant of waiver of domestic rights or not in conflict with NASA's plans to seek foreign rights. The details of foreign waiver rights are set forth in § 1245.106 of the NASA Patent Waiver Regulations.

All waivers granted by NASA are subject to the retention by the Government of a broad, irrevocable royalty-free license and to what are referred to as "march-in rights." These march-in rights assure that the invention is not suppressed and that the invention will be reasonably available to serve public health and safety needs

and to satisfy requirements of governmental regulations. NASA also retains the right to void a waiver if the contractor fails to report to NASA on the efforts it is undertaking to commercialize the invention. NASA periodically conducts utilization studies on waiver inventions (see Appendix C) in order to monitor contractors' efforts in commercializing waived inventions, and maintains statistics on overall waiver activities (see Appendix D). In addition, all waiver recommendations and findings of the ICB are completely documented and made available to the public. The ICB publishes selected recommendations and findings in a NASA Handbook (NHB 5500.1A) which is updated annually.

NASA also has one of the most active programs of all the agencies to license its inventions for which it has acquired title. As previously noted, the NASA licensing program is based on Section 305(g) of the Act, which is implemented by NASA Domestic Patent Licensing Regulations (see Appendix E), and the Foreign Patent Licensing Regulations (see Appendix F). Both nonexclusive and exclusive licenses, where appropriate, are available in any country in which NASA has patent protection, although the policies and guidelines differ for domestic and foreign licenses.

NASA initially issued domestic patent licensing regulations in 1962, and for the first time in Government these provided for exclusive licensing by a Government agency in an effort to foster early commercial utilization of its inventions. During the next ten years, experience was gained in developing techniques necessary to further encourage commercial use through licensing. The early regulations were revised in 1972 to incorporate changes in policies and procedures to accelerate commercial use.

In order to inform the public of NASA technology available for licensing, NASA uses a variety of channels. Abstracts of NASA inventions available for licensing are announced in widely disseminated NASA publications such as NASA Tech Briefs (published by the NASA Technology Utilization Program), the NASA Scientific and Technical Aerospace Reports (STAR), and the NASA Patent Abstracts Bibliography (PAB). The National Technical Information Service (NTIS) also publishes a weekly journal entitled "Government Inventions for Licensing" which include abstracts and licensing information from NASA and other Government agencies. In addition, NASA inventions, together with other Government-owned inventions available for licensing, are listed in the Federal Register and the Official Gazette of the U.S. Patent and Trademark Office.

NASA also holds, or participates in, licensing conferences and workshops throughout the country to explain to interested parties NASA's and the Government's licensing programs. Also, the NASA Industrial Applications Centers under the NASA Technology Utilization Program, provide their client companies with lists and abstracts of NASA technical documents in specific fields of technology and disseminate abstracts of NASA inventions available for licensing and information on how to obtain licenses.

The specific criteria for granting either nonexclusive or exclusive licenses (for domestic patents and patent applications) are specifically set forth in 1245.202 and 1245.203 of the NASA Domestic Patent Licensing Regulations, and are summarized as follows.

Generally, all patent licenses are granted as an incentive to encourage commercialization of NASA inventions. Nonexclusive licenses are encouraged, but exclusive licenses may be granted when the commercialization of the invention requires a substantial investment of risk capital and a private manufacturer is unwilling to take the risk under a nonexclusive license.

In all cases, the licensee is required to achieve commercialization by a specified date (negotiated with the licensee), and thereafter to practice the invention for the term of the license, which is usually less than the term of the patent. Further, before grant of an exclusive license, there must be a determination made to the effect that the invention has not been brought to commercialization under a nonexclusive license, is not likely to occur under a nonexclusive license or by further Government funding, and that the exclusive license will provide the necessary risk capital to achieve commercial use of the invention. Royalties are not normally required for a nonexclusive license, but may be for an exclusive license.

In all situations, both for exclusive and nonexclusive licenses, consideration is given to small businesses, minority enterprises, and economically depressed, low-income or labor surplus areas.

Each application for a domestic license is initially reviewed in the Office of the General Counsel to determine the conformity and appropriateness of the application for license and the availability of the invention for the license requested. If the application conforms to the regulations and the license requested appears appropriate, the application is forwarded to the Inventions and Contributions Board for

further review and formal recommendation. The ICB then recommends to the Administrator whether a nonexclusive or exclusive license should be granted, and any special terms and conditions of the license.

If a determination is made to grant a nonexclusive license, the appropriate terms and conditions are negotiated by the Office of General Counsel. If the determination is made to grant an exclusive license, notice of this intent, along with the identification of the invention, licensee, and special terms and conditions, are published in the Federal Register. The exclusive license will be granted, unless, within 30 days of the notice, a statement is received from any person setting forth reasons why it would not be in the interests of the United States to grant the proposed license, or an application for a nonexclusive license is received which states that the applicant has brought, or, within a reasonable period of time, is likely to bring the invention to practical application.

NASA also obtains patent protection on selected, significant inventions in various foreign countries. These inventions are available for licensing from NASA in these countries. The basic objectives of the NASA foreign licensing program are to further the interests of the United States industry, enhance the economic interests of the United States, and advance the international relationships of the United States. Foreign licenses may be either exclusive or nonexclusive. When more than one applicant applies for a foreign license, preference is given to an applicant who has previously been granted a license for the invention in the United States. Also, foreign licenses require royalties or some other consideration deemed to be in the interests of the United States. (The overall statistics for the NASA Patent Licensing Program, including report on the commercialization of licensed inventions, are set forth in Appendix G.)

NASA evaluates all inventions for which it has the right, or may acquire the right, to file for a patent (as described in the NASA Patent Soliciting Manual, NHB 5109.7). This evaluation is basically a two-step process, and applies to both contractor inventions for which NASA has acquired title under Section 305(a) of the Act, and inventions of NASA's employees the rights to which have been acquired under Executive Order 10096.

The first step of the evaluation (basically a technological evaluation) is to determine the technical significance of the invention, its use by or for the Government, and its commercial potential. If this evaluation justifies further interest in the invention, it is then evaluated in terms of patentable novelty (basically a legal evaluation) to determine whether a patent can be obtained, and if so, its scope. Determinations to file for a patent are based on a composite of these two evaluations and are made by the Patent Counsel of the various NASA field installations. Also, once domestic patent applications are filed there is a review to determine whether or not foreign patent protection should be sought, and if so, in which countries. (Appendix H is a summary of NASA's patent filing activities, including the number of invention disclosures received and patent applications filed.)

As a further incentive to the reporting of inventions NASA also makes monetary awards for each invention on which a patent application has been filed. Such awards are made by the Administrator under the authority of Section 306 of the Act. They are made upon recommendation of the Inventions and Contributions Board, and may be made to either NASA employees or employees of its contractors. The amount of the award is based on an evaluation and the recommendations of the ICB, taking into consideration such factors as the technological significance of the invention, its value to NASA in carrying out its programs, and commercial use or potential of the invention. At least a minimum award is normally made for each filed patent application, but often greater awards are made based on the Board's evaluation and recommendation.

An additional unique feature of NASA's patent policy is provided by Section 305 (c), (d) and (e) of the Act. These provisions establish a procedure under which NASA reviews all patent applications pending in the U.S. Patent and Trademark Office on inventions which appear to the Commissioner "to have significant utility in the conduct of aeronautical and space activities," and also provides procedures for a hearing to establish title before the Board of Patent Interferences whenever the Administrator fo NASA believes that an invention not reported to NASA by a contractor was made under a NASA contract. This procedure has in the past provided NASA with an opportunity to identify and contest rights to significant aeronautical and space inventions not reported by its contractors. (A summary of the number of patent applications contested and the results is provided in Appendix I.)

Mr. Chairman, this concludes my detailed statement. I would be pleased to provide any additional information you may want or answer any questions you may have.

APPENDIXES

A. Presidential Memorandum and Statement on Government Patent Policy.
B. NASA Patent Waiver Regulations, 14 C.F.R. 1245.1.
C. Utilization Study on Waived Inventions.
D. Statistics on Overall Waiver Activities.
E. NASA Domestic Patent Licensing Regulations, 14 C.F.R. 1245.2.
F. NASA Foreign Patent Licensing Regulations, 14 C.F.R. 1245.4.
G. Statistics for NASA Patent Licensing Program.
H. Summary of NASA Patent Filing Activities.
I. Statistics for Activities Under Section 305 (c) and (d) of the Space Act.

APPENDIX A

THE WHITE HOUSE,
Washington, August 23, 1971.

Memorandum for heads of executive departments and agencies.

On October 10, 1963, President Kennedy forwarded to the Heads of Executive Departments and Agencies a Memorandum and Statement of Government Patent Policy for their guidance in determining the disposition of rights to inventions made under Government-sponsored grants and contracts. On the basis of the knowledge and experience then available, this Statement first established Government-wide objectives and criteria, within existing legislative constraints, for the allocation of rights to inventions between Government and its contractors.

It was recognized that actual experience under the Policy could indicate the need for revision or modification. Accordingly, a Patent Advisory Panel was established under the Federal Council for Science and Technology for the purpose of assisting the agencies in implementing the Policy, acquiring data on the agencies' operations under the Policy, and making recommendations regarding the utilization of Government-owned patents. In December 1965, the Federal Council established the Committee on Government Patent Policy to assess how this Policy was working in practice, and to acquire and analyze additional information that could contribute to the reaffirmation or modification of the Policy.

The efforts of both the Committee and Panel have provided increased knowledge of the effects of Government patent policy on the public interest. More specifically, the studies and experience over the past seven years have indicated that:

(*a*) A single presumption of ownership of patent rights to Government-sponsored inventions either in the Government or in its contractors is not a satisfactory basis for Government patent policy, and that a flexible Government-wide policy best serves the public interest;

(*b*) The commercial utilization of Government-sponsored inventions, the participation of industry in Government research and development programs, and commercial competition can be influenced by the following factors: the mission of the contracting agency; the purpose and nature of the contract; the commercial applicability and market potential of the invention; the extent to which the invention is developed by the contracting agency; the promotional activities of the contracting agency; the commercial orientation of the contractor and the extent of his privately financed research in the related technology; and the size, nature and research orientation of the pertinent industry;

(*c*) In general, the above factors are reflected in the basic principles of the 1963 Presidential Policy Statement.

Based on the results of the studies and experience gained under the 1963 Policy Statement certain improvements in the Policy have been recommended which would provide (1) agency heads with additional authority to permit contractors to obtain greater rights to inventions where necessary to achieve utilization or where equitable circumstances would justify such allocation of rights, (2) additional guidance to the agencies in promoting the utilization of Government-sponsored inventions, (3) clarification of the rights of States and municipal governments in inventions in which the Federal Government acquires a license, and (4) a more definitive data base for evaluating the administration and effectiveness of the Policy and the feasibility and desirability of further refinement or modification of the Policy.

I have approved the above recommendations and have attached a revised Statement of Government Patent Policy for your guidance. As with the 1963 Policy Statement, the Federal Council shall make a continuing effort to record, monitor and evaluate the effects of this Policy Statement. A Committee on Government

Patent Policy, operating under the aegis of the Federal Council for Science and Technology shall assist the Federal Council in these matters.

This memorandum and statement of policy shall be published in the Federal Register.

RICHARD NIXON.

Attachment.

STATEMENT OF GOVERNMENT PATENT POLICY

BASIC CONSIDERATIONS

A. The Government expends large sums for the conduct of research and development which results in a considerable number of inventions and discoveries.

B. The inventions in scientific and technological fields resulting from work performed under Government contracts constitute a valuable national resource.

C. The use and practice of these inventions and discoveries should stimulate inventors, meet the needs of the Government, recognize the equities of the contractor, and serve the public interest.

D. The public interest in a dynamic and efficient economy requires that efforts be made to encourage the expeditious development and civilian use of these inventions. Both the need for incentives to draw forth private initiatives to this end, and the need to promote healthy competition in industry must be weighed in the disposition of patent rights under Government contracts. Where exclusive rights are acquired by the contractor, he remains subject to the provisions of the antitrust laws.

E. The public interest is also served by sharing of benefits of Government-financed research and development with foreign countries to a degree consistent with our international programs and with the objectives of U.S. foreign policy.

F. There is growing importance attaching to the acquisition of foreign patent rights in furtherance of the interests of U.S. industry and the Government.

G. The prudent administration of Government research and development calls for a Government-wide policy on the disposition of inventions made under Government contracts reflecting common principles and agencies. The policy must recognize the need for flexibility to accommodate special situations.

POLICY

Section 1. The following basic policy is established for all Government agencies with respect to inventions or discoveries made in the course of or under any contract of any Government agency, subject to specific statutes governing the disposition of patent rights of certain Government agencies.

(a) Where:

(1) A principal purpose of the contract is to create, develop or improve products, processes, or methods which are intended for commercial use (or which are otherwise intended to be made available for use) by the general public at home or abroad, or which will be required for such use by governmental regulations; or

(2) A principal purpose of the contract is for exploration into fields which directly concern the public health, public safety, or public welfare; or

(3) The contract is in a field of science or technology in which there has been little significant experience outside of work funded by the Government, or where the Government has been the principal developer of the field, and the acquisition of exclusive rights at the time of contracting might confer on the contractor a preferred or dominant position; or

(4) The services of the contractor are: (i) for the operation of a Government-owned research of production facility; or (ii) for coordinating and directing the work of others,

The Government shall normally acquire or reserve the right to acquire the principal or exclusive rights throughout the world in and to any inventions made in the course of or under the contract.

In exceptional circumstances the contractor may acquire greater rights than a nonexclusive license at the time of contracting where the head of the department or agency certifies that such action will best serve the public interest. Greater rights may also be acquired by the contractor after the invention has been identified where the head of the department or agency determines that the acquisition of such greater rights is consistent with the intent of this Section 1(a) and is either a necessary incentive to call forth private risk capital and expense to bring the invention to the point of practical application or that the Government's contribution to the invention is small compared to that of the contractor. Where an identified invention made in the course of or under the contract is not a primary object of the

contract, greater rights may also be acquired by the contractor under the criteria of Section 1(c).

(b) In other situations, where the purpose of the contract is to build upon existing knowledge or technology, to develop information, products, processes, or methods for use by the Government, and the work called for by the contract is in a field of technology in which the contractor has acquired technical competence (demonstrated by factors such as know-how, experience, and patent position) directly related to an area in which the contractor has an established nongovernmental commercial position, the contractor shall normally acquire the principal or exclusive rights throughout the world in and to any resulting inventions.

(c) Where the commercial interests of the contractor are not sufficiently established to be covered by the criteria specified in Section 1(b) above, the determination of rights shall be made by the agency after the invention has been identified, in a manner deemed most likely to serve the public interest as expressed in this policy statement, taking particularly into account the intentions of the contractor to bring the invention to the point of commercial application and the guidelines of Section 1(a) hereof, provided that the agency may prescribe by regulation special situations where the public interest in the availability of the inventions would best be served by permitting the contractor to acquire at the time of contracting greater rights than a nonexclusive license.

(d) In the situations specified in Sections 1(b) and 1(c), when two or more potential contractors are judged to have presented proposals of equivalent merit, willingness to grant the Government principal or exclusive rights in resulting inventions will be an additional factor in the evaluation of the proposals.

(e) Where the principal or exclusive rights in an invention remain in the contractor, he should agree to provide written reports at reasonable intervals, when requested by the Government, on the commercial use that is being made or is intended to be made of inventions made under Government contracts.

(f) Where the principal or exclusive rights in an invention remain in the contractor, unless the contractor, his licensee, or his assignee has taken effective steps within three years after a patent issues on the invention to bring the invention to the point of practical application or has made the invention available for licensing royalty-free or on terms that are reasonable in the circumstances, or can show cause why he should retain the principal or exclusive rights for a further period of time, the Government shall have the right to require the granting of a nonexclusive or exclusive license to a responsible applicant(s) on terms that are reasonable under the circumstances.

(g) Where the principal or exclusive rights to an invention are acquired by the contractor, the Government shall have the right to require the granting of a nonexclusive or exclusive license to a responsible applicant(s) on terms that are reasonable in the circumstances (i) to the extent that the invention is required for public use by governmental regulations, or (ii) as may be necessary to fulfill health or safety needs, or (iii) for other public purposes stipulated in the contract.

(h) Whenever the principal or exclusive rights in an invention remain in the contractor, the Government shall normally acquire, in addition to the rights set forth in Sections 1(e), 1(f), and 1(g),

(1) at least a nonexclusive, nontransferable, paid-up license to make, use, and sell the invention throughout the world by or on behalf of the Government of the United States (including any Government agency) and States and domestic municipal governments, unless the agency head determines that it would not be in the public interest to acquire the license for the States and domestic municipal governments; and

(2) the right to sublicense any foreign government pursuant to any existing or future treaty or agreement if the agency head determines it would be in the national interest to acquire this right; and

(3) the principal or exclusive rights to the invention in any country in which the contractor does not elect to secure a patent.

(i) Whenever the principal or exclusive rights in an invention are acquired by the Government, there may be reserved to the contractor a revocable or irrevocable nonexclusive royalty-free license for the practice of the invention throughout the world; an agency may reserve the right to revoke such license so that it might grant an exclusive license when it determines that some degree of exclusivity may be necessary to encourage further development and commercialization of the invention. Where the Government has a right to acquire the principal or exclusive rights to an invention and does not elect to secure a patent in a foreign country, the Government may permit the contractor to acquire such rights in any foreign coun-

try in which he elects to secure a patent, subject to the Government's rights set forth in Section 1(h).

Section 2. Under regulations prescribed by the Administrator of General Services, Government-owned patents shall be made available and the technological advances covered thereby brought into being in the shortest time possible through dedication or licensing, either exclusive or nonexclusive, and shall be listed in official Government publications or otherwise.

Section 3. The Federal Council for Science and Technology in consultation with the Department of Justice shall prepare at least annually a report concerning the effectiveness of this policy, including recommendations for revision or modification as necessary in light of the practices and determinations of the agencies in the disposition of patent rights under their contracts. The Federal Council for Science and Technology shall continue to

(a) develop by mutual consultation and coordination with the agencies common guidelines for the implementation of this policy, consistent with existing statutes, and to provide overall guidance as to disposition of inventions and patents in which the Government has any right or interest; and

(b) acquire data from the Government agencies on the disposition of patent rights to inventions resulting from federally financed research and development and on the use and practice of such inventions to serve as bases for policy review and development; and

(c) make recommendations for advancing the use and exploitation of Government-owned domestic and foreign patents.

Each agency shall record the basis for its actions with respect to inventions and appropriate contracts under this statement.

Section 4. Definitions: As used in this policy statement, the stated terms in singular and plural are defined as follows for the purposes hereof:

(a) Government agency: includes any executive department, independent commission, board, office, agency, administration, authority, Government corporation, or other Government establishment of the executive branch of the Government of the United States of America.

(b) States: means the States of the United States, the District of Columbia, Puerto Rico, the Virgin Islands, American Samoa, Guam and the Trust Territory of the Pacific Islands.

(c) Invention, or invention or discovery: includes any art, machine, manufacture, design, or composition of matter, or any new and useful improvement thereof, or any variety of plant, which is or may be patentable under the Patent Laws of the United States of America or any foreign country.

(d) Contractor: means any individual, partnership, public or private corporation, association, institution, or other entity which is a party to the contract.

(e) Contract: means any actual or proposed contract, agreement, grant, or other arrangement, or subcontract entered into with or for the benefit of the Government where a purpose of the contract is the conduct of experimental, developmental, or research work.

(f) Made: when used in relation to any invention or discovery means the conception or first actual reduction to practice of such invention in the course of or under the contract.

(g) To the point of practical application: means to manufacture in the case of a composition or product, to practice in the case of a process, or to operate in the case of a machine and under such conditions as to establish that the invention is being worked and that its benefits are reasonably accessible to the public.

Appendix B

Federal Register

Thursday, November 3, 1977

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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PATENT WAIVER REGULATIONS

14 CFR 1245.1

Reprint from Pages 57449-57454
of the Federal Register
Volume 42 No. 212

Title 14—AERONAUTICS AND SPACE

CHAPTER V—NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PART 1245—PATENTS

Subpart 1—Patent Waiver Regulations

AGENCY: National Aeronautics and Space Administration.

ACTION: Final regulations.

SUMMARY: The National Aeronautics and Space Administration (NASA) finalizes revision to its Patent Waiver Regulations. This revision, along with revisions to the NASA Procurement Regulations (NASA PR 9-107 and 9-109; PRD 76-14) provides greater uniformity, to the extent consistent with the requirements of section 305 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2457), between certain policies, practices, and procedures followed by NASA and other agencies in the implementation of the revised Presidential Memorandum and Statement of Government Patent Policy, August 23, 1971 (36 FR 16887-16892).

EFFECTIVE DATE: November 3, 1977.

ADDRESS: General Counsel, National Aeronautics and Space Administration, Washington, D.C. 20546.

FOR FURTHER INFORMATION CONTACT:

Robert P. Kempf, 202-755-3932.

SUPPLEMENTARY INFORMATION: On May 18, 1977, a notice of proposed revisions to the NASA Patent Waiver Regulations was published in the FEDERAL REGISTER (42 FR 25508-25513). The purpose of the revision is (1) to uniformly adopt, to the extent consistent with statute, the policies, practices, and procedures in implementing the aforesaid Presidential Statement, (2) modify certain internal handling procedures for waiver petitions submitted to NASA, and (3) set forth NASA's policy with respect to waiver under contracts for research, development, or demonstration work awarded by NASA on behalf of the Energy Research and Development Administration (ERDA) (or successor agencies). Interested parties were permitted 30 days to submit written comments regarding the proposed revisions. Consideration has been given to all material received and changes have been made as follows:

Section 1245.104(b)(1) has been modified to make it clear that advanced waivers apply to inventions "reported under the terms of the contract," thereby insuring consistency with the invention rights clause contained in the contract.

Sections 1245.104(g) and 1245.105(a)(3) have been modified to clarify the applicability of waivers to any division or continuation patent applications.

Section 1245.112(b)(4) has been amended to require the Inventions and Contributions Board to promptly notify the petitioner of its proposed recommendation to the Administrator.

The revised Patent Waiver Regulations are hereby adopted and shall become effective on November 3, 1977.

Subpart 1 is revised in its entirety as follows:

Subpart 1—Patent Waiver Regulations

Sec.
1245.100 Scope.
1245.101 Applicability.
1245.102 Definitions and terms.
1245.103 Policy.
1245.104 Advance waivers.
1245.105 Waiver after reporting inventions.
1245.106 Waiver of foreign rights.
1245.107 Reservations.
1245.108 License to contractor.
1245.109 Revocation and withdrawability of waivers.
1245.110 Content of petitions.
1245.111 Submission of petitions.
1245.112 Notice of proposed Board action and reconsideration.
1245.113 Hearing procedure.
1245.114 Findings and recommendation of the Board.
1245.115 Action of the Administrator.
1245.116 Filing of patent applications and reimbursement of costs.
1245.117 Publication and record of decisions.

AUTHORITY: 42 U.S.C. 2457.

Subpart 1—Patent Waiver Regulations

§ 1245.100 Scope.

This Subpart 1 prescribes regulations for the waiver of rights of the United States to inventions made under NASA contract.

§ 1245.101 Applicability.

The provisions of the subpart apply to all inventions made or which may be made under conditions enabling the Administrator to determine that the rights therein reside in the United States pursuant to section 305(a) of the National Aeronautics and Space Act of 1958, as amended (42 U.S.C. 2457(a)).

§ 1245.102 Definitions and terms.

As used in this subpart:

(a) "Contract" means any actual or proposed contract, agreement, understanding, or other arrangement with the National Aeronautics and Space Administration (NASA) or another Government agency on NASA's behalf, including any assignment, substitution of parties or subcontract executed or entered into thereunder, and including NASA grants awarded under the authority of 42 U.S.C. 1891-1893.

(b) "Contractor" means the party who has undertaken to perform work under a contract or subcontract.

(c) "Invention" includes any art, method, process, machine, manufacture, design, or composition of matter, or any new and useful improvement thereof, or any variety of plant, which is or may be patentable under the Patent Laws of the United States of America or any foreign country.

(d) "Made," when used in relation to any invention, means the conception or first actual reduction to practice of such invention.

(e) "To the point of practical application" means to manufacture in the case of a composition or product, to practice in the case of a process, or to operate in the case of a machine, and under such conditions as to establish that the invention is being worked and that its benefits are reasonably assessible to the public.

(f) "Board" means the NASA Inventions and Contributions Board established by the Administrator of NASA within the Administration under section 305(f) of the National Aeronautics and Space Act of 1958, as amended (42 U.S.C. 2457(f)).

(g) "Chairman" means Chairman of the NASA Inventions and Contributions Board.

(h) "Petitioner" means a contractor or prospective contractor who requests that the Administrator waive rights in an invention or class of inventions made or which may be made under a NASA contract. In the case of an identified invention, the petitioner may be the inventor(s).

(i) "Government agency" includes any executive department, independent commission, board, office, agency, administration, authority, Government corporation, or other Government establishment of the executive branch of the Government of the United States of America.

(j) "States and domestic municipal governments" means the States of the United States, the District of Columbia, Puerto Rico, the Virgin Islands, American Samoa, Guam, the Trust Territory of the Pacific Islands, and any political subdivision and agencies thereof.

(k) "Administrator" means the Administrator of the National Aeronautics and Space Administration or his duly authorized representative.

§ 1245.103 Policy.

(a) In implementing the provisions of section 305(f) of the National Aeronautics and Space Act of 1958, as amended (42 U.S.C. 2457(f)) and in determining when the interests of the United States would be served by waiver of all or any part of the rights of the United States in inventions made in the performance of work under NASA contracts, the Administrator will be guided by the objectives set forth in the National Aeronautics and Space Act of 1958, as amended (42 U.S.C. 2451-2477) and by the basic policy of the revised Presidential Memorandum and Statement of Government Patent Policy issued August 23, 1971 (36 FR 16887-16892). Among the most important goals thereof are to provide incentives to foster inventiveness and encourage reporting of inventions made under NASA contracts, to provide for

the widest practicable dissemination of new technology resulting from NASA activities, and to promote early utilization, continuous development, and continued availability of this new technology for commercial purposes and the public benefit. In applying this regulation both the need for incentives to draw forth private initiatives and the need to promote healthy competition in industry must be weighed.

(b) Several different situations when waiver of all or any part of the rights of the United States may be requested are prescribed in §§ 1245.104–1245.106. Under § 1245.104, advance waiver of rights to any or all of the inventions which may be made under a contract may be requested prior to the execution of the contract, or within 30 days after execution of the contract. Waiver of rights to an identified invention made and reported under a contract may be requested under any of these provisions even though a request under a different provision was not made, or if made, was not granted. Waiver of foreign rights under § 1245.106 may be requested concurrently with domestic rights or independently thereof.

(c) With respect to inventions which may be or are made or conceived in the course of or under contracts for research, development or demonstration work awarded by NASA on behalf of the Department of Energy (DOE) or in support of an DOE program, on a reimbursable basis pursuant to agreement between DOE and NASA, the waiver policy, regulations, and procedures of DOE will be applied. (See § 1245.110(e), § 1245.111 (b).)

§ 1245.104 Advance waivers.

(a) The provisions of this § 1245.104 apply to petitions for waiver of domestic rights to any or all of the inventions which may be made under a contract. Such petitions may be submitted by the contractor prior to its execution of the contract or within 30 days thereafter.

(b) (1) The Board shall recommend to the Administrator that waiver of domestic rights to any or all of the inventions which may be made under the NASA contract involved be granted when the Board makes each of the findings of paragraphs (c) and (d) of this section and concludes that the interest of the United States would be served thereby. Such waiver shall apply to inventions reported under the terms of the contract and which are designated at the time of reporting as being an invention on which the waiver recipient intends to file or has filed a U.S. patent application.

(2) When the Board is unable to make one or more of the findings to support a waiver under paragraph (c) of this section as to the contract but nevertheless finds that exceptional circumstances exist so that the public interest would best be served by a waiver of rights to any or all of the inventions which may be made under the contract, the Board shall recommend to the Administrator that waiver be granted (conditions of paragraph (d) of this section are not relevant to the Board's findings under this subparagraph). A finding of exceptional circumstances shall be accompanied by a discussion of the rationale therefor. Examples of exceptional circumstances would include: A contract where participation of the contractor may only be secured through the grant of waiver and such contractor is deemed essential to a NASA program objective; a contract having as a principal objective the application of aerospace related technology to other uses in accordance with an established NASA technology application program and where the grant of waiver would materially advance this objective; or, a cooperative endeavor where the contract calls for a significant contribution of funds by the contractor to the work to be performed. In the case of an invention which is identified prior to execution of the contract, exceptional circumstances may also be found where waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical or commercial application and where either (i) the contractor has established substantial equities at its own expense in the development of the invention; or, (ii) the grant of advance waiver will significantly advance the availability of the invention to the general public.

(c) (1) It is not a principal purpose of the contract to create, develop or improve products, processes, or methods which are intended for commercial use (or which are otherwise intended to be made available for use) by the general public at home or abroad, or which will be required for such use by governmental regulations.

(2) It is not a principal purpose of the contract to explore into fields which directly concern the public health, public safety, or public welfare.

(3) The contract is not in a field of science or technology in which there has been little significant experience outside of work funded by the Government, or where the Government has been the principal developer of the field, and the acquisition of exclusive rights at the time of contracting would not likely confer on the petitioner a preferred or dominant position.

(4) The contract is not for services of the petitioner for (i) the operation of a Government owned research or production facility; or (ii) coordinating and directing the work of others.

(d) (1) The purpose of the contract is to build upon existing knowledge or technology, to develop information, products, processes, or methods for use by the Government.

(2) The work called for by the contract is in a field of technology in which the petitioner has acquired technical competence (demonstrated by factors such as know-how, experience, and patent position), and either (i) the work is directly related to an area in which the petitioner has an established nongovernmental commercial position; or (ii) the commercial position of the petitioner is not sufficiently established, but a special situation exists such that the public interest in the availability of inventions would best be served by a waiver of rights to the petitioner. Such special situations include, but are not limited to the following:

(i) A newly formed company having a definite program for establishing a nongovernmental commercial position in the field of the contract or in an area directly related thereto.

(ii) An established company lacking an established nongovernmental commercial position in the field of the contract or a directly related field, but having established plans and programs for achieving such a position.

(iii) An educational or nonprofit institution having a promulgated policy and an effective program for acquiring rights to inventions and for acting by itself or through others to bring the results of such inventions to commercial application.

(e) When a petition for waiver is submitted pursuant to paragraph (a) of this section, prior to contract execution, it will be processed expeditiously so that a decision on the petition may be reached prior to execution of the contract. However, if there is insufficient time or insufficient information is presented, or for other reasons which do not permit a recommendation to be made without unduly delaying execution of the contract, the Board will inform the contracting officer that no recommendation has been made and the reason therefor. The contracting officer will then notify the petitioner of the Board's action.

(f) After notification by the contracting officer under paragraph (e) of this section; the petitioner may, upon its execution of the contract, or within 30 days thereof, request the Board to reconsider the matter under paragraph (b) of this section either on the record or with any additional statements submitted in support of the original petition.

(g) A waiver granted pursuant to a petition submitted under this § 1245.104 shall apply only to those inventions reported under the terms of the applicable contract and which are designated at the time of reporting as being an invention on which the petitioner intends to file or has filed a U.S. patent application. The waiver shall extend to the claimed invention of any division or continuation of the patent application filed on the reported invention provided the claims of the subsequent application do not substantially change the scope of the reported invention.

(h) A waiver granted pursuant to a petition submitted under this § 1245.104 shall extend to any contract changes, modifications, or supplemental agreements, so long as the purpose of the contract or the scope of work to be performed is not substantially changed.

§ 1245.105 Waiver after reporting inventions.

(a) (1) The provisions of this § 1245.105 apply to petitions for waiver of domestic rights to identified inventions which have been reported to NASA and to which a waiver of rights has not been

granted pursuant to § 1245.104. A petition for waiver under this section should be filed promptly after the reporting of the invention to NASA, and must be submitted prior to the filing by NASA of a U.S. patent application claiming the reported invention.

(2) A waiver granted pursuant to this section shall extend to the claimed invention of any division or continuation of that patent application filed on the reported invention provided the claims of the subsequent application do not substantially change the scope of the reported invention.

(b) The Board shall recommend to the Administrator that waiver of domestic rights to an identified invention be granted where the Board makes all of the findings below and concludes that the interest of the United States would be served thereby:

(1) The invention is not directly related to a governmental program for creating, developing, or improving products, processes, or methods for use by the general public at home or abroad.

(2) The invention is not likely to be required by governmental regulations for use by the general public at home or abroad.

(3) The invention does not directly concern the public health, public safety, or public welfare.

(4) The invention is not in a field of science or technology in which there has been little significant experience outside of work funded by the Government, or where the Government has been the principal developer of the field, and the acquisition of exclusive rights in the invention would not likely confer on the petitioner a preferred or dominant position.

Provided, that the Board also finds in view of the petitioner's plans and intentions to bring the invention to the point of practical application, and the activities of the Government, the incentives provided by waiver will increase the likelihood that the benefits of the invention would be readily available to the public at an early date.

(c) If the Board is unable to make one of the findings to support a waiver under paragraph (b) (1) through (4) of this section, the Board may nevertheless recommend that waiver of domestic rights be granted by the Administrator if the Board further finds that such waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical application, or that the Government's contribution to the invention is small compared to that of the contractor.

§ 1245.106 Waiver of foreign rights.

(a) The Board will consider the waiver of domestic and foreign rights concurrently when so requested by the petitioner in accordance with § 1245.110(d). Where the Board makes the findings necessary to support a waiver of domestic rights, the petitioner will normally be granted the right to secure patents in any country in which it elects to file provided that the grant of such right is consistent with the economic interests of the United States. The Board may also recommend the grant of only foreign rights, in accordance with the guidelines of paragraph (b) of this section, when the interests of the United States will best be served thereby.

(b) The Board will also consider a separate request for the waiver of the right to secure a patent in any country in which the petitioner elects to file as to an identified invention when so requested by the petitioner in accordance with § 1245.110(d). Waiver of such foreign rights will normally be granted in countries in which the Administrator does not desire to file an application for patent provided that the grant of such rights is consistent with the economic interests of the United States.

(c) When the Administrator determines that it is in the best interest of the Government and the petitioner to withhold the release or publication of information on an invention for which the petitioner has requested waiver and is to file foreign patent applications thereon, NASA may agree, upon written request by the petitioner, to use its best efforts to withhold publication until a patent application is filed thereon, but in no event shall the Government or its employees be liable for any publication thereof.

§ 1245.107 Reservations.

(a) With respect to any particular invention, each waiver of domestic or foreign rights granted shall be subject to the reservation of an irrevocable, nonexclusive, non-transferable, royalty-free license for the practice of the invention throughout the world by or on behalf of the U.S. Government or any agency thereof, any foreign government pursuant to any existing or future treaty or agreement with the United States, or States and/or domestic municipal governments unless the Administrator determines, based upon a recommendation of the Board, that it would not be in the public interest to acquire the license for States and/or domestic municipal governments.

(b) With respect to any particular invention, each waiver of domestic rights granted shall be subject to the reservation by the Administrator of the right to require the granting of a nonexclusive or exclusive license for the practice of the invention to any responsible applicant on terms that are reasonable under the circumstances:

(1) Unless the waiver recipient, its licensees, or assigns have taken effective steps within 3 years after a U.S. patent issues on the invention to bring the invention to the point of practical application and thereafter continue to work the invention and make its benefits reasonably accessible to the public; or

(2) Unless within 3 years after a U.S. patent issues on the invention, the waiver recipient, its licensee, or its assigns have made the invention available for licensing royalty-free or on terms that are reasonable in the circumstances; or

(3) To the extent that the invention is required for public use by governmental regulations or as may be necessary to fulfill health, safety, or welfare needs, or for other public purposes stipulated in the contract.

(c) With respect to any particular invention, each waiver granted for domestic or foreign rights shall be subject to the reservation by the Administrator of the right to require refund of any amounts received as royalty charges on the waived invention in procurements for or on behalf of the Government and to provide for that refund in any instrument transferring rights to any party in the waived invention.

(d) With respect to any particular invention, each waiver granted for domestic or foreign rights shall be subject to any other reservations called for by the Administrator on the grant of the petition.

(e) The waiver recipient shall be given an opportunity to show cause before the Board why it should not be required to grant a license under paragraph (b) of this section or why it should retain the principal or exclusive rights as provided by waiver for a further period of time.

§ 1245.108 License to contractor.

Each contractor reporting an invention is granted a license for each filed patent application and any resulting patent in which the Government acquires title of the scope and on the terms and conditions specified in the NASA Licensing Regulations (14 CFR 1245.204(a)).

§ 1245.109 Revocation and voidability of waivers.

(a) If the waiver recipient fails to file a domestic or foreign patent application on any waived invention within the prescribed time periods, or decides not to continue prosecution of any such patent application, or to pay any of the required maintenance fees, or for any reason decides not to retain title to any such patent application or any patent issued thereon, the waiver recipient shall notify the Chairman and shall, upon request, convey to NASA the entire right, title, and interest in the invention, and to any corresponding patent application or patent. The conveyance shall be made by delivering to the Chairman duly executed instruments (prepared by the Government) and, if applicable, such other papers as are deemed necessary to vest in the Government the entire right, title, and interest in the invention and any corresponding patent application. In addition, any waiver of rights (domestic or foreign) shall be voidable as set forth in paragraphs (b)-(d) of this section.

(b) With respect to any particular invention, each waiver of domestic rights shall be voidable at the option of the Administrator unless:

(1) Within 8 months from the date of reporting an invention under a contract subject to a waiver granted pursuant to § 1245.104, or 6 months from the date of the granting by the Administrator of a waiver pursuant to § 1245.105, or such longer periods as may be approved by NASA for good cause shown, the waiver

recipient causes an application for U.S. Letters Patent to be filed disclosing and claiming the invention and shall include as the first paragraph of the specification following the abstract, the statement:

The invention described herein was made in the performance of work under NASA Contract No. ..... and is subject to the provisions of section 305 of the National Aeronautics and Space Act of 1958 (72 Stat. 435; 42 U.S.C. 2457).

(2) Within 2 months after such filing or within 2 months after the date of the grant of waiver if such patent application previously has been filed, the waiver recipient delivers to the Chairman a copy of such application including the filing date and serial number.

(3) Within 6 months after such filing, or within 6 months after the grant of waiver if a patent application has been previously filed, the waiver recipient delivers to the Chairman a duly executed and approved instrument prepared by the Government, fully confirmatory of all the rights to which the Government is entitled, and provide the Administrator an irrevocable power to inspect and make copies of the patent application.

(4) The waiver recipient furnishes to the Chairman a copy of the patent within 2 months after the patent is issued on such application.

(5) The waiver recipient notifies the Chairman not less than 30 days before the expiration of the initial response period for any action required by the Patent and Trademark Office of any decision not to continue prosecution of the application and delivers to the Chairman executed instruments granting the Government a power of attorney to prosecute the application.

(6) The waiver recipient grants any license which the Administrator may require pursuant to § 1245.107.

(7) The waiver recipient files a utilization report with the Board, upon NASA's written request, not more often than annually. Such report shall set forth in detail the steps taken by the waiver recipient or its transferee regarding the progress, development, application, and commercial use being made and that is intended to be made of the waived invention.

(8) The waiver recipient notifies the Chairman in not less than 60 days prior to any transfer of principal rights in such invention to any party, and submits a statement of the transferee's development and commercialization plans to bring the invention to the point of practical application. Such statement should accompany the notification or it may be submitted in not less than 30 days prior to the transfer of rights. The statement must show to the Board's satisfaction that the property rights in the transferee will increase the likelihood that the benefits of the invention would be made readily available to the public at an early date.

(9) The waiver recipient complies with any other terms and conditions called for by the Administrator with respect to the grant of the petition.

(c) With respect to any particular invention, each waiver granted shall be voidable at the option of the Administrator if a patent claiming such invention is held, in a final determination, to have been used in violation of the antitrust laws in any suit, action, or proceeding brought before a properly constituted authority authorized to hear such matter.

(d) With respect to any particular invention, waiver of foreign rights as to any foreign country shall be voidable at the option of the Administrator unless:

(1) A patent application is filed in the country within 8 months from the date a corresponding U.S. application is filed, or 8 months from the date a license is granted by the Commissioner of Patents and Trademarks to file foreign applications where such filing has been prohibited for security reasons, or such longer periods as may be expressly approved by the Administrator;

(2) The waiver recipient furnishes to the Chairman the identifying serial number and filing date of each foreign patent application filed promptly upon receipt thereof; and, upon request, a copy of an English version of the foreign application without additional compensation and a copy of the foreign patents;

(3) The waiver recipient executes and furnishes to the Chairman instruments fully confirmatory of the rights herein reserved by the Government; and

(4) The waiver recipient, in the event it elects not to continue prosecution of any foreign application filed on such invention or if it intends to abandon a foreign patent by the nonpayment of a maintenance tax, notifies the Chairman within sufficient time to allow assumption of prosecution by the Government, or payment of the maintenance tax, respectively, and delivers to the Chairman such duly executed instruments as are necessary to vest in the Administrator title thereto, including an instrument of assignment.

§ 1245.110 Content of petitions.

(a) **General contents and forms.** Forms which may be used in petitioning for waiver and for filing utilization reports are available from the NASA Inventions and Contributions Board, National Aeronautics and Space Administration, Washington, D.C. 20546. Each request for waiver of domestic or foreign rights under § 1245.104, § 1245.105, or § 1245.106 shall be by petition to the Administrator and shall include:

(1) An identification of the petitioner, its place of business and address, and if the petitioner is represented by counsel, the name, address, and telephone number of the counsel;

(2) An identification by number of the pertinent NASA contract or proposed contract;

(3) The nature and extent of the rights desired and a citation to the section under which the petition is submitted; and

(4) The signature of the petitioner or its authorized representative, and date of signature.

(b) **Petitions for advance waiver under § 1245.104.** In addition to the information specified in paragraph (a) of this section, each petition for waiver under § 1245.104 shall include:

(1) A copy of the statement of work of the pertinent NASA contract or proposed contract;

(2) A full and detailed statement of facts sufficient to enable the Board to make the findings regarding the contract and the petitioner as specified in § 1245.-104 and, if applicable, whether exceptional circumstances of § 1245.104(b) and/or special situations under § 1245.-104(d)(2) are present; and

(3) The date of contractor's execution of the contract, if the petition is filed subsequent to contract execution.

(c) **Petitions for waiver for identified inventions under § 1245.105.** A separate petition shall be submitted for each identified invention except as provided by § 1245.105(a)(2). In addition to the information specified in paragraph (a) of this section, such petition shall include:

(1) The full names of all inventors;

(2) A statement whether a patent application has been filed on the invention, together with a copy of such application if filed; or, if not filed, a complete description of the invention;

(3) If a patent application has not been filed, any information which may indicate a potential statutory bar to the filing of a patent application under 35 U.S.C. 102 or a statement that no bar is known to petitioner to exist;

(4) A full and detailed statement of facts sufficient to enable the Board to make the findings regarding the invention as specified in § 1245.105 (b) or (c);

(5) Where principal rights in the waived invention are to be transferred to another party, a statement identifying such party and its relationship to the petitioner; and

(6) Where the petitioner(s) is the inventor(s), a statement in writing from the contractor that the contractor will not request waiver of rights and authorization of the contractor.

(d) **Petitions for waiver of foreign rights under § 1245.106.** A petition for waiver of foreign rights may accompany and be a part of a petition for waiver of domestic rights under either § 1245.104 or § 1245.105, or a petition for foreign rights may be submitted independently of any request for domestic rights under § 1245.106(b). In addition to the information specified in paragraph (a) of this section, petition for waiver of foreign rights shall include, where feasible, a denomination of the foreign countries in which petitioner elects to secure or intends to file patent applications, and its plans and intentions to practice and/or license the invention in such countries.

(e) **Petitions for waiver under § 1245.-103(c).** Contents of the petition shall normally be as prescribed by the other Government agency, and petitioner may use any forms provided by such agency.

§ 1245.111 Submission of petitions.

(a) Petitions for advance waiver of domestic rights under § 1245.104 or advance waiver of foreign rights under § 1245.108 presented prior to contract execution must be submitted to the contracting officer. Any such petitions submitted by organizations selected for negotiation of a contract will be processed and forwarded to the Board for consideration as specified in the NASA Procurement Regulations (41 CFR 18-9.109-6(e)). All other petitions shall be submitted directly to the Inventions and Contributions Board, National Aeronautics and Space Administration, Washington, D.C. 20546.

(b) Any waiver petitions submitted under § 1245.103(c) should be forwarded to the NASA field installation patent counsel for transmittal to DOE for processing.

§ 1245.112 Notice of proposed Board action and reconsideration.

(a) Notice. Except as provided by § 1245.104(c) the Board will notify the petitioner through the contracting officer for petitions for advance waiver prior to contract execution, and directly for all others:

(1) Whether it proposes to recommend to the Administration that the petition be:

(i) Granted in the extent requested;

(ii) Granted in an extent different from that requested; or

(iii) Denied.

(2) Of the reasons for any recommended action adverse to or different from the waiver of rights requested by the petitioner.

(b) Request for reconsideration and statements required.

(1) If, pursuant to paragraph (a) of this section, the Board notifies the petitioner that the Board proposes to recommend action adverse to or different from the waiver requested, the petitioner may, within such period as the Board may set, but not less than 15 days from such notification, request reconsideration by the Board.

(2) If reconsideration has been requested within the prescribed time, the petitioner shall, within 30 days from the date of the request for reconsideration, or within such other time as the Board may set, file a statement setting forth the points, authorities, arguments, and any additional material on which it relies.

(3) Upon filing of the reconsideration statement by the petitioner, the petition will be assigned for reconsideration by the Board upon the contents of the petition, the record, and the reconsideration statement submitted by the petitioner.

(4) The Board, after its reconsideration, will promptly notify the petitioner of its proposed recommendation to the Administrator. If the Board's proposed action is adverse to, or different from, the waiver requested, the petitioner may request an oral hearing within such time as the Board has set.

§ 1245.113 Hearing procedure.

(a) If the petitioner requests an oral hearing within the time set, pursuant to § 1245.112(b)(4), the Board shall set the time and place for such hearing and shall so notify the petitioner.

(b) Oral hearings held by the Board shall be open to the public and shall be held in accordance with the following procedures:

(1) Oral hearings shall be conducted in an informal manner, with the objective of providing the petitioner with a full opportunity to present facts and arguments in support of the petition. Evidence may be presented through means of such witnesses, exhibits, visual aids as are arranged for by the petitioner. Petitioner may be represented by any person including its attorney. While proceedings will be ex parte, members of the Board and its counsel may address questions to witnesses called by the petitioner, and the Board may, at its option, enlist the aid of technical advisors or expert witnesses. Any person present at the hearing may make a statement for the record.

(2) A transcript or equivalent record of the proceeding shall be arranged for by the Board. The petitioner shall submit for the record a copy of any exhibit or visual aid utilized during the hearing.

§ 1245.114 Findings and recommendations of the Board.

(a) Findings of the Board. The Board shall consider the petition, the NASA contract, if relevent, the goals cited in § 1245.103(a), the effect of the waiver on the objectives of the related NASA programs, and any other available facts and information presented to the Board by an interested party. The Board shall then determine and make, if applicable, each of the specific findings of fact required by § 1245.104, § 1245.105, or § 1245.106 under which the petition was submitted. The Board shall document its findings.

(b) Recommendation of the Board.

(1) Except as provided in § 1245.104 (e), after making the findings of fact, the Board shall formulate its proposed recommendation to the Administrator as to the grant of waiver as requested, the grant of waiver upon terms other than as requested, or denial of waiver.

(2) If the Board proposes to recommend, initially or upon reconsideration or after oral hearing, that the petition be granted in the extent requested or, in other cases, where the petitioner does not request reconsideration or a hearing during the period set for such action, or informs the Board that such action will not be requested, or fails to file the required statements within the prescribed time, the Board shall transmit the petition, a summary record of hearing proceedings, if applicable, its findings of fact with respect thereto, and its recommendation to the Administrator.

§ 1245.115 Action by the Administrator.

(a) After receiving the transmittal from the Board, the Administrator shall determine, in accordance with § 1245.103, whether or not to grant any waiver of rights to the petitioner. A waiver pursuant to § 1245.104(b)(2) will be granted only when the Board so recommends.

(b) In the event of denial of the petition by the Administrator, a written notice of such denial will be promptly transmitted by the Board to the petitioner. The written notice will be accompanied with a statement of the grounds for denial.

(c) If the waiver is granted by the Administrator, the petitioner shall be sent an original and one copy of an instrument of waiver confirmatory of the conditions and reservations of the waiver grant for his execution. The petitioner shall return the executed copy to the Chairman within 30 days from the grant of waiver. Failure to return such copy within the prescribed time may result in revocation of the waiver of rights granted. Before such action is taken, notice shall be given to petitioner so that it may show cause before the Board why the waiver should not be revoked.

§ 1245.116 Filing of patent applications and reimbursement of costs.

(a) In order to protect the interests of the Government and the petitioner in inventions, a petitioner may file a United States patent application for such inventions prior to the Administrator's determination on a petition for waiver. If an application on an identified invention is filed during the pendency of the petition, or within 60 days prior to the receipt of a petition, NASA will reimburse the petitioner for any reasonable costs of such filing and patent prosecution that may have occurred. *Provided:*

(1) Similar patent filing and prosecution costs are not normally reimbursed to the petitioner as direct or indirect costs chargeable to Government contracts;

(2) The petition is ultimately denied with respect to domestic rights, or with respect to foreign and domestic rights, if both are requested; and

(3) Prior to reimbursement, petitioner assigns the application to the United States of America as represented by the Administrator of the National Aeronautics and Space Administration.

§ 1245.117 Publication and record of decisions.

The findings of fact and recommendations made to the Administrator by the Board with respect to each petition for waiver shall be recorded by the Board and available to the public. In addition, selected findings and recommendations of the Board shall be published annually.

Effective Date: The provisions of this subpart shall be effective on November 3, 1977, and supersede the NASA Patent Waiver Regulations of August 30, 1972 (37 FR 17547-17551) as of that date, except that (a) any petition pending on the effective date will be considered under the latter regulations unless consideration under the revised regulations is specifically requested by the petitioner, and (b) any petition received on or before December 5, 1977, may be considered under the latter regulations if specifically requested by the petitioner at the time of submission. All petitions received on or after December 5, 1977, will be considered under the new revised Patent Waiver Regulations.

ROBERT A. FROSCH,
Administrator.

[FR Doc.77-31792 Filed 11-2-77;8:45 am]

APPENDIX C

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
Washington, D.C., August 18, 1978.

Memorandum to: Chairman and Members, Inventions and Contributions Board.
From: NB-9/Chief, Waiver Branch, Inventions and Contributions Board.
Subject: 1978 Summary Report on the Development and Utilization Activity of Waived Inventions.

The staff of the Inventions and Contributions Board (ICB) has made it a practice to monitor the recipients of waiver annually as to their efforts to develop, utilize, and commercialize their waived inventions. The waiver of property rights to inventions made under NASA contracts is effected primarily to further their development into commercially useful products as early as possible. This monitoring effort serves to follow the progress made by the waiver recipients in their commercialization efforts.

On April 14, 1978 the ICB made a request of waiver recipients of selected inventions that they complete a Patent Waiver Report questionnaire (NASA Form 1393, copy attached) and return it to the Board. A cover letter explained our need for such information; the staff partially completed the questionnaire so as to identify the invention. We asked that the questionnaires be returned to the Inventions and Contributions Board by May 15, 1978. A follow-up letter was sent to those who had not responded by that date.

Patent Waiver Reports were requested for 121 waived inventions. The inventions were selected from the waiver portfolio of approximately 800 waived inventions. The selection was based on: (a) earlier reports (100 inventions) which indicated a probability of use in 1977–1978 and, (b) inventions waived in the last six months of 1977 including inventions for which a report was requested last year but never received (21 inventions).

To date, waiver reports have been received for 102 inventions, an 84 percent response. 19 waiver reports or 16 percent of those requested have not been received although several waiverees have indicated that their reports are forthcoming (for 12 inventions). As regards the 100 inventions in selection Group (a), above, for which there was indicated a probability of use in 1977–1978, 83 reports have been received, an 83 percent response. As for the 21 inventions of Group (b), 19 reports have been received, a 90 percent response.

By analyzing the responses to the questions in the Patent Waiver questionnaire, the status of the inventions can be determined. The inventions appear to fall into four distinct classes: (1) inventions which are used in a commercial product, process, or service, (2) inventions which are undergoing further development efforts, (3) inventions for which only licensing efforts are being made and, (4) inventions for which no further development effort is planned next year.

As regards the inventions of Class (1), above, first commercial use was reported for 2 inventions. Continued commercial use was reported for 5 additional inventions which had been first placed on the market last year or where commericalization efforts were just getting underway when last reported to NASA. The commercialization activity for these inventions is set out in an Appendix to this summary report.

As reported Class (2) inventions, further technical development efforts are continuing or expected during the next year for 39 of the inventions. Six of these inventions have been licensed and the licensees plan to carry on further development.

Licensing efforts only are reported for 34 Class (3) inventions. 27 of these inventions were waived to universities or nonprofit organizations such as CALTECH, MIT, SRI, and IITRI. The remainder of the inventions are offered for licensing inasmuch as the waiver recipients cannot find use for the items in their own companies.

No further development is planned during next year for 22 Class (4) inventions. The reason given for the lack of interest in these inventions were: discontinued development of systems which could use the device, not salable in a product line, no commerical need, low priority, limited resources, market not identified, non-competitive market approach, better way of doing it, alternative concepts are satisfactory, and difficult to enforce patent rights. The waiver recipients for 9 of these inventions have elected to have their waivers voided. Appropriate action is being taken to void these waivers; after the waviers are voided, the inventions will be available for licensing under NASA's licensing program.

The above statistics are consolidated in the table, attached.

For the 73 inventions reported in Classes (2) and (3), the probability of use (expressed as a percentage) and the year that use is likely to occur may best be seen from the following chart.

YEAR AND NUMBER OF INVENTIONS

	1978	1979	1980	1981	1982	1983 and beyond
Percent:						
100	3		1		2	
90		3				
80		4				
70			1		1	
60						
50		7	8	1	1	1
40						2
30	1	2	9			
20	1	1	1	4		
10	2	1	8	2	1	5
0						

PROBABILITY OF USE

As seen, for 53 inventions or approximately 73 percent of the inventions which are undergoing development and licensing efforts, there is a probability of commercial use within 3 years. Of these 53 inventions there is a 50 percent chance or better that 27 inventions will be commercialized within 3 years.

J. LABOW.

TABLE OF STATISTICS

Utilization/commercialization report on waived inventions—1978

Number of waived inventions surveyed	121
Percent of total (778) active [1] inventions (percent)	15
Total number of responses	102
Percent response (percent)	84
Types of inventions surveyed:	
Previous indication of probability of use in 1977-78:	
Reports requested	100
Reports received	83
Percent response	83.0
Newly waived inventions:	
Reports requested	13
Reports received	12
Percent response	92.3
Nonresponsive to 1977 request:	
Reports requested	8
Reports received	7
Percent response	87.5
Status of surveyed inventions and number of inventions:	
Utilized/commercialized (first use-2 inventions)	7
Development efforts continuing	39
Licensing/promotion only	34
No further development expected	22
Total number of active [1] inventions (through 1977)	788
Total number of inventions voided	258
Total number of inventions utilized/commercialized (18.5 percent)	193

[1] Waiver not voided.

APPENDIX

Title of Invention: Multiple Crystal Oscillator Measuring Apparatus.
Waiver Recipient: California Institute of Technology.
Waiver Number: W-1287.

Waiver Granted: March, 1971.

The invention is licensed to the California Measurements of Sierra Madre, California. It was first commercially used in July 1978. Over $100,000 has been spent to develop the invention to commercial status; 60 percent of this amount was spent on technical development, 15 percent for production facilities, and 25 percent for marketing and sales promotion. A product information sheet was submitted disclosing the information below.

Aerosol researchers can now use a Pierzoelectric Particle Cascade (PPC) instrument to make direct mass measurements of aerosol particles in real-time over a wide size distribution range of 0.05 to 25 micrometers. This well-designed laboratory and field instrument has a ten-stage cascade impactor with inertial impactor nozzles for size discrimination and utilizes piezoelectric quartz crystals for "active" impaction plates.

By using quartz crystals impactors, the PPC instrument measures the mass of aerosol samples directly and rapidly. As sample particulates impact on an adhesive coated crystal their mass changes the resonant frequency of the crystal. The frequency change of the crystal controlled oscillator is therefore a direct indication of the mass collected. By monitoring the frequency changes of each of the ten cascade stages, information on mass concentation and size distribution of the aerosol sample can be obtained directly for scanning electron microscope (SEM) or X-ray analysis without having to be removed from the crystals.

The wide dynamic range of the PPC is unsurpassed by other types of aerosol measuring instruments. Optical instruments only cover a range of about one decade, from a few tenths to a few micrometers. Time-of-flight electrostatic charge instruments are capable of detecting particle sizes of one micrometer or less. Moreover, the PPC can be operated over a wide range of particle concentrations, from $10\mu g/m^3$, without dilution.

The California Measurements PPC is a high-quality self-contained instrument, complete with sample air pump (providing a flow rate of 240 Ml/min.), flowmeter, crystal reconditioning oscillator, and data processing electronics. A number of models are available to meet the various needs of the aerosol researcher. The models differ only in the optional built-in data disply equipment required by the user. The basic price range is between $8,600 and $12,000.

The California Measurement PPC is suitable for power plant emission studies, aerial sampling of atmospheric particles, biomedical research, soil erosion studies, and various other pollution monitoring applications.

Title of Invention: Energy Absorbing Arrangement.
Waiver Recipient: ARA, Inc.
Waiver Number: W-1345, W-295.
Waiver Granted: October, 1971.

First commercial use of the invention is reported to have occurred in March 1978. Application of the invention was directed towards a crash survivable passenger seat for helicopters. Seats were manufactured and tested, as well as sold, in the earlier part of the year. The Waiver Recipient believes that production orders for large quantities are imminent. ARA, Inc. plans to continue to exploit the U.S. commercial helicopter and foreign markets for sales of the energy absorber.

The invention is used in conjunction with an earlier waived invention entitled, "Energy Absorbing Device." The earlier invention (W-295) was waived in August 1965. ARA, Inc. reports that it has incurred from $150,000 to $200,000 to develop the devices. Of this amount, 75 percent was spent for technical development, 15 percent for production faciltities, and 10 percent for marketing and sales promotion. The benefits realized from the use of the inventions include reduced product liability insurance costs for helicopter manufacturers by providing safer and better seats.

Title of Invention: Tunable Acousto–Optic Method and Apparatus.
Waiver Recipient: Hewlett-Packard Company.
Waiver Number: W-1085.
Waiver Granted: February, 1970.

Since the last waiver report to NASA in 1976, approximately 100 man-months have been applied to the development of apparatuses which utilize the invention, and approximately 1,000 man-months have also been applied to the development of equipment which, although not directly related to the invention, may be useful in extending the potential of the invention. The invention is licensed to Isomet Corporation; two other companies have also expressed an interest in obtaining licenses. Isomet's major products are delay lines, acousto-optic devices (including Q-switches, frequency translators, light beam modulators, light deflectors, and acoustically-tunable optical filters), and associated electronics.

The invention is an acoustically-tuned optical filter for use in optical spectrometers as analystical instrumets. It holds promise as a field instrument for pollution detection and control, and it has the ability to monitor many components of a rapidly flowing fluid.

A product brochure describes the invention as an Acousto-Optic Tunable Optical Filter, TOF 100. This is all solid state device which has the unique capability of changing its optical transmission in accordance with the frequency of an applied electrical signal. It is thus possible to electrically tune the color or wavelength of a light source. Traditionally, this has been accomplished with ruled gratings and prisms which are moved mechanically to sort out different colors from a light source. The TOF not only has the advantage of no moving parts, but it can scan a light source very rapidly, in one or two thousandths of a second, simply by applying an electrical signal whose frequency is swept.

The TOF consists of a solid interaction medium typical of a single crystal, into which has been launched an acoustic wave. Under proper conditions the sound wave may be made to switch the polarization of a very narrow spectral component of a multicolor light beam which is passed through the medium so as to propagate collinearly with the acoustic wave. By virtue of one polarization switch, the narrow spectral band may be separated from the primary light beam, thereby giving the filter its unique wavelength selection capability. Sound waves are propagated into the medium by means of a piezoelectric transducer, bonded to the interaction crystal, and excited by an rf signal. The center wavelength of the optical passband is inversely proportional to the frequency of the electrical signal.

It is reported that the invention provides a cost reduction and improved performance chararteristics over comparable monochromators. At maturity, it is expected that the component will sell in both the domestic and the world markets at a rate in excess of several million dollars a year.

Title of Invention: Electric Current-Producing Cell.
Waiver Recipient: Honeywell, Inc.
Waiver Number: W-298, W-299.
Waiver Granted: August, 1965.

The invention is licensed to Philips, Eindhoven which first used the invention in a commercial product in January 1977. The invention uses SO_2 to solubolize the salt in the electrolyte for deep sea long life primary active batteries. About $750,000 of Honeywell money has been spent in development of products covered by the invention.

Title of Invention: Wideband Digital Pseudo-Gaussian Noise Generator.
Waiver Recipient: California Institutie of Technology.
Waiver Number: W-1566.
Waiver Granted: October, 1974.

The invention is licensed to Micro, Incorporated of Phoenix, Arizona whose major products is Testing Instruments. Commercialization of the invention has continued since its first use in January 1975. The licensee reports that improved Logic Testing Systems utilizing the invention have been made available to its customers. The licensee reported expenditures of about $50,000 as follows: 50 percent for technical development, 40 percent for production facilities, and 10 percent for marketing and sales promotion.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION **PATENT WAIVER REPORT**			O.M.B. No. 104-R0064 Approval Expires: March 1979
TITLE OF INVENTION			NASA CASE NO.
CONTRACT NO.	WAIVER NO.	WAIVER DATE	ANNUAL REPORT *(Year)*
U.S PATENT OR APPLICATION NO.	CONTRACTOR'S REFERENCE	TYPE OF CONCERN *(Please check, if applicable)* ☐ SMALL BUSINESS ☐ NON-PROFIT ORGANIZATION	

1. To what extent has the invention been developed, technically, for commercial application (e.g., Fully developed, largely undeveloped, etc.)?

2. Has the invention been licensed? *(Check one)*
☐ a. YES *(If "yes," identify all domestic and foreign licensees and their Major Product or Service)* ☐ b. NO

3. Has the invention been used in a commercial process, product, or service? *(Check one)*
☐ a. YES

(1) Date of first use _____ *(Month)* _____ *(Year).*
(2) Briefly describe in the space below the application of the invention in such process, product, or service *(Please also submit brochures or other similar information, if available, concerning use of the invention.)*

☐ b. NO *(Indicate your estimate of the probability that your company, or licensee, will use this invention in the future by expressing as a percentage, i.e., 10, 20, etc.)*

(1) Probability_____%; Year likely to occur_____.
(2) Describe in the space below what additional effort is required to make the invention ready for utilization and commercialization.

Answer items 3a(2) or 3b(2) here. *(Use separate sheets, if necessary.)*

4. If the answer to question 3 is "No," what effort has been made toward further development, promotion, and commercialization of the invention in the past year, or since your last report?

   a. Indicate what effort is expected during the next year.

   b. If no further effort is expected, explain why.

5. What benefits have been realized, or are expected, from the use of this invention *(Cost reductions, items sold, domestic and foreign sales in dollars, etc., state also any intangible benefits)*?

6. What private funded costs *(Actual or estimated)* have been incurred in an effort to date to evaluate and develop this invention to commercial status *(Express in dollars, if possible, otherwise, figures such as man-hours expended will be helpful)*?

   a. Please estimate what percent of these costs were incurred for:

   (1) Technical Development _____ %
   (2) Production Facilities _____ %
   (3) Marketing & Sales Promotion _____ %
   (4) Other *(Please be specific)* _____ %

   b. If the invention is not in commercial use, please give an estimate of the anticipated future costs of development and commercialization.

7. On separate sheet list by number, date and country, any patent applications, or issued patents on the subject invention that have not yet been reported to NASA.

RETURN REPORT TO:	FROM *(Name and address)*	
National Aeronautics and Space Administration *Inventions and Contributions Board* Washington, D.C. 20546		
RESPONDENT'S NAME, TITLE AND TELEPHONE NO.	SIGNATURE OF RESPONDENT	DATE

APPENDIX D

NASA waiver statistics—1959 through 1978

Individual waivers:	
1. Number of inventions reported by NASA contractors	31,357
2. Petitions for waiver requested	1,366
3. Waivers granted	1,035
4. Petitions denied	148
5. Peititons withdrawn	139
6. Petitions pending	44
Advance waivers:	
1. Advance waivers requested	906
2. Advance waivers granted	463
3. Advance waivers denied	293
4. Requests withdrawn	111
5. Requests pending	39
6. Number of inventions reported under contracts having advance waivers and contractor intends to file	216
Inventions waived:	
1. Total inventions waived	1,254
Under individual waivers	1,029
Under advance waivers	225
2. Inventions for which waivers have been voided	266

Appendix E

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D. C. 20546

PATENT LICENSING REGULATIONS

(Revised 4/1/72)

14 CFR 1245.2

REPRINT FROM PAGES 6465 - 6469 OF THE

FEDERAL REGISTER

THURSDAY, MARCH 30, 1972
WASHINGTON, D.C.
Volume 37 ■ Number 62

52-476 O - 80 - 6

Title 14—AERONAUTICS AND SPACE

Chapter V—National Aeronautics and Space Administration

PART 1245—PATENTS

Subpart 2—Patent Licensing Regulations

1. Subpart 2 is revised in its entirety as follows:

Sec.

1245.200 Scope of subpart.
1245.201 Definitions.
1245.202 Basic considerations.
1245.203 Licenses for practical application of inventions.
1245.204 Other licenses.
1245.205 Publication of NASA inventions available for license.
1245.206 Application for nonexclusive license.
1245.207 Application for exclusive license.
1245.208 Processing applications for license.
1245.209 Royalties and fees.
1245.210 Reports.
1245.211 Revocation of licenses.
1245.212 Appeals.
1245.213 Litigation.
1245.214 Address of communications.

AUTHORITY: The provisions of this Subpart 2 issued under 42 U.S.C. 2457, 2473(b)(3).

§ 1245.200 Scope of subpart.

This Subpart 2 prescribes the terms, conditions, and procedures for licensing inventions covered by U.S. patents and patent applications for which the Administrator of the National Aeronautics and Space Administration holds title on behalf of the United States.

§ 1245.201 Definitions.

For the purpose of this subpart, the following definitions apply:

(a) "Invention" means an invention covered by a U.S. patent or patent application for which the Administrator of NASA holds title on behalf of the United States and which is designated by the Administration as appropriate for the grant of license(s) in accordance with this subpart.

(b) "To practice an invention" means to make or have made, use or have used, sell or have sold, or otherwise dispose of according to law any machine, article of manufacture or composition of matter physically embodying the invention, or to use or have used the process or method comprising the invention.

(c) "Practical application" means the manufacture in the case of a composition of matter or product, the use in the case of a process, or the operation in the case of a machine, under such conditions as to establish that the invention is being utilized and that its benefits are reasonably accessible to the public.

(d) "Special invention" means any invention designated by the NASA Assistant General Counsel for Patent Matters to be subject to short-form licensing procedures. An invention may be designated as a special invention when a determination is made that:

(1) Practical application has occurred and is likely to continue for the life of the patent and for which an exclusive license is not in force, or

(2) The public interest would be served by the expeditious granting of a nonexclusive license for practice of the invention by the public.

(e) The "Administrator" means the Administrator of the National Aeronautics and Space Administration, or his designee.

(f) "Government" means the Government of the United States of America.

(g) The "Inventions and Contributions Board" means the NASA Inventions and Contributions Board established by the Administrator of NASA within the Administration in accordance with section 305 of the National Aeronautics and Space Act of 1958 as amended (42 U.S.C. 2457).

§ 1245.202 Basic considerations.

(a) Much of the new technology resulting from NASA sponsored research and development in aeronautical and space activities has application in other fields. NASA has special authority and responsibility under the National Aeronautics and Space Act of 1958, as amended (42 U.S.C. 2451), to provide for the widest practical dissemination and utilization of this new technology. In addition, NASA has been given unique requirements to protect the inventions resulting from NASA activities and to promulgate licensing regulations to encourage commercial use of these inventions.

(b) NASA-owned inventions will best serve the interests of the United States when they are brought to practical application in the shortest time possible. Although NASA encourages the nonexclusive licensing of its inventions to promote competition and achieve their widest possible utilization, the commercial development of certain inventions calls for a substantial capital investment which private manufacturers may be unwilling to risk under a nonexclusive license. It is the policy of NASA to seek exclusive licensees when such licenses will provide the necessary incentive to the licensee to achieve early practical application of the invention.

(c) The Administrator, in determining whether to grant an exclusive license, will evaluate all relevant information submitted by applicants and all other persons and will consider the necessity for further technical and market development of the invention, the capabilities of prospective licensees, their proposed plans to undertake the required investment and development, the impact on competitors, and the benefits of the license to the Government and to the public. Preference for exclusive license shall be given to U.S. citizens or companies who intend to manufacture or use, in the case of a process, the invention in the United States of America, its territories and possessions. Consideration may also be given to assisting small businesses and minority business enterprises, as well as economically deprossed, low income and labor surplus areas.

(d) All licenses for inventions shall be by express written instruments. No license shall be granted either expressly or by implication, for a NASA invention except as provided for in §§ 1245.203 and 1245.204 and in any existing or future treaty or agreement between the United States and any foreign government.

(e) Licenses for inventions covered by NASA-owned foreign patents and patent applications shall be granted in accordance with the NASA Foreign Patent Licensing Regulations (§ 1245.4).

§ 1245.203 Licenses for practical application of inventions.

(a) *General.* As an incentive to encourage practical application of inventions, licenses will be granted to responsible applicants according to the circumstances and conditions set forth in this section.

(b) *Nonexclusive licenses.* (1) Each invention will be made available to responsible applicants for nonexclusive, revocable licensing in accordance with § 1245.206, consistent with the provisions of any existing exclusive license.

(2) The duration of the license shall be for a period as specified in the license.

(3) The license shall require the licensee to achieve the practical application of the invention and to then practice the invention for the duration of the license.

(4) The license may be granted for all or less than all fields of use of the invention and throughout the United States of America, its territories and possessions, Puerto Rico, and the District of Columbia, or in any lesser geographic portion thereof.

(5) The license shall extend to the subsidiaries and affiliates of the licensee and shall be nonassignable without approval of the Administrator, NASA, except to the successor of that part of the licensee's business to which the invention pertains.

(c) *Short-form nonexclusive licenses.* A nonexclusive, revocable license for a special invention, as defined in § 1245.201 (d), shall be granted upon written request, to any applicant by the Patent Counsel of the NASA installation having cognizance of the invention.

(d) *Exclusive licenses.* (1) A limited exclusive license may be granted on an invention available for such licensing provided that:

(i) The Administrator has determined that: (*a*) The invention has not been brought to practical application by a nonexclusive licensee in the fields of use or in the geographical locations covered by the application for the exclusive license, (*b*) practical application of the invention in the fields of use or geographical locations covered by the application for the exclusive license is not likely to be achieved expeditiously by the further funding of the invention by the Government or under a nonexclusive license requested by any applicant pursuant to these regulations, and (*c*) the exclusive license will provide the necessary incentive to the licensee to achieve the practical application of the invention; and

(ii) Either a notice pursuant to

§ 1245.205 [illegible] the invention as available for licensing has been published in the Federal Register for at least 9 months, or a patent covering the invention has been issued for at least 6 months. However, a limited exclusive license may be granted prior to the periods specified above if the Administrator determines that the public interest will best be served by the earlier grant of an exclusive license.

(2) The license may be granted for all or less than all fields of use of the invention, and throughout the United States of America, its territories and possessions, Puerto Rico, and the District of Columbia, or in any lesser geographic portion thereof.

(3) The exclusive period of the license shall be negotiated, but shall be for less than the terminal portion of the patent, and shall be related to the period necessary to provide a reasonable incentive to invest the necessary risk capital.

(4) The license shall require the licensee to practice the invention within a period specified in the license and then to achieve practical application of the invention.

(5) The license shall require the licensee to expend a specified minimum sum of money and/or to take other specified actions, within indicated period(s) after the effective date of the license, in an effort to achieve practical application of the invention.

(6) The license shall be subject to at least an irrevocable royalty-free right of the Government of the United States to practice and have practiced the invention throughout the world by or on behalf of the Government of the United States and on behalf of any foreign government pursuant to any existing or future treaty or agreement with the United States.

(7) The license may reserve to the Administrator, NASA, under the following circumstances, the right to require the granting of a sublicense to responsible applicant(s) on terms that are considered reasonable by the Administrator, taking into consideration the current royalty rates under similar patents and other pertinent facts: (i) To the extent that the invention is required for public use by Government regulation, or (ii) as may be necessary to fulfill health or safety needs, or (iii) for other purposes stipulated in the license.

(8) The license shall be nontransferable except to the successor of that part of the licensee's business to which the invention pertains.

(9) Subject to the approval of the Administrator, the licensee may grant sublicenses under the license. Each sublicense granted by an exclusive licensee shall make reference to and shall provide that the sublicense is subject to the terms of the exclusive license including the rights retained by the Government under the exclusive license. A copy of each sublicense shall be furnished to the Administrator.

(10) The license may be subject to such other reservations as may be in the public interest.

§ 1245.204 Other licenses.

(a) *License to contractor.* There is hereby granted to the contractor reporting an invention made in the performance of work under a contract of NASA in the manner specified in section 305(a)(1) or (2) of the National Aeronautics and Space Act of 1958 as amended (42 U.S.C. 2457(a)(1) or (2)), a revocable, nonexclusive, royalty-free license for the practice of such invention, together with the right to grant sublicenses of the same scope to the extent the contractor was legally obligated to do so at the time the contract was awarded. Such license and right is nontransferable except to the successor of that part of the contractor's business to which the invention pertains.

(b) *Miscellaneous licenses.* Subject to any outstanding licenses, nothing in this subpart 2 shall preclude the Administrator from granting other licenses for inventions, when he determines that do so would provide for an equitable distribution of rights. The following exemplify circumstances wherein such licenses may be granted:

(1) In consideration of the settlement of an interference;

(2) In consideration of a release of a claim of infringement; or

(3) In exchange for or as part of the consideration for a license under adversely held patent(s).

§ 1245.205 Publication of NASA inventions available for license.

(a) A notice will be periodically published in the Federal Register listing inventions available for licensing. Abstracts of the inventions will also be published in the NASA Scientific and Technical Aerospace Reports (STAR) and other NASA publications.

(b) Copies of pending patent applications for inventions abstracted in STAR may be purchased from the National Technical Information Service, Springfield, Va. 22151.

§ 1245.206 Application for nonexclusive license.

(a) *Submission of application.* An application for nonexclusive license under § 1245.203(b) or a short-form nonexclusive license for special inventions under § 1245.203(c) shall be addressed to the NASA Patent Counsel of the NASA installation having cognizance over the NASA invention for which a license is desired or to the NASA Assistant General Counsel for Patent Matters.

(b) *Contents of an application for nonexclusive license.* An application for nonexclusive license under § 1245.203(b) shall include:

(1) Identification of invention for which license is desired, including the NASA patent case number, patent application serial number of patent number, title and date, if known;

(2) Name and address of the person, company or organization applying for license and whether the applicant is a U.S. citizen or a U.S. corporation;

(3) Name and address of representative of applicant to whom correspondence should be sent;

(4) Nature and type of applicant's business;

(5) Number of employees;

(6) Purpose for which license is desired;

(7) A statement that contains the applicant's best knowledge of the extent to which the invention is being practiced by private industry and the Government;

(8) A description of applicant's capability and plan to undertake the development and marketing required to achieve the practical application of the invention, including the geographical location where the applicant plans to manufacture or use, in the case of a process, the invention; and

(9) A statement indicating the minimum term of years the applicant desires to be licensed.

(c) *Contents of an application for a short-form nonexclusive license.* An application for a short-form nonexclusive license under § 1245.203(c) for a special invention shall include:

(1) Identification of invention for which license is desired, including the NASA patent case number, patent application serial number or patent number, title and date, if known;

(2) Name and address of company or organization applying for license; and

(3) Name and address of representative of applicant to whom correspondence should be sent.

§ 1245.207 Application for exclusive license.

(a) *Submission of application.* An application for exclusive license under § 1245.203(d) may be submitted to NASA at any time. An application for exclusive license shall be addressed to the NASA Assistant General Counsel for Patent Matters.

(b) *Contents of an application for exclusive license.* In addition to the requirements set forth in § 1245.206(b), the application for an exclusive license shall include:

(1) Applicant's status, if any, in any one or more of the following categories:

(i) Small business firm;

(ii) Minority business enterprise;

(iii) Location in a surplus labor area;

(iv) Location in a low-income urban area; and

(v) Location in an area designed by the Government as economically depressed.

(2) A statement indicating the time, expenditure, and other acts which the applicant considers necessary to achieve practical application of the invention, and the applicant's offer to invest that sum and to perform such acts if the license is granted;

(3) A statement whether the applicant would be willing to accept a license for all or less than all fields of use of the invention throughout the United States of America, its territories and possessions, Puerto Rico, and the District of Columbia, or in any lesser geographic portion thereof.

(4) A statement indicating the amount of royalty fees or other consideration, if any, the applicant would be willing to pay the Government for the exclusive license; and

(5) Any other facts which the applicant believes to show it to be in the interests of the United States of America for the Administrator to grant an exclusive license rather than a nonexclusive li-

cense and that such an exclusive license should be granted to the applicant.

§ 1245.208 **Processing applications for licenses.**

(a) *Initial review.* Applications for nonexclusive and exclusive licenses under §§ 1245.206 and 1245.207 will be reviewed by the Patent Counsel of the NASA installation having cognizance for the invention and the NASA Assistant General Counsel for Patent Matters, to determine the conformity and appropriateness of the application for license and the availability of the specific invention for the license requested. The Assistant General Counsel for Patent Matters will forward all applications for license conforming to §§ 1245.206(b) and 1245.207(b) to the NASA Inventions and Contributions Board when the invention is available for consideration of the requested license. Prior to forwarding applications for exclusive licenses to the Inventions and Contributions Board, notice in writing will be given to each nonexclusive licensee for the specific invention advising of the receipt of the application for the exclusive license and providing each nonexclusive licensee with a 30-day period for submitting either evidence that practical application of the invention has occurred or is about to occur or, an application for an exclusive license for the invention.

(b) *Recommendations of Inventions and Contributions Board.* The Inventions and Contributions Board shall, in accordance with the basic considerations set forth in §§ 1245.202 and 1245.203, evaluate all applications for license forwarded by the Assistant General Counsel for Patent Matters. Based upon the facts presented to the Inventions and Contributions Board in the application and any other facts in its possession, the Inventions and Contributions Board shall recommend to the Administrator: (1) Whether a nonexclusive or exclusive license should be granted, (2) the identity of the licensee, and (3) any special terms or conditions of the license.

(c) *Determination of Administrator and grant of nonexclusive licenses.* The Administrator shall review the recommendations of the Inventions and Contributions Board and shall determine whether to grant the nonexclusive license as recommended by the Board. If the Administrator determines to grant the license, the license will be granted upon the negotiation of the appropriate terms and conditions of the Office of General Counsel.

(d) *Determination of Administrator and grant of exclusive licenses*—(1) *Notice.* If the Administrator determines that the best interest of the United States will be served by the granting of an exclusive license in accordance with the basic considerations set forth in §§ 1245.202 and 1245.203, a notice shall be published in the FEDERAL REGISTER announcing the intent to grant the exclusive license, the identification of the invention, special terms or conditions of the proposed license, and a statement that NASA will grant the exclusive license unless within 30 days of the publication of such notice the Inventions and Contributions Board receives in writing any of the following together with supporting documentation:

(i) A statement from any person setting forth reasons why it would not be in the best interest of the United States to grant the proposed exclusive license; or

(ii) An application for a nonexclusive license under such invention, in accordance with § 1245.206(b), in which applicant states that he has already brought or is likely to bring the invention to practical application within a reasonable period.

The Inventions and Contributions Board shall, upon receipt of a written request within the 30 days' notice period, grant an extension of 30 days for the submission of the documents designated above.

(2) *Recommendation of Inventions and Contributions Board.* Upon the expiration of the period required by subparagraph (1) of this paragraph, the Board shall review all written responses to the notice and shall then recommend to the Administrator whether to grant the exclusive license as the Board initially recommended or whether a different form of license, if any, should instead be granted.

(3) *Grant of exclusive licenses.* The Administrator shall review the Board's recommendation and shall determine if the interest of the United States would best be served by the grant of an exclusive license as recommended by the Board. If the Administrator determines to grant the exclusive license, the license will be granted upon the negotiation of the appropriate terms and conditions by the Office of General Counsel.

§ 1245.209 **Royalties and fees.**

(a) Normally, a nonexclusive license for the practical application of an invention granted to a U.S. citizen or company will not require the payment of royalties; however, NASA may require other consideration.

(b) An exclusive license for an invention may require the payment of royalties, fees or other consideration when the licensing circumstances and the basic considerations in § 1245.202, considered together, indicate that it is in the public interest to do so.

§ 1245.210 **Reports.**

A license shall require the licensee to submit periodic reports of his efforts to work the invention. The reports shall contain information within his knowledge, or which he may acquire under normal business practice, pertaining to the commercial use that is being made of the invention and such other information which the Administrator may determine pertinent to the licensing program and which is specified in the license.

§ 1245.211 **Revocation of licenses.**

(a) Any license granted pursuant to § 1245.203 may be revoked, either in part or in its entirety, by the Administrator if in his opinion the licensee at any time shall fail to use adequate efforts to bring to or achieve practical application of the invention in accordance with the terms of the license, or if the licensee at any time shall default in making any report required by the license, or shall make any false report, or shall commit any breach of any covenant or agreement therein contained, and shall fail to remedy any such default, false report, or breach within 30 days after written notice, or if the patent is deemed unenforceable either by the Attorney General or a final decision of a U.S. court.

(b) Any license granted pursuant to § 1245.204(a) may be revoked, either in part or in its entirety, by the Administrator if in his opinion such revocation is necessary to achieve the earliest practical application of the invention pursuant to an application for exclusive license submitted in accordance with § 1245.207, or the licensee at any time shall breach any covenant or agreement contained in the license, and shall fail to remedy any such breach within 30 days after written notice thereof.

(c) Before revoking any license granted pursuant to this Subpart 2 for any cause, there will be furnished to the licensee a written notice of intention to revoke the license, and the licensee will be allowed 30 days after such notice in which to appeal and request a hearing before the Inventions and Contributions Board on the question of revocation. After a hearing, the Inventions and Contributions Board shall transmit to the Administrator the record of proceedings, its findings of fact, and its recommendation whether the license should be revoked either in part or in its entirety. The Administrator shall review the recommendation of the Board and determine whether to revoke the license in part or in its entirety. Revocation of a license shall include revocation of all sublicenses which have been granted.

§ 1245.212 **Appeals.**

Any person desiring to file an appeal pursuant to § 1245.211(c) shall address the appeal to Chairman, Inventions and Contributions Board. Any person filing an appeal shall be afforded an opportunity to be heard before the Inventions and Contributions Board, and to offer evidence in support of his appeal. The procedures to be followed in any such matter shall be determined by the Administrator. The Board shall make findings of fact and recommendations with respect to disposition of the appeal. The decision on the appeal shall be made by the Administrator, and such decision shall be final and conclusive, except on questions of law, unless determined by a court of competent jurisdiction to have been fraudulent, or capricious, or arbitrary, or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence.

§ 1245.213 **Litigation.**

An exclusive licensee shall be granted the right to sue at his own expense any party who infringes the rights set forth in his license and covered by the licensed patent. The licensee may join the Government, upon consent of the Attorney General, as a party complainant in such suit, but without expense to the Government and the licensee shall pay costs and any final judgment or decree that may be rendered against the Govern-

ment in such suit. The Government shall also have an absolute right to intervene in any such suit at its own expense. The licensee shall be obligated to promptly furnish to the Government, upon request, copies of all pleadings and other papers filed in any such suit and of evidence adduced in proceedings relating to the licensed patent including, but not limited to, negotiations for settlement and agreements settling claims by a licensee based on the licensed patent, and all other books, documents, papers, and records pertaining to such suit. If, as a result of any such litigation, the patent shall be declared invalid, the licensee shall have the right to surrender his license and be relieved from any further obligation thereunder.

§ 1245.214 *Address of communications.*

(a) Communications to the Assistant General Counsel for Patent Matters in accordance with §§ 1245.208 and 1245.207 and requests for information concerning licenses for NASA inventions should be addressed to the Assistant General Counsel for Patent Matters, Code GP, National Aeronautics and Space Administration, Washington, D.C. 20546.

(b) Communications to the Inventions and Contributions Board in accordance with §§ 1245.208, 1245.211, and 1245.212 should be addressed to Chairman, Inventions and Contributions Board, National Aeronautics and Space Administration, Washington, D.C. 20546.

Effective date. The regulations set forth in this subpart 2 are effective April 1, 1972.

JAMES C. FLETCHER,
Administrator.

Appendix F

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D. C. 20546

FOREIGN PATENT LICENSING REGULATIONS

EXCERPTS FROM PAGES 10958 & 10959

FEDERAL REGISTER
VOLUME 31 • NUMBER 160
Thursday, August 18, 1966 • Washington, D.C.

Title 14—AERONAUTICS AND SPACE

Chapter V—National Aeronautics and Space Administration

PART 1245—PATENTS

Subpart 4—Foreign Patent Licensing Regulations

New Subpart 4 is added:

Subpart 4—Foreign Patent Licensing Regulations

Sec.
1245.400 Scope of subpart.
1245.401 Policy.
1245.402 Types of licenses and terms and conditions.
1245.403 Government license.
1245.404 Enforcement of patent rights.
1245.405 Procedures.

AUTHORITY: The provisions of this Subpart 4 issued under 42 U.S.C. 2457 (g) and (h).

§ 1245.400 Scope of subpart.

(a) The subpart establishes the policy, terms, conditions, and procedures under which NASA-owned foreign patents and patent applications may be licensed.

(b) The provisions of this subpart apply to all NASA-owned patents granted in countries other than the United States and to NASA-owned patent applications pending in such countries and supplement the provisions of Subpart 2 of this part for foreign patent licensing.

§ 1245.401 Policy.

The foreign licensing program of the National Aeronautics and Space Administration serves to promote and utilize foreign patent rights vested in the Administration. The objectives of this program are to further the interests of United States industry in foreign commerce, to enhance the economic interests of the United States, and to advance the international relationships of the United States.

§ 1245.402 Types of licenses and terms and conditions.

Licenses will be individually negotiated and may be granted to any applicant, foreign or domestic, on a nonexclusive or exclusive basis for royalties or other considerations and on such other terms and conditions as are deemed appropriate to the interests of the United States. Preference in the granting of foreign license rights will be shown to those applicants who have previously been granted a license under the corresponding U.S. patent or patent application.

§ 1245.403 Government license.

There will be reserved from each exclusive license an irrevocable, nonexclusive, nontransferable, royalty-free license for the practice of such invention throughout the world by or on behalf of the United States or any foreign government pursuant to any existing or future treaty or agreement with the United States.

§ 1245.404 Enforcement of patent rights.

An exclusive licensee will be authorized to enforce the licensed patent and to sue infringers of the patent at its own expense.

§ 1245.405 Procedures.

(a) NASA will publish in the United States, and elsewhere as may be appropriate, lists of NASA-owned foreign patents or patent applications available for licensing.

(b) NASA will also furnish written notice of the availability for licensing of NASA-owned foreign patents or patent applications to any licensee under the corresponding U.S. patent or patent application.

(c) Applications for license should be addressed to the Administrator, National Aeronautics and Space Administration, Washington, D.C. 20456. The application must fully identify the patent or patent application, and state the type of license requested together with proposed terms and conditions thereof.

(d) The conduct of negotiations with prospective licensees will be the responsibility of the General Counsel, NASA. In the conduct of such negotiations, due regard shall be had for the possible interests of NASA program and staff offices, and their coordination will be obtained as deemed appropriate.

(e) NASA will publish notice in the FEDERAL REGISTER, and elsewhere as may be appropriate, of its intention to grant an exclusive license under an identified patent or patent application. An exclusive license will not be granted until the expiration of 60 days from the date of notice in order to provide a suitable time interval for interested persons or other Government agencies to interpose comment or objection.

(f) All licenses shall become effective upon the written acceptance by the licensee of a license instrument specifying the type of license and terms and conditions thereof.

Effective date. The provisions of this Subpart 4 are effective upon publication in the FEDERAL REGISTER.

JAMES E. WEBB,
Administrator.

[F.R. Doc. 66-8920; Filed, Aug. 17, 1966; 8:45 a.m.]

NASA licensing statistics U.S. patents and patent applications—Dec. 31, 1978

U.S. patents held by NASA:	
U.S. patents and patent applications available for licensing	3,512
Employee investions	2,378
Contractor inventions	1,134
Nonexclusive licenses:	
Licenses granted to date	502
Licenses revoked or terminated	260
Licenses in force as of this date	242
Inventions covered by licenses in force	124
Exclusive licenses:	
Licenses granted to date	21
Licenses revoked or terminated	12
Licenses in force as of this date	9
Inventions covered by licenses in force	9
Different licenses	8

NASA licensing statistics, foreign patents and patent applications—Dec. 31, 1978

Foreign patents held by NASA:	
Foreign patents and patent applications available for licensing	787
Inventions covered by foreign patents and patent applications	184
Nonexclusive licenses:	
Foreign patents and patent applications licensed nonexclusively in force	11
Inventions covered by nonexclusive licenses	1
Different licensees	3
Exclusive licenses:	
Foreign patents and patent applications licensed exclusively in force	117
Inventions covered by exclusive licenses	58
Different licensees	4

Commercial use of NASA owned inventions licensed by NASA in the United States—Dec. 31, 1978

Nonexclusive licenses:	
Nonexclusive license in force	242
Utilization reports received from licensees	138
Positive use reports:	
Reports of commercial use	50
Inventions covered by these reports	34
Employee inventions	28
Contractor inventions	6
Negative use reports:	
Reports of no commercial use	88
Inventions covered by these reports	56
Employee inventions	40
Contractor inventions	16
Exclusive licenses:	
Exclusive licenses granted to date	21
Employee inventions	14
Contractor inventions	7
Positive use reports:	
Reports of commercial use	6
Employee inventions	4
Contractor inventions	2
Negative use reports:	
Reports of no commercial use	15
Employee inventions	10
Contractor inventions	5

APPENDIX H

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION OFFICE OF GENERAL COUNSEL—SUMMARY OF NASA PATENT FILING ACTIVITIES

	NASA employee		Contractor employee		Totals	
	Invention disclosures reported	Patent applications filed[1]	Invention disclosures reported	Patent applications filed[1]	Invention disclosures reported	Patent applications filed[1]
Fiscal year:						
1963[2]	330	70	533	30	863	100
1964	507	100	1,040	46	1,547	146
1965	407	120	1,526	85	1,933	205
1966	360	143	3,307	82	3,667	225
1967	406	124	2,747	121	3,153	245
1968	495	137	3,297	117	3,792	254
1969	528	184	3,352	103	3,880	287
1970	410	154	2,632	117	3,042	271
1971	350	136	2,125	126	2,475	262
1972	256	140	2,199	105	2,455	245
1973	283	130	1,864	91	2,147	221
1974	261	96	1,415	96	1,676	192
1975	259	84	879	101	1,138	185
1976	253	107	1,080	97	1,333	204
T.P.	80	21	263	16	343	37
1977	264	102	1,289	112	1,553	214
1978	244	94	995	128	1,239	222
Total	5,693	1,942	30,543	1,573	36,236	3,515

[1] NASA owns.

[2] The first year of the Federal Council on Science and Technology reporting requirements. During 1959–62. 366 inventions were received from NASA employees and 429 from NASA contractors.

APPENDIX I

Statistics on 305(c) and (d) activities—June 30, 1979

I. Patent applications and 305(c) affidavits reviewed at NASA headquarters (1959 through June 30, 1979)	10,872
Jan. 1, 1979 to June 30, 1979	175
1978	325
1977	265
1976	286
1975	297
1974	368
1973	441
1972	544
1971	853
1970	819
1969	894
1968	701
1967	646
1966	737
1965	1,027
Prior to 1965	2,494
II. Complete file wrappers ordered on basis of 305(c) statements (during 1979)	1
III. Total number of 305(d) requests to Commissioner of Patents and Trademarks as of June 30, 1979	195
Jan. 1, 1979 to June 30, 1979	0
1978	5
1977	10

1976	9
1975	3
1974	4
1973	1
1972	10
1971	20
1970	12
1969	23
1968	20
1967	21
1966	23
1965	17
Prior to 1965	17
A. Pending cases before the Patent Office Board of Patent Interferences as of June 30, 1979	0
B. Completed cases	195
1. NASA obtains rights	133
(a) By patent issuing to NASA	54
(b) By petition for waiver filed and granted	37
(c) By agreement and license	37
(d) By decision of Board	2
(e) Other	3
2. Applicant obtains rights	60
(a) NASA's withdrawal of request	49
(b) NASA's withdrawal upon entry of amendment to cancel claims	2
(c) By decision of Board	5
(d) Failure to request within 90-day period	4
3. Appealed to the CCPA after board decision	2
(a) NASA obtains rights by decision of CCPA	1
(b) Applicant obtains rights by decision of CCPA	1

Senator SCHMITT. Thank you, Mr. Mossinghoff.

We will listen to Mr. Denny next, and then ask questions of both of you.

Mr. DENNY. Thank you, Senator.

Senator Schmitt, I am James Denny, Assistant General Counsel for Patents for the Department of Energy.

As I am sure you are aware, the administration is presently reviewing its own position on the issue of Government patent policy and I therefore cannot give you an administration-approved position on S. 1215. But I do hope to give the subcommittee information regarding the patent policy at DOE and our experience under it, and some benefit of my experience on what I believe to be the most critical patent policy issues.

The Department of Energy patent policy is controlled by both the Nuclear and Non-nuclear Acts. These acts both provide for the Government to acquire title to inventions and provide authority to grant waivers. The primary difference is that the Non-nuclear Act is more recent and considerably more detailed. We believe these legislative patent policies are technically sufficient and appropriately flexible to allow DOE to support a wide variety of research activities that it must undertake in every field of technology and with a wide variety of private, industrial and university entities.

Our policies are not without problems, however. DOE has the flexibility to grant waivers and makes use of that flexibility.

DOE has utilized its ability to grant both advance waivers at the time of contracting and identified waivers to individual inventions on a case-by-case basis.

We have granted waivers to the largest corporations in America, and to firms which employ six people.

We have granted waivers to all inventions to be made under a contract, and only to inventions which fall within a particular field of technology.

We have granted waivers covering both domestic and foreign rights to inventions, and waivers only to foreign rights.

We have granted waivers to individually identified inventions, as well as to all inventions of a class of contractors undertaking a particular type of work.

Our waivers have been limited in fields of technology, fields of use, and period of duration.

We have also denied waivers where it was believed to be in the public interest to do so.

In my more detailed comments, I provide waiver statistics. But I would like to emphasize for the subcommittee our three most relevant pieces of information.

First, we have granted advance waivers to approximately 3 percent of the prime contracts and major subcontracts to which they could have been made applicable.

Second, we have granted identified waivers to less than 1 percent of the individual inventions which are reported under our contracts and subcontracts; and

Third, the whole waiver process is a substantial administrative work load for both DOE and its prospective and actual contractors.

My more detailed remarks provide information about what we have found to be our average delays. We try to place our priority on those waiver decisions that hold up contracts. The rest of them are relegated to a lesser degree of priority and our delays in acting on these waivers run into some months, averaging somewhere between 10 and 20 months.

Although not all delays are caused by DOE, there is concern that in at least some cases the delays may well affect the commercialization efforts on the inventions involved. At present, the delays caused by DOE are simply due to the lack of sufficient personnel to promptly and properly process them.

Our experience under a title plus a waiver policy would be the same for the administration of any policy where the Government acquires title subject to a waiver. It involves substantial burdens for both the Government and the prospective contractor with respect to petitioning for waivers, negotiating, and determining waiver requests. This, in turn, can create delays in the research and development contracting process and may cause delays in the commercialization process because ownership of patent rights is frequently an important issue in both areas.

Additionally, a patent policy that provides for Government ownership of inventions places the burden and responsibilities upon the Government to see that the resulting technology is utilized. These responsibilities include:

The review of inventions to assess their importance, operability, feasibility, and commercial potential.

Obtaining protection on the most important inventions both domestically and in relevant foreign countries.

Advertising their availability, negotiating appropriate agreements for their licensing, and promoting their utilization.

Enforcing the patents obtained on them against unlicensed infringers.

These are part of a policy where the Government acquires title that is frequently forgotten. These responsibilities impose a tremendous and burdensome work load which should not be left to the Government unless there is also provided sufficient funding and staffing to carry out these responsibilities. Otherwise, consideration should be given to allowing industry to assume this primary responsibility, with the Government taking a monitoring or overseeing role.

Additionally, consideration must be given to the question of whether industry will or will not participate fully in Government R. & D. programs under a Government title policy. There is a frequently stated position that there are always companies and corporations standing in line waiting for Government moneys. This, of course, is true.

It does not address the issue, however, of whether those corporations or segments of corporations with the most advanced expertise in the field of technology of interest to the Government agency will accept R. & D. contracts under such a policy in areas where the contractor has an advanced, highly proprietary commercial position.

In view of the DOE mission to assist in the development of commercial energy alternatives, we are working in areas that have the highest commercial sensitivities. We know that there are corporations, or divisions of corporations, which will not work with us or will not even approach DOE in a contracting situation because of our patent policies.

Notwithstanding these problems, DOE believes that its policies are sufficiently flexible to accomplish its mission. Conceivably, this same type of policy might be applied with similar results to agencies having equal or smaller R., D. & D. programs.

The application of such a policy, however, on a Government-wide basis would, in my opinion, be burdensome to the point of becoming a substantial barrier to the Government R. & D. mission. The most recent data available indicate that over 40,000 contract and grant actions involving R. & D. are awarded by the Federal Government each year, and that under these approximately 6,000 invention disclosures are reported on an annual basis. The application of a title in the Government with waiver policy to this volume of contracting and inventing activity would not be possible in any realistic sense.

In any debate on this policy issue, one always hears charges of windfall profits, concerns expressed regarding Government giveaways, suggestions that valuable technology is either being suppressed by industry or utilized in an anticompetitive sense, and beliefs that making inventions available to all through Government ownership will achieve widespread commercial use. Government supported studies, however, have found no basis in fact for these charges, concerns, and beliefs.

Approximately 10 years ago, the Federal Council for Science and Technology supported the most comprehensive study ever conducted on the issue of Government patent policy—commonly referred to as the Harbridge House Report. This report made the following findings:

Government ownership with an offer of free public use does not alone result in commercialization of research results.

The commercial utilization rate of Government-generated inventions was low, approximately 12 percent, but that the rate doubled when contractors with commercial background positions were allowed to keep exclusive commercial rights to the inventions.

Windfall profits do not result from contractors retaining title to such inventions.

Little, if any, anticompetitive effect resulted from contractor ownership of inventions.

One final thought in regard to the concept of march-in rights. There has been considerable discussion that in the 10 years or more that such rights have been acquired by the Government, they have not been utilized. The conclusion is frequently drawn, therefore, that such rights are ineffective. I believe that this is an erroneous conclusion.

The march-in rights were developed to address issues of windfall, suppression, and the detrimental effects of exclusive patent rights on competition. In my opinion, it is because these problems have been primarily theoretical, and not actual, that the "march-in" rights have not been utilized.

I would emphasize what was said before, that the primary benefit to the concept of march-in rights is that the administrative burden to everyone can be limited to those cases, and only those cases, where an invention is commercially important to two or more parties who cannot settle their differences.

In view of this total experience, it is my opinion that any patent policy, whether enacted by Congress or adopted by the executive branch, should concentrate on the following three problems:

Achieving commercial utilization of the results of Government-sponsored research.

Insuring that the Government can work cooperatively with those segments of industry having the most advanced technology.

Reducing the administrative work load to the extent consistent with the overall public interest.

With that, I would be pleased to answer any questions that I can.

Senator SCHMITT. Thank you, Mr. Denny. And at the end of your statement, without objection, the summary synopsis of the Harbridge House study of Government patent policy prepared for this committee by Mr. Richard Miller, vice president of Harbridge House, will be included.

[The statement and study referred to follows:]

STATEMENT OF JAMES E. DENNY, ASSISTANT GENERAL COUNSEL FOR PATENTS, U.S. DEPARTMENT OF ENERGY

Mr. Chairman, members of the Subcommittee, I am James Denny, Assistant General Counsel for Patents of the Department of Energy (DOE), and I have held that same position for the Energy Research and Development Administration (ERDA) and the Atomic Energy Commission (AEC). As I have been deeply involved in the issue of Government patent policy for over 15 years, I sincerely appreciate

the opportunity to appear before this Subcommittee and comment on S. 1215, the Science and Technology Research and Development Utilization Policy Act. For the purpose of these remarks, the term Government patent policy shall be limited to the issue of the allocation of rights to inventions between the Government and its contractors.

This issue was not a problem prior to World War II primarily because most of the Government's research, development and demonstration (R,D&D) efforts were performed by Government employees in Government laboratories. Since World War II, however, the Government has steadily increased its commitment in financing this country's R,D&D efforts to the point where in 1978 the Federal Government's R,D&D expenditures were $23.8 billion, amounting to approximately 50 percent of the research and development supported in this country.

The approach to resolving this issue of increasing importance varied considerably depending upon the agency involved, the mission of the R,D&D program, or the type of research being conducted. The approach varied depending upon whether support was directed to basic research with universities through a grant program of the National Science Foundation, basic or applied health research by the National Institutes of Health, a military weapon systems developed by the Department of Defense, or a synfuels program by the Department of Interior.

As the Committee knows, the debate on the Government patent policy issue has gone on for over 30 years and is one in which both the Executive Branch and the Congress have failed to date to agree upon uniform policy guidance. The guidance provided by congress has not been consistent and has sometimes applied to a single agency, sometimes to an individual agency program, and sometimes to an R,D&D program which crossed agency lines. Also, this policy guidance has varied from an inflexible policy requiring an agency to always take title to inventions to policies which provide substantial flexibility. The Executive Branch has attempted to establish a consistent Government-wide policy approach through Presidential patent policy statements that are applicable in situations not covered by legislation, and which are flexible depending upon the agency mission and the intended end-use of the technology being supported.

As I am sure you are aware, the Administration is presently reviewing its own position on the issue of Government patent policy. This review will not be completed until later this year, and I cannot, therefore, bring to you an Administration-approved position on S. 1215. What I can do is provide the Subcommittee with information regarding the patent policy of DOE and our experience under it. In addition, I would like to comment on the most critical patent policy issues based on my experience as patent counsel for DOE/ERDA/AEC, and from the positions I have held in the patent policy area in the Deparment of the Navy, the National Aeronautics and Space Administration, the Patent and Trademark Office, the Department of Commerce, and on several interagency committees that have dealt with these issues. For example, I served as Executive Secretary to the Patent Advisory Panel and the Committee on Government Patent Policy of the Federal Council for Science and Technology. Presently, I chair the Subcommittee on Intellectual Property of the Federal Coordinating Council for Science, Engineering, and Technology.

One of the most detailed and recent expressions of Congressional patent policy was that developed for ERDA in December of 1974 by a Congressional/Executive Branch task group. That policy, now applicable to DOE, normally requires the Government to take title to inventions made under R,D&D contracts, but also provides the flexibility to enable DOE to waive these patent rights, subject to certain limitations and conditions. This policy, found in Section 9 of the Federal Nonnuclear Energy Reserch and Development Act of 1974 (Public Law 93-577), covers DOE's R,D&D contracts in the nonnuclear area and is more fully described in Attachment 1 to my Statement which I would like entered into the record.

DOE's nuclear patent policy is controlled by Section 152 of the Atomic Energy Act of 1954, as amended. This policy similarly requires the Government to normally take title to inventions and provides the authority to waive this right. The primary difference between the nuclear and nonnuclear patent policies is that Section 9 of the Nonnuclear Act provides substantially more detailed guidance and criteria for the application of the waiver policy than does Section 152 of the Atomic Energy Act. The two, however, are not inconsistent and have been harmonized in DOE's Procurement Regulations of 41 CFR Part 9-9. These regulations (Attachment 2) are also submitted for the record. The current DOE patent policy illustrates how this issue has evolved, incrementally, through both Congressional and Executive Branch action.

Congress requested ERDA in Section 9(n) of the Nonnuclear Act to report to the President and Congress on the applicability of its existing patent policies along with

any recommendations on mandatory patent licensing which were believed desirable. Such a report, entitled "The Patent Policies Affecting ERDA Energy Programs," (ERDA-76-16) dated January 1976, was submitted to Congress and the President. This report, which provided the information then available, indicated that it was preliminary in nature in view of the fact that insufficient experience had been obtained under the new patent policies and insufficient information and data were known regarding mandatory patent licensing. The final report under Section 9(n) is in the process of being prepared, so it is somewhat premature to provide you with DOE's full conclusions regading these issues. The report will indicate, however, that the nuclear and nonnuclear patent policies applicable to DOE are technically sufficient and appropriately flexible to allow DOE to support the wide variety of R,D&D activities that it must undertake in literally every field of technology, and with a wide variety of private, industrial, and university entities. On the other hand, the report will indicate that the DOE policies are not without problems and substantial administrative work load.

As I said before, DOE's nuclear and nonnuclear patent policies provide the flexibility to grant waivers of the Government's rights in inventions made under our R,D&D contracts, and we have made use of that flexibility. DOE has utilized its ability to grant both "advance" waivers at the time of contracting, which cover all or part of the inventions to be made under a contract, and "identified" waivers to individual inventions on a case-by-case basis. We have granted waivers to the largest corporations in America, and to firms which employ six people. We have granted waivers to all inventions to be made under a contract, and only to inventions which fall within a particular field of technology. We have granted waivers covering both domestic and foreign rights to inventions and waivers only to foreign rights. We have granted waivers to individually identified inventions as well as to all inventions of a class of contractors undertaking a particular type of work. Our waivers have been limited in fields of technology, fields of use, and period of duration. We have also denied waivers where it was believed not to be in the public interest to grant them and have discouraged waiver petitions during contract negotiations where they would obviously not be granted.

Typical situations where DOE will grant a waiver at the time of contracting are where DOE is:

Cost-sharing the R,D&D effort with the contractor;

Buying into a contractor's presently ongoing private R,D&D effort;

Allowing the private use of DOE facilities at full cost reimbursement;

In need of a particular contractor necessary for our program which will not contract without a waiver; and

Contracting with small businesses.

For identified waivers of individual inventions, the primary criteria are whether or not the invention involved in the waiver appears to need additional R,D&D efforts in order to commercialize it, whether DOE or other Government agencies plan to provide additional funding, and, in the case of a university, whether it has an approved patent program. In all waiver decisions, we consider the competitive impact of the rights retained by the contractor and those acquired by the Government, and, where believed to be in the public interest, DOE has acquired some rights to a contractor's privately developed background technology.

Statistics regarding DOE's waiver experience can be in large measure misleading when viewed without an understanding of our flexible administrative procedures. Our approach to waivers is to negotiate them as early in the contracting process as possible, to encourage informal inquiry regarding the possibilities of obtaining a waiver, to discourage what would appear to be frivolous requests for waivers, and to encourage the withdrawal or modification of waiver requests where appropriate. Accordingly, formal and informal waiver requests are frequently modified during the negotiation process, and defy analysis as to when they were received and acted upon and whether they were denied in part or granted in part. In addition, many waiver situations will show substantial delays prior to a final decision, some of which are the fault of DOE and some of which are the fault of the requestor.

The three most relevant pieces of information I would like to give you regarding the current administration of our legislative waiver policy are:

(1) We have granted advance waivers to approximately 3 percent of the prime contracts and major subcontracts to which they could have been made applicable;

(2) We have granted identified waivers to less than 1 percent of the individual inventions which are reported under contracts and subcontracts; and

(3) The whole waiver process is a substantial administrative work load for both DOE and its prospective and actual contractors.

With the above warning on the usefulness of additional statistics, the following statistical information is provided. Since the beginning of ERDA in January of 1975, through the month of March 1979, ERDA/DOE has granted advance waivers to 193 out of the approximately 7,100 prime contracts and major subcontracts to which waivers could have been made applicable. During that same time, ERDA/DOE has obtained approximately 6,100 invention disclosures under its RD&D contracts and subcontracts and has granted 52 identified waivers on these inventions.

Currently, we receive approximately 100 formal requests, or petitions, annually for advance waivers on some 2,400 prime contracts and major subcontracts. Our current backlog of pending advance waiver requests is 62. Those advance waiver requests that are holding up contract actions, of necessity, obtain priority treatment and are the ones to which we give our major attention. We attempt to negotiate and determine these waiver requests during the negotiation of other contract matters so as not to delay the contracting effort. The other advance waiver requests, however, have been delayed as much as 10 to 18 months before formal DOE action has been taken. I believe we are improving, however, and our backlog has recently been substantially reduced.

Waiver requests for identified inventions made under a contract also are relegated to a lower level of priority because they do not delay the R,D&D contracting effort. As a result, actions on these waivers have frequently taken between 10 and 20 months, although more recently the average pendency has been reduced to about 12 months. Our present backlog of identified waivers is 97. Although not all delays are caused by DOE, there is concern that in at least some cases the delays may well affect the commercialization efforts on the inventions involved. At present, the delays caused by DOE are simply due to the lack of sufficient personnel to promptly and properly process them.

In the development and implementation of any approach to the Government patent policy issue, trade-offs are necessary. Uniformity or consistency of application of a single policy to all contracting situations provides for ease of administering any policy, but eliminates the flexibility to react differently to different situations. If flexibility is introduced to a policy, the administrative burden that accompanies decision making also increases work load and introduces delays. Where the contractor is allowed to retain rights to resulting inventions, the responsibility, expense, and burden to achieve commercial utilization falls on the contractor. Where the Government obtains title to inventions, it accepts these responsibilities. For example, the experience under the DOE legislative patent policies indicate that they are sufficiently flexible to address the various R,D&D mission responsibilities of DOE, but that the policies are not without problems.

The administration of any policy where the Government acquires title, subject to a waiver, involves substantial burdens for both the Government agency and prospective contractors with respect to petitioning, negotiating, and determining waiver requests. This, in turn, can create delays in the R,D&D contracting process and may cause delays in the commercialization process because ownership of the patent rights is frequently an important issue in both areas.

Additionally, a patent policy that provides for Government ownership of inventions places the burden upon the Government to see that the resulting technology is utilized. As a Government employee responsible for carrying out such policies, this is of particular concern to me and should be more of a concern to Congress. The responsibility to review the inventions created under Government sponsorship, to assess the importance, operability, feasibility, and commercial potential of these inventions, to obtain protection of the inventions both domestically and in relevant foreign countries, to advertise their availability, to negotiate appropriate agreements for their licensing, to promote their utilization, and to enforce the patents obtained on them against unlicensed infringers, imposes a tremendous and burdensome work load which should not be left to the Government unless there is also provided sufficient funding and staffing to carry out these responsibilities. Otherwise, consideration should be given to allowing industry to assume this primary responsibility, with the Government taking a monitoring or overseeing role. This has been one of the major issues that has eluded our Executive Branch-Congressional consensus.

Additionally, consideration must be given to the question of whether industry will or will not participate fully in Government R,D&D programs under a Government title policy. There is a frequently stated position that there are always companies and corporations standing in line waiting for Government R,D&D contracting monies. This, of course, is true. It does not address the issue, however, of whether those corporations, or segments of corporations, with the most advanced expertise in the field of technology of interest to the Government agency, will accept R,D&D

contracts under such a policy in areas where the contractor has an advanced, highly proprietary, commercial position as presently exists in many portions of the electronics and fossil fuels industries.

In view of the DOE mission to assist in the development of commercial energy alternatives, we are working in areas that have the highest commercial sensitivities. We know that there are corporations, or divisions of corporations, which will not work with us, or will not even approach this Department in contracting situation because of our patent and technical data policies. Companies are concerned that if they deal with the Government under a title in the Government policy, their privately developed technology, proprietary data, trade secrets and know-how will be compromised.

Notwithstanding these problems of administrative burdens and delays associated with DOE legislative and regulatory patent policies, we believe that the policies are sufficiently flexible to enable DOE to accomplish its mission. Conceivably, this same type of policy might be applied with similar results to agencies having equal or small R,D&D programs, to programs limited to more basic type research efforts, or to programs concerning the development of technology specifically intended to solve critical public problems as in the case of DOE. The application of such a policy, however, on a Government-wide basis, would, in my opinion, be burdensome to the point of becoming a substantial barrier to the Government R,D&D mission. The most recent data available indicates that over 40,000 contract and grant actions involving R,D&D are awarded by the Federal Government each year, and that under these, approximately 6,000 invention disclosures are reported on an annual basis. The application of a title in the Government with waiver policy to this volume of contracting and inventing activity would not be possible in any realistic sense.

In any debate on this policy issue, one always hears charges of windfall profits going to Government contractors, concerns expressed regarding Government give-aways, suggestions that valuable technology is either being suppressed by industry or utilized in an anti-competitive sense, and beliefs that making inventions available to all through Government ownership will achieve widespread commercial use. Government supported studies, however, have found no basis in fact for these charges, concerns, and beliefs. Approximately 10 years ago, the Federal Council for Science and Technology supported the most comprehensive study ever conducted on the issue of Government patent policy—commonly referred to as the Harbridge House Report. This report made the following findings:

Government ownership with an offer of free public use does not alone result in commercialization of research results;

The commercial utilization rate of Government-generated inventions was low (approximately 12 percent), but that the rate doubled when contractors with commercial background positions were allowed to keep exclusive commercial rights to the inventions;

Windfall profits do not result from contractors retaining title to such inventions; and

Little, if any, anti-competitive effect resulted from contractor ownership of inventions because contractors normally licensed such technology, and where they did not, alternative technologies were available.

In our effort to complete the report to Congress on the issue of mandatory or compulsory licensing, DOE recently funded an additional study with Harbridge House which is presently under analysis. This study shows that there are few, if any, adverse effects resulting from enforcement of exclusive patent rights, and, in fact, indicates some stimulation of research occurs when exclusive rights are enforced. Accordingly, this data seems to reinforce the original study which found no anti-competition effects when exclusive rights were left with the contractors.

One final comment in regard to the concept of "march-in" rights—there has been considerable discussion that in the 10 years or more that such rights have been acquired by the Government, they have not been utilized. The conclusion is frequently drawn, therefore, that such rights are ineffective. I believe that this is an erroneous conclusion. The "march-in" rights were developed to address issues of windfall, suppression, and the detrimental effects of exclusive patent rights to competition. In my view, it is because these problems have been primarily theoretical, and not actual, that the "march-in" rights have not been utilized. The primary benefit to the concept of "march-in" rights is that the administrative burden to everyone can be limited to those cases, and only those cases, where an invention is commercially important to two or more parties who cannot settle their differences.

In the invitation extended by the Subcommittee, five questions or policy issues were included with a request that views be expressed on them. I believe that I have

addressed many, but not all, of those issues. Addressing them all would have extended my prepared testimony will beyond the time permitted. I have, however, given my personal comments regarding these issues in Attachment 3. Also, I have not attempted to comment on the various details of S. 1215, but I have limited my remarks to studies of an experiences gainded under various policy approaches. I would be happy to work with the Subcommittee or its staff in further developing this bill from an operational point of view, particularly regarding its impact on the missions and responsibilities of the various Federal agencies. Working out such details was not intended to be within the scope of this presentation.

In summary, and in view of this total experience, it is my opinion that any patent policy, whether enacted by Congress or adopted by the Executive Branch, should concentrate on the following three problems:

Achieving commercial utilization of the results of Government-sponsored research;

insuring that the Government can work cooperatively with those segments of industry having the most advanced technology; and

reducing the administrative work load to the extent consistent with the overall public interest.

If I can answer any questions, I will be happy to do so.

ATTACHMENT 1

DOE STATUTORY PATENT POLICY—SUMMARY

DOE patent policy is controlled by two statutes: the Atomic Energy Act of 1954, as amended, P.L. 83-703, 68 Stat. 919, 42 U.S.C. 2011 et seq., and the Federal Nonnuclear Energy Research and Development Act of 1974, (hereinafter Nonnuclear Energy Act) P.L. 93-577, 88 Stat. 1878, 42 U.S.C. 5901 et seq.

These two statutes generally require DOE to take title to inventions conceived or made under DOE contracts, grants, agreements, understandings or other arrangements which involve research, development or demonstration work. However, both these statutes provide the Secretary of Energy (hereinafter Secretary) with discretionary authority to waive all or any part of Government rights to such inventions. For example, Section 152 of the Atomic Energy Act, 42 U.S.C. 2182, sets forth DOE policy in the field of nuclear energy by providing:

Any invention or discovery, useful in the production or utilization of special nuclear material or atomic energy, made or conceived in the course of or under any contract, subcontract, or arrangement entered into with or for the benefit of * * * [DOE] regardless of whether the contract, subcontract, or arrangement involved the expenditure of funds by * * * [DOE], shall be vested in, and be the property of, * * * [DOE], except that * * * [DOE] may waive its claim to any such invention or discovery under such circumstances as * * * [DOE] may deem appropriate, consistent with the policy of this section.

This policy is similar to, but less detailed than, that found in the Nonnuclear Energy Act in that it provides broad discretionary powers in the Secretary to waive Government rights to such inventions.

Subsection 9(a) of the Nonnuclear Energy Act, 42 U.S.C. Sec. 5908, sets forth DOE policy in the nonnuclear field by providing:

Whenever any invention is made or conceived in the course of or under any * * * [DOE] contract * * * other than nuclear energy research, development, and demonstration pursuant to the Atomic Energy Act of 1954 * * * title to such invention shall vest in the United States * * * unless in particular circumstatnces the * * * [Secretary] waives all or any part of the rights of the United States to such invention in conformity with the provisions of this section.

Section 9(c) states that the Secretary may waive all or any part of the rights to any invention or class of inventions made or to be made under any contract with DOE if it is determined that the interests of the United States and the general public will best be served by such waiver. In making waiver determinations, the following objectives must be considered:

Making the benefits of the energy research, development and demonstration program widely available to the public in the shortest practicable time;

Promoting the commercial utilization of such inventions;

Encouraging participation by private persons in the DOE's energy research, development, and demonstration program; and

Fostering competition and preventing undue market concentration or the creation or maintenance of other situations inconsistent with the antitrust laws.

The Conference Committee on the Nonnuclear Energy Act, H.R. Rep. No. 93-1563, 93d Cong., 2d Sess., at page 27, recognized that in any single waiver situation, all

four of these objectives might not be obtainable, i.e., in some situations participation might be more important than fostering competition, while in others the reverse might be true. Congress did expect, however, that over the long run all four of these objectives must be attained.

Sections 9(d) and 9(j) set forth twelve specific factors which the Secretary should consider in making waiver determinations at the time of contracting. These factors were obtained from experience under the AEC and NASA legislation and from other Federal agencies under the Presidential Patent Policy statement. They concern considerations of:

The willingness of a contractor to participate;

The contractor's background and commercial position;

The contribution that contractor has made or will make to commercialization of contract results;

The contribution that the Government has made or will make to commercialization of the contract results;

The effect of the waiver on public health, safety and welfare, and its effect on competition; and

The extent to which universities have a technology transfer capability and the small business status of the contractor.

Section 9(e) sets forth similar waiver considerations that must be taken into account in waiving individual inventions identified under DOE contracts. Accordingly, with both Sections 9(d) and (e), DOE has the authority to make both advance and identified waivers.

Section 9(h) of the Nonnuclear Energy Act provides for the minimum rights DOE must retain under each waiver which cannot be waived. These include a free Government license plus the following so-called "march-in" rights:

The right to require the contractor to license others at reasonable royalties if the invention is required for use by Government regulations or is necessary to fulfill health, safety, or energy needs;

The right to terminate the waiver in whole or in part if the contractor is not taking effective steps necessary to commercialize the invention, or will not take such steps within a reasonable time; and

The right to require licensing at reasonable royalties, or to terminate the waiver in whole or in part if it is shown at a public hearing held four years after the grant of a waiver that—the waiver has tended to violate the antitrust laws, or the contractor has not taken, and is not expected to take, effective steps to commercialize the invention.

ATTACHMENT 2

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PART 9-9 PATENTS, DATA, AND COPYRIGHTS

§9-9.000 Scope of part.

(a) This part sets forth policies, instructions, and contract clauses pertaining to patents, data, and copyrights in connection with the procurement of supplies and services.

(b) It is noted that §9-9.107-4(d) entitled "License rights (upon request) to the contractor" pertains to contracts for the operation of Government-owned facilities or special long term, cost-reimbursement Government-funded research, development, or demonstration work. It provides that in such contracts, the paragraph set forth in §9-9.107-5(e) shall be substituted for paragraph (c)(1) of the Patent Rights (long form) clause of §9-9.107-5(a) to provide a revocable, nonexclusive, royalty-free license in inventions only upon request by the contractor for reservation of such license.

(c) Also, §9-9.107-4(g) entitled "Facilities license" covers a contract which has, as a purpose, the design, construction, or operation of a Government-owned research, development, demonstration, or production facility. It states that the paragraph of §9-9.107-5(h) shall be used in all such contracts, in addition to the provisions of the Patent Rights (long form) clause, since it is necessary that the Government be accorded certain rights with respect to further use of the facility by or on behalf of the Government upon termination of the contract, including the right to make, use, transfer, or otherwise dispose of all articles, materials, products, or processes embodying inventions or discoveries used or embodied in the facility, regardless of whether or not conceived or actually reduced to practice under or in the course of such contracts. Further, §9-9.107-4(h) entitled "Subcontracts" states that the withholding of payment provision of the prime contract will not normally be included in a subcontract except upon request of the Contracting Officer except for subcontracts awarded by contractors who operate Government-owned facilities and for other special contracting situations, in which cases the withholding of payment provision may be flowed down to the first-tier subcontractor only.

(d) With respect to technical data and copyrights, §9-9.202-4 applies to contracts for the operation of Government-owned, contractor-operated research or production facilities. This section sets forth the Rights in Technical Data-Facility clause which shall normally be included in such contracts.

Subpart 9-9.1 Patents

§9-9.100 Scope of subpart.

(a) This subpart sets forth policies, procedures, and contract clauses with respect to inventions made, conceived, or utilized in the course of or under any contracts, grants, agreements, understandings or other arrangements entered into with or for the benefit of the DOE. One of DOE's primary missions requires the use of its procurement process to insure the conduct of research, development, and demonstration leading to the ultimate commercial utilization of all efficient sources of energy. Accordingly, DOE's mission is not oriented toward procurement for Government use, except where procurements are involved with special classified programs or the construction or improvement of Government-owned facilities. To accomplish its mission, DOE must work in cooperation with industry in the development of new energy sources and in achieving the ultimate goal of widespread commercial use. To this end, Congress has provided DOE with an array of incentives to secure the adoption of the new technology developed for DOE. An important incentive in commercializing technology is that provided by the

patent system. As set forth in these regulations, patent incentives, including DOE's authority to waive the Government's patent rights to the extent provided for by statute, will be utilized in appropriate situations at the time of contracting to encourage industrial participation, foster commercial utilization and competition, and make the benefits of DOE's activities widely available to the public. In addition to considering the waiver of patent rights at the time of contracting, DOE will also consider the incentive of a waiver of patent rights upon the reporting of an identified invention when requested by the contractor or the employee-inventor with the permission of the contractor. These requests can be made whether or not a waiver request was made at the time of contracting. Waivers for identified inventions will be provided where it is determined that the patent waiver will be a real incentive to achieving the development and ultimate commercial utilization of inventions. Where a waiver of the Government's patent rights is granted, either at the time of contracting or upon request or after an invention is made, certain safeguards will be required by DOE to protect the public interest.

(b) Another major DOE mission is to manage the nation's uranium enrichment and other classified programs, where R&D procurements are directed toward processes and equipment not available to the public. To accomplish DOE's programs for bringing private industry into these and other special programs to the maximum extent permitted by national security and policy considerations, it is desirable that the technology developed in these programs be made available on a selected basis for use in the particular fields of interest and under controlled conditions by properly cleared industrial and scientific research institutions. To insure such availability and control, the grant of waivers in these programs may necessarily be more limited than in other DOE programs.

§9-9.101 (Reserved).

§9-9.102 Authorization and consent.

(a) Under 28 USC 1498, any suit for unauthorized use of a United States patent based on the manufacture or use by or for the United States of an invention described in and covered by a patent of the United States by a contractor or by a subcontractor (at any tier) can be maintained only against the Government in the Court of Claims, and not against the contractor or subcontractor, in those cases where the Government has authorized or consented to the manufacture or use of the patented invention. Accordingly, to insure that work by a contractor or subcontractor under a Government contract may not be enjoined by reason of patent infringement, authorization and consent shall be given in the prime contract and shall apply to all subcontracts thereunder as provided below. The liability of the Government for damages in such suit against it may, however, ultimately be borne by a contractor or subcontractor in accordance with the terms of any Patent Indemnity clause also included in the contract or subcontract, and an Authorization and Consent clause may be included in the same contract or subcontract.

(b) In certain contracting situations, such as those involving demonstration projects, consideration should be given to the impact of third party-owned patents covering technology that may be incorporated in the project which may ultimately affect widespread commercial use of the project results. In such situations, Patent Counsel should be consulted to determine what modifications, if any, should be made to the utilization of the Authorization and Consent and Patent Indemnity provisions or what other action might be deemed appropriate.

(c) An Authorization and Consent clause shall not be used in contracts where both complete performance and delivery are to be outside the United States, its possessions or Puerto Rico.

§9-9.102-1 Authorization and consent in contracts for supplies or services.

The following contract clause shall be included in all contracts for supplies or services except when prohibited by §9-9.102(c) or in contracts for research, development, or demonstration work and in subcontracts thereunder in which the clause in §9-9.102-2 is required.

AUTHORIZATION AND CONSENT

The Government hereby gives its authorization and consent (without prejudice to any rights of indemnification) for all use and manufacture, in the performance of this contract or any part hereof or any amendment hereto or any subcontract hereunder (including any lower-tier subcontract), of any invention described in and covered by a patent of the United States (a) embodied in the structure or composition of any article the delivery of which is accepted by the Government under this contract or (b) utilized in the machinery, tools or methods, the use of which necessarily results from compliance by the contractor or the using subcontractor with (i) specifications or written provisions now or hereafter forming a part of this contract, or (ii) specific written instructions given by the Contracting Officer directing the manner of performance. The entire liability to the Government for infringement of a patent of the United States shall be determined solely by the provisions of the indemnity clauses, if any, included in this contract or any subcontract hereunder (including all lower-tier subcontracts), and the Government assumes liability for all other infringement to the extent of the authorization and consent hereinabove granted.

§9-9.102-2 Authorization and consent in contracts for research, development, or demonstration.

Greater latitude in the use of patented inventions may be necessary in a contract for research, development, or demonstration work than in a contract for supplies. Unless prohibited by §9-9.102(c), the following clause shall be included in all contracts calling for research, development, or demonstration work and shall be included in contracts calling for both supplies and research, development, or demonstration work where the latter work is a primary purpose of the contract. In all other contracts for both supplies and research, development, or demonstration work, the Authorization and Consent clause in §9-9.102-1 shall be used. If the following clause is included in a contract, the clause in §9-9.102-1 shall not be included.

AUTHORIZATION AND CONSENT

The Government hereby gives its authorization and consent for all use and manufacture of any invention described in and covered by a patent of the United States in the performance of this contract or any part hereof or any amendment hereto or any subcontract hereunder (including all lower-tier subcontracts).

§9-9.103 Patent indemnification of Government by contractors.

In order that the Government may be reimbursed for liability for patent infringement arising out of or resulting from the performance of construction contracts or contracts for supplies, including standard parts and components which normally are or have been sold or offered for sale to the public in the commercial open market, or which are the same as such supplies with a relatively minor modification thereof, a clause providing for indemnification of the Government shall be included in such contracts as well as in subcontracts, as appropriate, in accordance with the instructions set forth below. However, a Patent Indemnity clause normally shall not be used in contracts or subcontracts:

(a) When the Authorization and Consent clause in §9-9.102-2 applicable to research, development, or demonstration contracts is authorized, except that in contracts calling also for supplies of the kind described above, or for supplying standard parts or components, the Patent Indemnity clause in §9-9.103-3(b) may be used with respect to such supplies; in subcontracts

thereunder, the Patent Indemnity clause of §9-9.103-1 or §9-9.103-3(b) shall be used as appropriate;

(b) When the contract is for supplies which clearly are not, or have not been, sold or offered for sale to the public in the commercial open market;

(c) When both performance and delivery are to be outside the United States, its possessions, or Puerto Rico, unless the contract indicates that the supplies are ultimately to be shipped into the United States, its possessions or Puerto Rico, in which case the instructions of §9-9.103-1 or §9-9.103-3 are applicable; or

(d) When the contract is for an amount of $10,000 or less (as a matter of administrative convenience, however, the clause need not be deleted where it is a part of a standard form being used for such contracts, since it is self-deleting).

§9-9.103-1 Patent indemnification in formally advertised contracts - commercial status predetermined.

Except as prohibited by §9-9.103, the following clause is appropriate in formally advertised construction contracts and shall be included in formally advertised contracts for supplies when it has been determined in advance of issuing the invitation for bids that the supplies (or such supplies apart from relatively minor modifications to be made thereto) normally are or have been sold or offered for sale by any supplier to the public in the commercial open market.

PATENT INDEMNITY

If the amount of this contract is in excess of $10,000 the contractor shall indemnify the Government and its officers, agents, and employees against liability, including costs, for infringement of any United States letters patent (except U.S. letters patent issued upon an application which is now or may hereafter be kept secret or otherwise withheld from issue by order of the Government) arising out of the manufacture or delivery of supplies or out of construction, alteration, modification, or repair of real property (hereinafter referred to as "construction work") under this contract, or out of the use or disposal by or for the account of the Government of such supplies or construction work. The foregoing indemnity shall not apply unless the contractor shall have been informed as soon as practicable by the Government of the suit or action alleging such infringement, and shall have been given such opportunity as is afforded by applicable laws, rules, or regulations to participate in the defense thereof; and further, such indemnity shall not apply to: (a) an infringement resulting from compliance with specific written instructions of the Contracting Officer directing a change in the supplies to be delivered or in the materials or equipment to be used, or directing a manner of performance of the contract not normally used by the contractor; (b) an infringement resulting from addition to or change in, such supplies or components furnished or construction work performed which addition or change was made subsequent to delivery or performance by the contractor; or (c) a claimed infringement which is settled without the consent of the contractor, unless required by final decree of a court of competent jurisdiction.

§9-9.103-2 (Reserved)

§9-9.103-3 Patent indemnification in negotiated contracts.

The fact that a contract is negotiated does not preclude inclusion of a Patent Indemnity clause in such a contract, and such clause may be included in negotiated construction contracts and in contracts for supplies when such supplies normally are or have been sold or offered for sale to the public in the commercial open market, or are such supplies with relatively minor modifications made thereto, or in contracts for supplying standard parts or components.

(a) Subject to the foregoing and to the prohibitions in §9-9.103, the clause in §9-9.103-1 is approved for use in negotiated contracts for construction work or supplies.

(b) Except as prohibited by §9-9.103, the following clause is appropriate in research, development, or demonstration contracts when it has been determined by DOE in any particular contracting situation that the contract will require standard supplies sold or offered for sale to the public on the commercial open market or will use the contractor's practices or methods which normally are or have been used in providing goods and services on the commercial open market.

PATENT INDEMNITY

The contractor shall indemnify the Government and its officers, agents, and employees against liability, including costs, for infringement of U.S. Letters Patent (except U.S. Letters Patent issued upon an application which is now or may hereafter be kept secret or otherwise withheld from issue by order of the Government) resulting from the contractor's: (a) furnishing or supplying standard parts or components which have been sold or offered for sale to the public on the commercial open market; or (b) utilizing its normal practices or methods which normally are or have been used in providing goods and services in the commercial open market, in the performance of the contract; or (c) utilizing any parts, components, practices, or methods to the extent to which the contractor has secured indemnification from liability. The foregoing indemnity shall not apply unless the contractor shall have been informed as soon as practicable by the Government of the suit or action alleging such infringement, and shall have been given such opportunity as is afforded by applicable laws, rules, or regulations to participate in the defense thereof; and further, such indemnity shall not apply to a claimed infringement which is settled without the consent of the contractor, unless required by final decree of a court of competent jurisdiction or to an infringement resulting from addition to or change in such supplies or components furnished or construction work performed for which addition or change was made subsequent to delivery or performance by the contractor.

§9-9.103-4 Waiver of indemnity by the Government.

If it is desired to exempt one or more specified United States patents from the Patent Indemnity clause in §9-9.103-1 and §9-9.103-3(b), concurrence for such exemption shall be obtained from the Patent Counsel assisting the procuring activity, and the following clause shall be included in the contract, in addition to the Patent Indemnity clause.

WAIVER OF INDEMNITY

Any provision of this contract to the contrary notwithstanding, the Government hereby authorizes and consents to the use and manufacture, solely in the performance of this contract, of any invention covered by the United States patents identified as listed below, and waives indemnification by the contractor with respect to such patents: (identify the patents by number or by other means if more appropriate).

§9-9.104 Notice and assistance.

The Government should be notified by the contractor of all claims of infringement in connection with the performance of a Government contract which come to the contractor's attention. The contractor should also assist the Government, to the extent of evidence and information in the possession of the contractor, in connection with any suit against the Government or any claims against the Government made before suit has been instituted, on account of any alleged patent or copyright infringement arising out of or resulting from the performance of the contract. Accordingly, the following clause shall be included in all contracts in excess of $10,000 for supplies, services, construction, research, development, or demonstration work. However, the clause shall not be included in contracts:

(a) Where both performance and delivery are to be outside the United States, its possessions, or Puerto Rico, unless the contract indicates that the supplies are ultimately to be shipped into the United States, its possessions, or Puerto Rico; or

(b) Of $10,000 or less (as a matter of administrative convenience, however, the clause need not be deleted when it is part of a standard form being used for such contracts since it is self-deleting).

NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT

The provisions of this clause shall be applicable only if the amount of this contract exceeds $10,000.

(a) The contactor shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this contract of which the contractor has knowledge.

(b) In the event of any claim or suit against the Government on account of any alleged patent or copyright infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or services performed hereunder, the contractor shall furnish to the Government when requested by the Contracting Officer, all evidence and information in possession of the contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the contractor has agreed to indemnify the Government.

(c) This clause shall be included in all subcontracts.

§9-9.105 (Reserved).

§9-9.106 Classified inventions.

Unauthorized disclosure of classified subject matter, whether in a patent application or resulting from the issuance of a patent, may be a violation of not only the Atomic Energy Act of 1954, as amended, and other laws relating to espionage and national security, but also provisions pertaining to disclosure of information incorporated in the contract. Accordingly, the following clause shall be included in every contract which covers or is likely to cover classified subject matter.

CLASSIFIED INVENTIONS

(a) The contractor shall not file or cause to be filed on any invention or discovery conceived or first actually reduced to practice in the course of or under this contract in any country other than the United States, an application or registration for a patent without first obtaining written approval of the Contracting Officer.

(b) When filing a patent application in the United States on any invention or discovery conceived of or first actually reduced to practice in the course of or under this contract, the subject matter of which is classified for reasons of security, the contractor shall observe all applicable security regulations covering the transmission of classified subject matter. When transmitting the patent application to the United States Patent and Trademark Office, the contractor shall by separate letter identify by agency and number, the contract or contracts which require security classification markings to be placed on the application.

(c) The substance of this clause shall be included in subcontracts which cover or are likely to cover classified subject matter.

§9-9.107 Patent rights under contracts for research, development, and demonstration and under special contracts.

§9-9.107-1 General.

This section sets forth the policies, procedures and practices of DOE in connection with inventions, patents, and related matters based upon the Atomic Energy Act of 1954, as amended (42 USC 2182), and Section 9 of the Federal Nonnuclear Energy Research and Development Act of 1974 (42 USC 5908); and, to the extent not inconsistent with the foregoing statutes, the revised Presidential Memorandum and Statement of Government Patent Policy, August 23,

1971 (36 F.R. 16887-16892). Section 152 of the Atomic Energy Act provides that the title to inventions useful in the nuclear energy field, made or conceived in the course of or under a contract, subcontract, or arrangement entered into for the benefit of the Commission (now DOE), shall be vested in the Government. Government rights in such an invention may be waived consistent with the policy of Section 152. In a similar manner, Section 9 of the Federal Nonnuclear Energy Research and Development Act provides that title to inventions made or conceived in the course of or under DOE contracts other than in the nuclear energy field shall vest in the Government, and that all or part of the rights of the Government in such inventions may be waived if it is determined, in conformity with the provisions of Section 9, that the interests of the United States and the general public will best be served by such waiver.

§9-9.107-2 (Reserved).

§9-9.107-3 Policy.

(a) Whenever any invention is made or conceived in the course of or under any contract of DOE, title to such invention shall vest in the United States unless the Head of the Agency or designee waives all or any part of the rights of the United States in the invention. While waivers are to be granted only in conformity with the specific minimum considerations and under the carefully delineated conditions set forth in §9-9.109-6, it is recognized that waivers comprise a necessary part of the commercialization incentives available to DOE. It is intended, therefore, that waivers will be provided in appropriate situations to encourage industrial participation and foster rapid commercial utilization in the overall best interest of the United States and the general public. With regard to any waivers granted under this Part 9-9, DOE shall maintain a publicly available, periodically updated record of such waiver determinations.

(b) In contracts having as a purpose the conduct of research, development or demonstration work and in other special contracts, the Government shall normally acquire title in and to any invention or discovery conceived or first actually reduced to practice in the course of or under the contract, allowing the contractor to retain a nonexclusive, revocable, paid-up license in the invention and the right to file and retain title in any foreign country in which the Government does not elect to secure patent rights. The contractor's nonexclusive license retained in the invention may be revoked or modified by DOE only to the extent necessary to achieve expeditious practical application of the invention pursuant to an applicaton for and the grant of an exclusive license in the invention.

(c) In contracts having as a purpose the conduct of research, development, or demonstration work and in other special contracts, the Government may have to acquire the right to require licensing of background patent rights by the contractor to insure reasonable public availability and accessibility necessary to practice the subject of the contract in the fields of technology specifically contemplated in the contract effort. The need for background patent rights and the particular rights that should be obtained for either the Government or the public will depend upon the type, purpose, and scope of the contract effort, and the cost to the Government of obtaining such rights. Accordingly, the background patent rights provision which will be appropriate for many contract situations is included in the Patent Rights clause.

(d) Nothing in this Part 9-9 shall be deemed to convey to any individual, corporation or other business organization immunity from civil or criminal liability, or to create defenses to actions under the antitrust laws.

§9-9.107-4 Procedures.

(a) Selection of Patent Rights clause.

(1) Whenever a contract, subcontract or other arrangement has as a purpose the conduct of research, development, or demonstration work, the operation of a Government-owned research or production facility, the furnishing of architect-engineer, design or other special services, or the coordination and direction of the work of others, the Contracting Officer shall

include in the proposed contract either the Patent Rights clause of §9-9.107-5(a), or the clause of §9-9.107-6. The clause set forth in §9-9.107-6 may be used only in contracts calling for basic or applied research work with nonprofit or educational institutions or in certain consultant contracts as set forth in paragraph (a)(5) of this section.

(2) The Patent Rights clauses of §9-9.107-5(a) and §9-9.107-6 provide that the Government shall acquire title to each invention made (i.e., conceived or first actually reduced to practice) in the course of or under the contract. However, the contractor shall retain in such invention a nonexclusive, revocable license and, subject to DOE security requirements and regulations, may file and retain title in any foreign country in which the Government does not elect to secure patent rights. The contractor or the inventor may also retain greater rights than these after an invention has been identified and reported to DOE if the Secretary or designee determines that the interests of the United States and the general public will best be served by a waiver of such rights, utilizing the considerations set forth in §9-9.109-6.

(3) The Patent Rights clauses shall normally include the provisions set forth in paragraph (1) of the clause in §9-9.107-5(a) and paragraph (f) of the clause in §9-9.107-6. If the Contracting Officer determines that the work to be performed under the contract would not be useful in the production or utilization of special nuclear material or atomic energy, paragraphs (1) or (f) may be omitted.

(4) The primary missions of DOE may require that certain rights in the contractor's privately developed background patents be acquired for the Government's future production, research, development, and demonstration projects. Similar rights may also be required to enable private parties to utilize a subject of the contract in the fields of technology specifically contemplated in the contract effort. To this end, subject to specified exceptions and negotiations, the Patent Rights clause in contracts over $250,000 shall normally include provisions obtaining rights of the type specified in §9-9.107-5 to such background patents. It is recognized that the precise rights to be acquired will depend upon the facts of each situation and are a matter for determination by DOE and for negotiation with the contractor. General guidelines for use by Contracting Officers and contract negotiators are provided in §9-9.107-5(b).

(5) The short form Patent Rights clause in §9-9.107-6 may be used in contracts calling for basic or applied research where the contractor is a nonprofit or educational institution, and in special situations such as consultant contracts. However, this clause will not be used in contracts in which an advance waiver or greater rights has been granted, in certain consultant contracts as explained in §9-9.107-6, or in other special contracts.

(6) Solicitations and proposed contracts shall provide offerors and prospective contractors with notice of and the right to request, in advance of or within 30 days after the effective date of contracting, a waiver of all or any part of the rights of the United States with respect to subject inventions. In no event will the fact that an offeror has requested such a waiver be a consideration in the evaluation of the offer or the determination of its acceptability. If an advance waiver is granted, the Patent Rights clause of §9-9.107-5(a) shall be used and appropriately modified in accordance with the terms of such waiver. To provide adequate notice to prospective contractors or offerors, the following provision will be inserted in all solicitations which may result in contracts calling for research, development, or demonstration:

> Offerors and prospective contractors, in accordance with applicable statutes and DOE Regulations (41 CFR §9-9.109-6), have the right to request in advance of or within 30 days after the effective date of contracting a waiver of all or any part of the rights of the United States in subject inventions.

(7) DOE may make restricted data applicable to civil uses of atomic energy available to contractors or other persons requiring such data for use in their contracts, business, trade, or profession. In such instances, the special terms and conditions of the type set forth in 10 CFR 725.23(b) and (d) should be used instead of the provision set forth in this part.

(b) License for the Government, states, and domestic municipal governments.

When a waiver is granted or foreign rights are retained by either the contractor or the inventor, the Government shall retain for the United States, States, and domestic municipal governments at least a paid-up, nonexclusive, irrevocable license in all applicable inventions unless the Head of the Agency or designee determines that it would not be in the public interest to acquire such rights for the States and domestic municipal governments. Requests by contractors for such determinations, together with justifications therefor, shall be submitted to the Contracting Officer. The Contracting Officer shall refer such requests to the Patent Counsel assisting the procuring activity forwarding the request, along with appropriate comments and recommendations, to the Assistant General Counsel for Patents to serve as a basis for the above referenced determination by the Head of the Agency or designee.

(c) Right to sublicense foreign governments.

The Patent Rights clause does not provide the Government with the right to grant sublicenses to a foreign government, pursuant to any treaty or agreement, in subject inventions to which the contractor has been granted greater or foreign rights. The Head of the Agency or designee may determine at the time of contracting that it would be in the national interest to acquire this right, or the Head of the Agency or designee may reserve the right to make this determination after the invention is identified. When such a determination is made or such right is reserved, the Patent Rights clause should be amended as set forth in §9-9.107-5(d).

(d) License rights (upon request) to the contractor.

Paragraph (c) of the Patent Rights (long form) clause of §9-9.107-5(a) specifies the license rights retained by the contractor in inventions made in the course of or under the contract. In appropriate circumstances, such as in contracts for the operation of Government-owned facilities or special long term, cost-reimbursement, Government-funded research, development, or demonstration work, this provision shall be modified to provide a revocable, nonexclusive, royalty-free license in inventions only upon request by the contractor for reservation of such license. In such situations, the paragraph set forth in §9-9.107-5(e) shall be substituted for paragraph (c)(1) of the Patent Rights (long form) clause. However, in programs of the type discussed in §9-9.107-4(a)(7), or in certain contracts or subcontracts involving access to restricted data, royalty-free licenses shall not necessarily be granted with respect to inventions or discoveries resulting from the contractor's or subcontractor's access to restricted data.

(e) License rights to contractor (irrevocable).

Paragraph (c)(1) of the Patent Rights (long form) clause specifies that the license rights retained by the contractor in such inventions are revocable. In special circumstances the license may be irrevocable, in which case paragraph (c)(1) set forth in §9-9.107-5(f) shall be substituted for paragraphs (c)(1), (c)(2) and (c)(3) of the Patent Rights (long form) clause. Because granting irrevocable licenses may interfere with DOE's licensing program which is intended to promote the commercial utilization of inventions resulting from its research, development, or demonstration programs, contractors desiring irrevocable licenses shall submit a written request with a justification to the Contracting Officer. The Contracting Officer shall refer such request to the Patent Counsel assisting the procuring activity forwarding the request, along with appropriate comments and recommendations, to the Assistant General Counsel for Patents to serve as a basis for approval by the Head of the Agency or designee.

(f) Contractor sublicensing.

The rights of a contractor having a license as set forth in paragraphs (d) and (e) above to grant a revocable license to one or more sublicensees may be considered appropriate by the Head of the Agency or designee in certain circumstances such as, where the contractor is cost-sharing; where the contractor's control or involvement in the technology which is the subject of the contract is substantial; where the reservation of licensing rights in the contractor would best promote commercialization or utilization of the technology; or where substantial segments of the user population already have licenses or would otherwise be licensed. In such situations,

the paragraph in §9-9.107-5(g)(1) may be substituted for paragraph (c)(1) of §9-9.107-5(a), or the paragraphs in §9-9.107-5(g)(2) may be substituted for paragraphs (c)(1), (c)(2), and (c)(3) of §9-9.107-5(a), as appropriate.

(g) Facilities license.

Whenever a contract has as a purpose, the design, construction, or operation of a Government-owned research, development, demonstration or production facility, it is necessary that the Government be accorded certain rights with respect to further use of the facility by or on behalf of the Government upon termination of the contract, including the right to make, use, transfer, or otherwise dispose of all articles, materials, products, or processes embodying inventions or discoveries used or embodied in the facility regardless of whether or not conceived or actually reduced to practice under or in the course of such a contract. Accordingly, paragraph §9-9.107-5(h) shall be used in all such contracts in addition to the provisions of the "long form" Patent Rights clause.

(h) Subcontracts.

(1) The policy expressed in §9-9.107-3 is applicable to prime contracts and to subcontracts regardless of tier. The Patent Rights clause of §9-9.107-5(a) or §9-9.107-6 shall be included in all subcontracts having as a purpose, the conduct of research, development, or demonstration work. However, the Patent Rights clause contained in the prime contract is not to be deemed automatically appropriate for subcontracts. For example, it would not be appropriate to the extent that waivers have been granted the prime contractor at the time of contracting. A separate waiver, if any, must be obtained by subcontractors. Further, the withholding of payment provision of the prime contract will not normally be included in a subcontract except upon request of the Contracting Officer and except for subcontracts awarded by contractors who operate Government-owned facilities and for special contracting situations, in which cases the withholding of payment provision may be flowed down to the first-tier subcontractor only. Whenever either the prime contractor or a proposed subcontractor considers the inclusion of the Patent Rights clause of §9-9.107-5(a) or §9-9.107-6 to be inappropriate, or the subcontractor refuses to accept such a clause in its subcontract, the matter shall be referred, prior to award of the subcontract, to the Contracting Officer for a resolution in accordance with §9-9.107-4(k). Upon such referral, the same considerations and procedures followed in selecting the appropriate Patent Rights clause included in the prime contract shall be used in selecting the subcontractor clause.

(2) Contractors shall not use their ability to award subcontracts as economic leverage to acquire rights for themselves in the inventions resulting from subcontracts, and a waiver granted to a prime contractor is not normally applicable to inventions of subcontractors. However, in appropriate circumstances, the prime contractor's waiver may be made applicable to the inventions of any or all subcontractors such as, where there are pre-existing special research and development arrangements between the prime contractor and subcontractor, or where the prime contractor and subcontractor are partners in a cooperative effort. In addition, in such circumstances, the prime contractor may be permitted to acquire nonexclusive licenses in the subcontractor's inventions when a waiver for subcontractor inventions is not applicable.

(i) Record of decisions.

Patent Counsel assisting the procuring activity shall record the basis for the following actions: (1) waivers at the time of contracting; (2) waivers granted on identified inventions; (3) determinations that no license need be obtained for States or domestic municipal governments; (4) determinations that the right to sublicense foreign governments should be obtained; and (5) the grant of irrevocable licenses.

(j) Publication of invention disclosures.

The Patent Rights clauses specify that the Government may duplicate and disclose invention disclosures reported under the contract, although it is not DOE's practice to publish invention disclosures. Because public disclosure before the filing of a U.S. patent application may create a bar to filing certain foreign applications, the clauses also require that patent approval for release or publication of information relating to the contract work be secured from Patent Counsel prior to any such release or publication. When the contractor has requested or obtained a waiver, or has advised of its interest in obtaining certain foreign filing rights, provision is made for DOE to use its best efforts to withhold release or publication of such information for a specified time period in accordance with paragraph (d)(1) of the clause in §9-9.107-5(a) to permit the timely filing of a U.S. patent application by the contractor.

(k) Negotiations and deviations.

Contracting Officers shall contact the field Patent Counsel assisting their procuring activity or the Assistant General Counsel for Patents, for assistance in selecting, negotiating, or approving appropriate patent, copyright, and data clauses. It should be noted that such clauses may be involved in and affected by the negotiations for a patent waiver. In the case of field procuring activities, Patent Counsel will coordinate such review and assistance with the Chief Counsel in accordance with established local procedures. Any intended departures or deviations from the Federal Procurement Regulations shall be referred by the Contracting Officer to the Assistant General Counsel for Patents for review and concurrence prior to obtaining approval in accordance with §9-1.009-2. A deviation amounting to a class deviation to the FPR or the DOE-PR shall be forwarded through the Assistant General Counsel for Patents to the Senior Procurement Official, Headquarters.

§9-9.107-5 Clause for domestic contracts (long form).

(a) Patent Rights clause.

When the Contracting Officer has determined that a contract falls within §9-9.107-4(a)(1), except where the clause of §9-9.107-6 is applicable, the following clause shall be included in the contract.

PATENT RIGHTS (LONG FORM)

(a) Definitions.

(1) "Subject invention" means any invention or discovery of the contractor conceived or first actually reduced to practice in the course of or under this contract, and includes any art, method, process, machine manufacture, design or composition of matter, or any new and useful improvement thereof, whether patented or unpatented under the Patent Laws of the United States of America or any foreign country.

(2) "Contract" means any contract, grant, agreement, understanding, or other arrangement, which includes research, development, or demonstration work, and includes any assignment or substitution of parties.

(3) "States and domestic municipal governments" means the States of the United States, the District of Columbia, Puerto Rico, the Virgin Islands, American Samoa, Guam, the Trust Territory of the Pacific Islands, and any political subdivision and agencies thereof.

(4) "Government agency" includes an executive department, independent commission, board, office, agency, administration, authority, government corporation, or other Government establishment of the Executive Branch of the Government of the United States of America.

(5) "To the point of practical application" means to manufacture, in the case of a composition or product, to practice in the case of a process, or to operate in the case of a machine and under such conditions as to establish that the invention is being worked and that its benefits are reasonably accessible to the public.

(6) "Patent Counsel" means the Department of Energy Patent Counsel assisting the procuring activity.

(b) Allocation of principal rights.

(1) Assignment to the Government.

The contractor agrees to assign to the Government the entire right, title, and interest throughout the world in and to each subject invention, except to the extent that rights are retained by the contractor under paragraphs (b)(2) and (c) of this clause.

(2) Greater rights determinations.

The contractor or the employee-inventor with authorization of the contractor may request greater rights than the nonexclusive license and the foreign patent rights provided in paragraph (c) of this clause on identified inventions in accordance with 41 CFR §9-9.109-6(d). Such requests must be submitted to Patent Counsel (with notification by Patent Counsel to the Contracting Officer) at the time of the first disclosure pursuant to paragraph (e)(2) of this clause, or not later than 9 months after conception or first actual reduction to practice, whichever occurs first, or such longer periods as may be authorized by Patent Counsel (with notification by Patent Counsel to the Contracting Officer) for good cause shown in writing by the contractor.

(c) Minimum rights to the contractor.

(1) Contractor license.

The contractor reserves a revocable, nonexclusive, paid-up license in each patent application filed in any country on a subject invention and any resulting patent in which the Government acquires title. The license shall extend to the contractor's domestic subsidiaries and affiliates, if any, within the corporate structure of which the contractor is a part and shall include the right to grant sublicenses of the same scope to the extent the contractor was legally obligated to do so at the time the contract was awarded. The license shall be transferable only with approval of DOE except when transferred to the successor of that part of the contractor's business to which the invention pertains.

(2) Revocation limitations.

The contractor's nonexclusive license retained pursuant to paragraph (c)(1) of this clause and sublicenses granted thereunder may be revoked or modified by DOE, either in whole or in part, only to the extent necessary to achieve expeditious practical application of the subject invention under DOE's published licensing regulations (10 CFR 781), and only to the extent an exclusive license is actually granted. This license shall not be revoked in that field of use and/or the geographical areas in which the contractor, or its sublicensee, has brought the invention to the point of practical application and continues to make the benefits of the invention reasonably accessible to the public, or is expected to do so within a reasonable time.

(3) Revocation procedures.

Before modification or revocation of the license or sublicense, pursuant to paragraph (c)(2) of this clause, DOE shall furnish the contractor a written notice of its intention to modify or revoke the license and any sublicense thereunder, and the contractor shall be allowed 30 days, or such longer periods as may be authorized by the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) for good cause shown in writing by the contractor, after such notice to show cause why the license or any sublicense should not be modified or revoked. The contractor shall have the right to appeal, in accordance with 10 CFR 718, any decision concerning the modification or revocation of his license or any sublicense.

(4) Foreign patent rights.

Upon written request to Patent Counsel (with notification by Patent Counsel to the Contracting Officer), and subject to DOE security regulations and requirements, there shall be reserved to the contractor, or the employee inventor with authorization of the contractor, the patent rights to a subject invention in any foreign country where the Government has elected not to secure such rights provided:

(i) The recipient of such rights, when specifically requested by DOE and three years after issuance of a foreign patent disclosing said subject invention, shall furnish DOE a report setting forth:

(A) The commercial use that is being made, or is intended to be made, of said invention, and

(B) The steps taken to bring the invention to the point of practical application or to make the invention available for licensing

(ii) The Government shall retain at least an irrevocable, nonexclusive, paid-up license to make, use, and sell the invention throughout the world by or on behalf of the Government (including any Government agency) and States and domestic municipal governments, unless the Head of the Agency or designee determines that it would not be in the public interest to acquire the license for the States and domestic municipal governments.

(iii) Subject to the rights granted in (c)(1), (2) and (3) of this clause, the Head of the Agency or designee shall have the right to terminate the foreign patent rights granted in this paragraph (c)(4) in whole or in part unless the recipient of such rights demonstrates to the satisfaction of the Head of the Agency or designee that effective steps necessary to accomplish substantial utilization of the invention have been taken or within a reasonable time will be taken.

(iv) Subject to the rights granted in (c)(1), (2) and (3) of this clause, the Head of the Agency or designee shall have the right, commencing four years after foreign patent rights are accorded under this paragraph (c)(4), to require the granting of a nonexclusive or partially exclusive license to a responsible applicant or applicants, upon terms reasonable under the circumstances, and in appropriate circumstances to terminate said foreign patent rights in whole or in part, following a hearing upon notice thereof to the public, upon a petition by an interested person justifying such hearing:

(A) If the Head of the Agency or designee determines, upon review of such material as he deems relevant, and after the recipient of such rights or other interested person has had the opportunity to provide such relevant and material information as the Head of the Agency or designee may require, that such foreign patent rights have tended substantially to lessen competition or to result in undue market concentration in any section of the United States in any line of commerce to which the technology relates; or

(B) Unless the recipient of such rights demonstrates to the satisfaction of the Head of the Agency or designee at such hearing that the recipient has taken effective steps, or within a reasonable time thereafter is expected to take such steps, necessary to accomplish substantial utilization of the invention.

(d) Filing of patent applications.

(1) With respect to each subject invention in which the contractor or the inventor requests foreign patent rights in accordance with paragraph (c)(4) of this clause, a request may also be made for the right to file and prosecute the U.S. application on behalf of the U.S. Government. If such request is granted, the contractor or inventor shall file a domestic patent application on the invention within 6 months after the request for foreign patent rights is granted, or such longer period of time as may be approved by the Patent Counsel for good cause shown in writing by the requestor. With respect to the invention, the requestor shall promptly notify the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) of any decision not to file an application.

(2) For each subject invention on which a domestic patent application is filed by the contractor or inventor, the contractor or inventor shall:

(i) Within 2 months after the filing of a patent application or within 2 months after submission of the invention disclosure, if the patent application has been filed previously, deliver to the Patent Counsel a copy of the application as filed including the filing date and serial number;

(ii) Within 6 months after filing the application or within 6 months after submitting the invention disclosure if the application has been filed previously, deliver to the Patent Counsel a duly executed and approved assignment to the Government, on a form specified by the Government;

(iii) Provide the Patent Counsel with the original patent grant promptly after a patent is issued on the application; and

(iv) Not less than 30 days before the expiration of the response period for any action required by the Patent and Trademark Office, notify the Patent Counsel of any decision not to continue prosecution of the application.

(3) With respect to each subject invention in which the contractor or inventor has requested foreign patent rights, the contractor or inventor shall file a patent application on the invention in each foreign country in which such request

is granted and within one of the following periods:

(i) Eight months from the date of filing a corresponding United States application, or if such an application is not filed, six months from the date the request was granted.

(ii) Six months from the date a license is granted by the Commissioner of Patents and Trademarks to file the foreign patent application, where such filing has been prohibited by security reasons; or

(iii) Such longer periods as may be approved by the Patent Counsel for good cause shown in writing by the contractor or inventor.

(4) Subject to the license specified in paragraphs (c)(1), (2) and (3) of this clause, the contractor or inventor agrees to convey to the Government, upon request, the entire right, title, and interest in any foreign country in which the contractor or inventor fails to have a patent application filed in accordance with paragraph (d)(3) of this clause, or decides not to continue prosecution or to pay any maintenance fees covering the invention. To avoid forfeiture of the patent application or patent, the contractor or inventor shall, not less than 60 days before the expiration period for any action required by any patent office, notify the Patent Counsel of such failure or decision, and deliver to the Patent Counsel, the executed instruments necessary for the conveyance specified in this paragraph.

(e) Invention identification, disclosures, and reports.

(1) The contractor shall establish and maintain active and effective procedures to ensure that subject inventions are promptly identified and timely disclosed. These procedures shall include the maintenance of laboratory notebooks or equivalent records and other records that are reasonably necessary to document the conception and/or the first actual reduction to practice of subject inventions, and records which show that the procedures for identifying and disclosing the inventions are followed. Upon request, the contractor shall furnish the Contracting Officer a description of these procedures so that he may evaluate and determine their effectiveness.

(2) The contractor shall furnish the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) on a DOE-approved form:

(i) A written report containing full and complete technical information concerning each subject invention within 6 months after conception or first actual reduction to practice, whichever occurs first in the course of or under this contract, but in any event, prior to any sale, public use, or public disclosure of such invention known to the contractor. The report shall identify the contract and inventor and shall be sufficiently complete in technical detail and appropriately illustrated by sketch or diagram to convey to one skilled in the art to which the invention pertains, a clear understanding of the nature, purpose, operation, and to the extent known, the physical, chemical, biological, or electrical characteristics of the invention. The report should also include any request for foreign patent rights under paragraph (c)(4) of this clause and any request to file a domestic patent application made within the period set forth in paragraph (b)(2) of this clause. When an invention is reported under this paragraph (e)(2)(i), it shall be presumed to have been conceived or first actually reduced to practice in the course of or under the contract, unless the contractor contends it was not so made, in accordance with paragraph (g)(2)(ii) or this clause.

(ii) Upon request, but not more than annually, interim reports on a DOE-approved form listing subject inventions and subcontracts award(s) containing a Patent Rights clause for that period and certifying that:

(A) The contractor's procedures for identifying and disclosing subject inventions as required by this paragraph (e) have been followed throughout the reporting period;

(B) All subject inventions have been disclosed or that there are no such inventions; and

(C) All subcontracts containing a Patent Rights clause have been reported or that no such subcontracts have been awarded;

(iii) A final report on a DOE-approved form within three months after completion of the contract work listing all subject inventions and all subcontracts awarded containing a Patent Rights clause and certifying that:

(A) All subject inventions have been disclosed or that there were no such inventions; and

(B) All subcontracts containing a Patent Rights clause have been reported or that no such subcontracts have been awarded.

(3) The contractor shall obtain patent agreements to effectuate the provisions of this clause from all persons in its employ who perform any part of the work under this contract except nontechnical personnel, such as clerical employees and manual laborers.

(4) The contractor agrees that the Government may duplicate and disclose subject invention disclosures and all other reports and papers furnished or required to be furnished pursuant to this clause. If the contractor is to file a foreign patent application on a subject invention, the Government agrees, upon written request, to use its best efforts to withhold publication of such invention disclosures until the expiration of the time period specified in paragraph (d)(1) of this clause, but in no event shall the Government or its employees be liable for any publication thereof.

(f) Publication.

It is recognized that during the course of the work under this contract, the contractor or its employees may from time to time desire to release or publish information regarding scientific or technical developments conceived or first actually reduced to practice in the course of or under this contract. In order that public disclosure of such information will not adversely affect the patent interests of DOE or the contractor, patent approval for release or publication shall be secured from Patent Counsel prior to any such release or publication.

(g) Forfeiture of rights in unreported subject inventions.

(1) The contractor shall forfeit to the Government, at the request of the Head of the Agency or designee, all rights in any subject invention which the contractor fails to report to Patent Counsel (with notification by Patent Counsel to the Contracting Officer) within 6 months after the time the contractor:

(i) Files or causes to be filed a United States or foreign patent application thereon; or

(ii) Submits the final report required by paragraph (e)(2)(ii) of this clause, whichever is later.

(2) However, the contractor shall not forfeit rights in a subject invention if, within the time specified, in (1)(i) or (1)(ii) of this paragraph (g), the contractor:

(i) prepares a written decision based upon a review of the record that the invention was neither conceived nor first actually reduced to practice in the course of or under the contract and delivers the same to Patent Counsel (with notification by Patent Counsel to the Contracting Officer); or

(ii) contending that the invention is not a subject invention, the contractor nevertheless discloses the invention and all facts pertinent to this contention to the Patent Counsel (with notification by Patent Counsel to the Contracting Officer); or

(iii) establishes that the failure to disclose did not result from the contractor's fault or negligence.

(3) Pending written assignment of the patent application and patents on a subject invention determined by the Head of the Agency or designee to be forfeited (such determination to be a final decision under the Disputes clause of this contract), the contractor shall be deemed to hold the invention and the patent applications and patents pertaining thereto in trust for the Government. The forfeiture provision of this paragraph (g) shall be in addition to and shall not supersede other rights and remedies which the Government may have with respect to subject inventions.

(h) Examination of records relating to inventions.

(1) The Contracting Officer or his authorized representative, until the expiration of 3 years after final payment under this contract, shall have the right to examine any books (including laboratory notebooks), records, documents, and other supporting data of the contractor which the Contracting Officer or his authorized representative reasonably deem pertinent to the discovery or identification of subject inventions or to determine compliance with the requirements of this clause.

(2) The Contracting Officer or authorized representative shall have the right to examine all books (including laboratory notebooks), records and documents of the contractor relating to the conception or first actual reduction to practice of

inventions in the same field of technology as the work under this contract to determine whether any such inventions are subject inventions, if the contractor refuses or fails to:.

(i) Establish the procedures of paragraph (e)(1) of this clause; or

(ii) maintain and follow such procedures; or

(iii) correct or eliminate any material deficiency in the procedures within thirty days after the Contracting Officer notifies the contractor of such a deficiency.

(i) Withholding of payment (not applicable to subcontracts).

(1) Any time before final payment of the amount of this contract, the Contracting Officer may, if he deems such action warranted, withhold payment until a reserve not exceeding $50,000 or 5 percent of the amount of this contract, whichever is less, shall have been set aside if in his opinion the contractor fails to:

(i) establish, maintain and follow effective procedures for identifying and disclosing subject inventions pursuant to paragraph (e)(1) of this clause; or

(ii) disclose any subject invention pursuant to paragraph (e)(2)(i) of this clause; or

(iii) deliver the interim reports pursuant to paragraph (e)(2)(ii) of this clause; or

(iv) provide the information regarding subcontracts pursuant to paragraph (j)(5) of this clause; or

(v) convey to the Government, using a DOE-approved form, the title and/or rights of the Government in each subject invention as required by this clause.

(2) The reserve or balance shall be withheld until the Contracting Officer has determined that the contractor has rectified whatever deficiencies exist and has delivered all reports, disclosures, and other information required by this clause.

(3) Final payment under this contract shall not be made by the Contracting Officer before the contractor delivers to Patent Counsel all disclosures of subject inventions and other information required by (e)(2)(i) of this clause, the final report required by (e)(2)(iii) of this clause, and Patent Counsel has issued a patent clearance certification to the Contracting Officer.

(4) The Contracting Officer may, in his discretion, decrease or increase the sums withheld up to the maximum authorized above. If the contractor is a nonprofit organization, the maximum amount that may be withheld under this paragraph shall not exceed $50,000 or 1 percent of the amount of this contract, whichever is less. No amount shall be withheld under this paragraph while the amount specified by this paragraph is being withheld under other provisions of the contract. The withholding of any amount or subsequent payment thereof shall not be construed as a waiver of any rights accruing to the Government under this contract.

(j) Subcontracts.

(1) For the purpose of this paragraph the term "contractor" means the party awarding a subcontract and the term "subcontractor" means the party being awarded a subcontract, regardless of tier.

(2) Unless otherwise authorized or directed by the Contracting Officer, the contractor shall include the Patent Rights clause of 41 CFR §9-9.107-5(a) or 41 CFR §9-9.107-6 as appropriate, modified to identify the parties in any subcontract hereunder having as a purpose the conduct of research, development, or demonstration work. In the event of a refusal by a subcontractor to accept this clause, or if in the opinion of the contractor this clause is inconsistent with DOE's patent policies, the contractor:

(i) shall promptly submit written notice to the Contracting Officer setting forth reasons for the subcontractor refusal and other pertinent information which may expedite disposition of the matter; and

(ii) shall not proceed with the subcontract without the written authorization of the Contracting Officer.

(3) Except as may be otherwise provided in this clause, the contractor shall not, in any subcontract by using a subcontract as consideration therefor, acquire any rights in its subcontractor's subject invention for the contractor's own use (as distinguished from such rights as may be required solely to fulfill the contractor's

contract obligations to the Government in the performance of this contract).

(4) All invention disclosures, reports, instruments, and other information required to be furnished by the subcontractor to DOE, under the provisions of a Patent Rights clause in any subcontract hereunder may, in the discretion of the Contracting Officer, be furnished to the contractor for transmission to DOE.

(5) The contractor shall promptly notify the Contracting Officer in writing upon the award of any subcontract containing a Patent Rights clause by identifying the subcontractor, the work to be performed under the subcontract, and the dates of award and estimated completion. Upon the request of the Contracting Officer, the contractor shall furnish a copy of the subcontract.

(6) The contractor shall identify all subject inventions of the subcontractor of which it acquires knowledge in the performance of this contract and shall notify the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) promptly upon the identification of the inventions.

(7) It is understood that the Government is third party beneficiary of any subcontract clause granting rights to the Government in subject inventions, and the contractor hereby assigns to the Government all rights that the contractor would have to enforce the subcontractor's obligations for the benefit of the Government with respect to subject inventions. The contractor shall not be obligated to enforce the agreements of any subcontractor hereunder relating to the obligations of the subcontractor to the Government regarding subject inventions.

(k) Background Patents.

(1) "Background Patent" means a domestic patent covering an invention or discovery which is not a subject invention and which is owned or controlled by the contractor at any time through the completion of this contract:

(i) Which the contractor, but not the Government, has the right to license to others without obligation to pay royalties thereon, and

(ii) Infringement of which cannot reasonably be avoided upon the practice of any specific process, method, machine, manufacture or composition of matter (including relatively minor modificatons thereof) which is a subject of the research, development, or demonstration work performed under this contract.

(2) The contractor agrees to and does hereby grant to the Government a royalty-free, nonexclusive, license under any background patent for purposes of practicing a subject of this contract by or for the Government in research, development, and demonstration work only.

(3) The contractor also agrees that upon written application by DOE, it will grant to responsible parties for purposes of practicing a subject of this contract, nonexclusive licenses under any background patent on terms that are reasonable under the circumstances. If, however, the contractor believes that exclusive or partially exclusive rights are necessary to achieve expeditious commercial development or utilization, then a request may be made to DOE for DOE approval of such licensing by the contractor.

(4) Nothwithstanding the foregoing paragraph (k)(3), the contractor shall not be obligated to license any background patent if the contractor demonstrates to the satisfaction of the Head of the Agency or designee that:

(i) a competitive alternative to the subject matter covered by said background patent is commercially-available or readily introducible from one or more other sources; or

(ii) the contractor or its licensees are supplying the subject matter covered by said background patent in sufficient quantity and at reasonable prices to satisfy market needs, or have taken effective steps or within a reasonable time are expected to take effective steps to so supply the subject matter.

(l) Atomic energy.

(1) No claim for pecuniary award or compensation under the provisions of the Atomic Energy Act of 1954, as amended, shall be asserted by the contractor or its employees with respect to any invention or discovery made or conceived in the course of or under this contract.

(2) Except as otherwise authorized in writing by the Contracting Officer, the contractor will obtain patent agreements to effectuate the provisions of para-

graph (l)(1) who perform any part of the work under this contract, except nontechnical personnel, such as clerical employees and manual laborers.

(m) Limitation of rights.

Nothing contained in this patent rights clause shall be deemed to give the Government any rights with respect to any invention other than a subject invention except as set forth in the Patent Rights clause of this contract with respect to background patents and the facilities license.

(b) Licenses in contractor background patents.

(1) It will normally be the case that a contractor qualified to perform work under a DOE contract will have developed a degree of expertise in the general field of activity to which the contract relates. Accordingly, it will not be unusual for a prospective contractor to have an established patent position relating to the general field of work to be performed under the contract and to have ongoing research and development programs in that general field which could result in patentable inventions. Because the contractor is obligated to apply its best efforts to accomplishing the objectives of the contract work, it is to be expected that inventions owned or controlled by the contractor at any time during the contract period may be utilized in connection with the work performed under the contract. If such inventions are or become the subject of a patent, such patented inventions may control a subject of the contract.

(2) It is usually the case that at the time the contract is negotiated, such inventions, if any, of the contractor are not known to the Government and may not be known to the contractor either. Use by the contractor of such inventions in connection with the contract work does not necessarily result in a need for rights in those inventions by the Government or others. However, failure of DOE to obtain limited rights on behalf of the Government and/or third parties in a narrow class of those inventions, defined as "background patents," could frustrate the objectives of DOE to promptly make the benefits of its programs widely available to the public and to promote the commercial utilization of the technology developed or demonstrated under DOE programs. Therefore, it is DOE's policy to obtain limited license rights in background patents on a basis that is reasonable under the circumstances of the particular contract and takes into account the relative equities of the contractor, the Government and the general public.

(3) Paragraph (k) of the Patent Rights clause of §9-9.107-5 (a) sets out the background patent provisions that will be appropriate for many DOE contracting situations by balancing the needs of DOE programs with the equities of the contractor. This clause obtains a paid-up, nonexclusive license for the Government for research, development, and demonstration work only and thus includes any use of the background patents under DOE programs where research, development, or demonstration work is being conducted. The clause also requires the contractor to license responsible parties on reasonable terms at the request of DOE in the field of technology specifically contemplated in the contract effort. The background patent provisions, however, are only applicable insofar as infringement of the patents cannot reasonably be avoided in order to utilize the results of the contract work for these purposes. Additionally, the clause is not effective if the contractor can demonstrate to the satisfaction of the Head of the Agency or designee that commercial alternatives are available or readily introducible from one or more sources, or that the contractor or its licensees are supplying the market in sufficient quantities and at reasonable prices or have taken effective steps, or within a reasonable time are expected to take effective steps, to so supply the market. In determining whether to request such licensing, DOE will recognize the need, where appropriate, to limit licensing to preserve the commercialization incentives provided by the patent, and also to meet the needs of the public for early availability of the technology.

(4) Subparagraph (k)(1) defines those inventions which will fall within the definition of what constitutes a background patent, while subparagraphs (k)(2) and (k)(3) define the scope or field of use of any license granted. Although DOE, as stated in paragraph (3), controls the requesting of licenses to responsible parties, the final resolution of questions regarding the scope

of such licenses and the terms thereof, including reasonable royalties, are then left to the negotiation of the parties with final resolution of the issues being made by a court of competent jurisidiction if necessary. In subparagraph (k)(4), the decision not to apply the licensing requirement of subparagraph (k)(3), however, is subject to the final decision of the Head of the Agency or designee. The final authority of DOE in these decisions is required because the determinations are dependent in substantial part on the requirement of DOE's specific mission.

(5) Balancing of the respective equities in particular contracting situations, however, may require that paragraph (k) be modified. Paragraph (k) should normally be deleted for contracts under $250,000 and may not be appropriate in certain types of study contracts, planning contracts, contracts with educational institutions, and contracts for specialized equipment for in-house Government use or not intended for further procurement by the Government or for use by the public. Except for the deletion of paragraph (k) in contracts under $250,000 as permitted in this paragraph (5), deletions or modifications of paragraph (k) as set forth in this section are to be made with the advice of Patent Counsel.

(6) On the other hand, there will be situations where the equities between the Government and the contractor, or anticipated Government needs, would require that rights be obtained for either the Government or for the public greater than those set forth in paragraph (k). For example, where (i) the contribution of the Government towards the development and/or commercialization of the background patent is substantially greater than that of the contractor, (ii) it is expected that the Government may be involved in special long-term projects, or (iii) the Government may require substantial production, procurement or utilization for purposes outside of research, development, and demonstration, it may be necessary to obtain greater rights. In such situations, consideration should be given to extending the Government's rights beyond research, development, and demonstration work, or to adjust royalties (that may be due by the Government) to reflect the Government's contribution. Such adjustment could take the form of (i) credit to be given the Government based upon its contribution through the contract, or (ii) a royalty based upon the relative contributions of the contractor and the Government. Consideration could also be given to utilizing the relative contributions in determining reasonable royalties to be charged to others.

(7) Similarly, it may be necessary to obtain greater rights for the public in the contractor's background patents where, for example, the contractor's background patents cover the basic technology intended to be developed under the contract effort, rather than components or products or processes which are ancillary thereto. In such cases, subparagraph (4) might also be appropriate where the future market for the subject of the contract will be very large and there are presently only a few suppliers available.

(8) It may also be appropriate to modify the rights acquired by paragraph (k) where the contractor's background patent rights were of primary importance in granting the contractor a waiver. For example, if the contractor was permitted to retain exclusive rights to subject inventions based upon the consideration that both foreground and background inventions would be licensed at reasonable royalties, then paragraph (k) should be modified. The modification may be made applicable to the fields of technology, inventions, or other aspects of the contract. Concomitant with such modification, the licensing obligations for subject inventions should also be modified to be compatible therewith. In such cases, the definition of "background patent" should be broadened to include all patents useful in the practice of a subject of the contract, and subparagraph (k)(4) should be deleted or appropriately modified.

(9) The application of paragraph (k) is limited to the practice of any specific process, method, or machine, manufacture, or composition of matter which is a subject of research, development, or demonstration work performed under the contract, otherwise referred to as "subject of this contract" in subparagraphs (2) and (3). The expression "a subject of this contract" is intended to limit the licensing required in paragraph (k) to the fields of technology specifically contemplated in the contract effort. During negotiations, when the subject matter of the contract is known, a more specific statement of the fields of technology intended to be covered

may be substituted for the expression "subject of this contract." For example, the application of paragraph (k) may be limited to the generation of electric power utilizing coal-derived fuels, to high-temperature, gas cooled reactors, or other specified fields of technology of interest to DOE programs.

(10) The considerations and statements in the foregoing paragraphs (1)-(9) also apply to the negotiation, application, and inclusion of background patent rights provisions in subcontracts.

(c) License for the States and domestic municipal governments.

When the Head of the Agency or designee determines at the time of contracting that it would not be in the public interest to acquire a paid-up license in subject inventions for States and domestic municipal governments, paragraph (c)(4)(ii) of the Patent Rights clause in §9-9.107-5(a) shall be replaced with the following paragraph:

> (ii) The Government shall retain at least an irrevocable, nonexclusive, paid-up license to make, use, and sell the invention throughout the world by or on behalf of the Government of the United States (including any Government agency).

(d) Right to sublicense foreign governments.

(1) When the Head of the Agency or designee determines at the time of contracting that it would be in the national interest to acquire the right to sublicense foreign governments pursuant to any treaty or agreement, a sentence shall be added to the end of paragraph (c)(4)(ii) of the Patent Rights clause in §9-9.107-5(a) as follows:

> This license shall include the right of the Government to sublicense foreign governments pursuant to any treaty or agreement with such foreign governments.

(2) When the Head of the Agency or designee wishes to reserve the right to make the determination to sublicense foreign governments pursuant to any treaty or agreement until after the invention has been identified, a sentence shall be added to the end of paragraph (c)(4)(ii) of the Patent Rights clause in §9-9.107-5(a) as follows:

> This license shall include the right of the Government to sublicense foreign governments pursuant to any treaty or agreement with such foreign governments if the Head of the Agency or designee determines after the invention has been identified that it would be in the national interest to acquire this right.

(e) License rights (upon request) to contractor (revocable).

When the Head of the Agency or designee determines at the time of contracting that the contractor may, subject to the provisions of §9-9.107-4(a)(7) (involving access to restricted data), reserve a revocable, nonexclusive, paid-up license in subject inventions, only upon a request by the contractor for the retention of such a license, paragraph (c)(1) of this clause in §9-9.107-5(a) shall be replaced with the following paragraph (c)(1):

> (c)(1) The contractor may reserve upon request a revocable, nonexclusive, paid-up license in each patent application filed in any country on a subject invention and any resulting patent in which the Government acquires the title. The license shall extend to the contractor's domestic subsidiaries and affiliates, if any, within the corporate structure of which the contractor is a part and shall include the right to grant sublicenses of the same scope to the extent the contractor was legally obligated to do so at the time the contract was awarded. The license shall be transferable only with approval of DOE except when transferred to the successor of that part of the contractor's business to which the invention pertains.

(f) License rights to contractor (irrevocable).

When the Head of the Agency or designee determines at the time of contracting that the contractor may reserve an irrevocable, nonexclusive, paid-up license in the inventions resulting from the contract, paragraph (c)(1) of the Patent Rights clause of §9-9.107-5(a) shall be re-

placed with the following paragraph (c)(1), and paragraphs (c)(2) and (c)(3) of §9-9.107-5(a) and references thereto shall be cancelled:

> (c)(1) The contractor reserves an irrevocable, nonexclusive, paid-up license in each patent application filed in any country on a subject invention and any resulting patent in which the Government acquires the title. The license shall extend to the contractor's domestic subsidiaries and affiliates, if any, within the corporate structure of which the contractor is a part and shall include the right to grant sublicenses of the same scope to the extent the contractor was legally obligated to do so at the time the contract was awarded. The license shall be transferable only with approval of DOE except when transferred to the successor of that part of the contractor's business to which the invention pertains.

(g) Contractor sublicense (revocable).

(1) When the Head of the Agency or designee determines at the time of contracting that, as indicated in §9-9.107-4(f), it would be in the interests of the Government to permit a contractor having the right to retain a revocable, nonexclusive license in a subject invention to have the further right to grant one or more sublicensees a revocable license of the same scope, the following paragraph may be substituted for paragraph (c)(1) of the Patent Rights clause in §9-9.107-5(a):

> (c)(1) The contractor reserves a revocable, nonexclusive paid-up license in each patent application filed in any country on a subject invention and any resulting patent in which the Government acquires the title. The license shall extend to the contractor's domestic subsidiaries and affiliates, if any, within the corporate structure of which the contractor is a part and shall include the right to grant revocable, nonexclusive sublicenses of the same scope. The license shall be transferable only with approval of DOE except when transferred to the successor of that part of the contractor's business to which the invention pertains.

(2) Where the contractor has been granted the right to retain an irrevocable, nonexclusive license in a subject invention, and it is determined as in (g)(1) above to leave in the contractor the right to grant one or more revocable sublicenses thereunder, the following three paragraphs will be substituted for paragraphs (c)(1), (c)(2), and (c)(3) of the Patent Rights clause in §9-9.107-5(a):

> (c)(1) Contractor license.
>
> The contractor reserves an irrevocable, nonexclusive, paid-up license in each patent application filed in any country on a subject invention and any resulting patent in which the Government acquires title. The license shall extend to the contractor's domestic subsidiaries and affiliates, if any, within the corporate structure of which the contractor is a part and shall include the right to grant revocable, nonexclusive sublicenses which are revocable under the same terms and conditions as set forth in paragraphs (c)(2) and (3) of this clause. The license shall be transferable only with approval of DOE except when transferred to the successor of that part of the contractor's business to which the invention pertains.
>
> (c)(2) Revocation limitations.
>
> Any sublicense granted by the contractor may be revoked or modified by DOE, either in whole or in part, only to the extent necessary to achieve expeditious practical application of the subject invention under DOE's published licensing regulations (10 CFR 781), and only to the extent an exclusive license is actually granted. This sublicense shall not be revoked in that field of use and/or geographical areas in which the contractor, or its sublicensee, has brought the invention to the point of practical application and continues to make the benefits of the invention reasonably accessible to the public, or is expected to do so within a reasonable time.
>
> (c)(3) Revocation procedures.
>
> Before modification or revocation of any sublicense pursuant to paragraph (c)(2) of this clause, DOE shall furnish the contractor and the sublicensee written notice of its intention to modify or revoke the sublicense, and the contractor and the sublicensee shall be allowed 30 days, or such longer period as may be allowed by the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) for good cause shown in writing by the contractor or the sublicensee, after such notice to show cause why the sublicense should not be modified or revoked. The

contractor or the sublicensee shall have the right to appeal in accordance with 10 CFR 781, any decision concerning the modification or revocation of the sublicense.

(h) Facilities license.

The following paragraph will be included as paragraph (n) of the Patent Rights (long form) clause in each contract having as purpose the design, construction, or operation of a Government-owned research, development, demonstration, or production facility. The scope of the license in the following paragraph may, in appropriate situations, be expanded to cover similar facilities.

(n) Facilities license.

In addition to the rights of the parties with respect to inventions or discoveries conceived or first actually reduced to practice in the course of or under this contract, the contractor agrees to and does hereby grant to the Government an irrevocable, nonexclusive paid-up license in and to any inventions or discoveries regardless of when conceived or actually reduced to practice or acquired by the contractor, which are owned or controlled by the contractor at any time through completion of this contract and which are incorporated or embodied in the construction of the facility or which are utilized in the operation of the facility or which cover articles, materials, or products manufactured at the facility (1) to practice or to have practiced by or for the Government at the facility, and (2) to transfer such license with the transfer of that facility. The acceptance or exercise by the Government of the aforesaid rights and license shall not prevent the Government at any time from contesting the enforceability, validity or scope of, or title to, any rights or patents herein licensed.

§9-9.107-6 Clause for domestic contracts (short form).

The following clause may be used instead of the clause of §9-9.107-5(a) in contracts for basic or applied research where the contractor is a nonprofit or educational institution and in special situations including consultant contracts. This clause shall not be used in long term consultancy arrangements for work in DOE programs providing opportunities for specialized work experience at DOE-owned facilities for scientific, engineering, and other employees of private firms and institutions engaged in civilian applications of atomic energy. In such instances consult Patent Counsel. Also, this clause is not to be used in contracts calling for the operation of Government-owned facilities, or contracts in which an advance waiver has been granted, or other special contracts such as those for the conduct of major long-term continuing programs or basic agreements providing for the assignment of new tasks from time to time by mutual agreement.

PATENT RIGHTS (SHORT FORM)

(a) Definitions.

(1) "Subject invention" means any invention or discovery of the contractor conceived or first actually reduced to practice in the course of performance of or under this contract, and includes any art, method, process, machine, manufacture, design, or composition of matter, or any new and useful improvement thereof, or any variety of patents, whether patented or unpatented, under the patent laws of the United States of America or any foreign country.

(2) "Patent Counsel" means the DOE Patent Counsel assisting the procuring activity.

(b) Invention disclosures and reports.

(1) The contractor shall furnish the Patent Counsel (with notification by Patent Counsel to the Contracting Officer):

(i) A written report containing full and complete technical information concerning each subject invention within 6 months after conception or first actual reduction to practice but in any event prior to any on sale, public use, or public disclosure of such invention known to the contractor. The report shall identify the contract and inventor and shall be sufficiently complete in technical detail and appropriately illustrated by sketch or diagram to convey to one skilled in the art to which the invention pertains, a clear understanding of the nature, purpose, operation, and to the extent known, the physical, chemical, biological, or electrical char-

acteristics of the invention;

(ii) Upon request, but not more than annually, interim reports on a DOE-approved form listing subject inventions for that period and certifying that all subject inventions have been disclosed or that there were no such inventions; and

(iii) A final report on a DOE-approved form within 3 months after completion of the contract work listing all subject inventions and certifying that all subject inventions have been disclosed or that there were no such inventions.

(2) The contractor agrees that the Government may duplicate and disclose subject invention disclosures and all other reports and papers furnished or required to be furnished pursuant to the contract.

(c) Allocation of principal rights.

(1) Assignment to the Government.

The contractor agrees to assign to the Government the entire right, title, and interest throughout the world in and to each subject invention, except to the extent that rights are retained by the contractor under paragraphs (c)(2) and (d) of this clause.

(2) Greater rights determination.

The contractor, or the employee-inventor with authorization of the contractor, may request greater rights than the nonexclusive license and the foreign patent rights provided in paragraph (d) of this clause on identified inventions in accordance with the procedure and criteria of 41 CFR §9-9.109-6. A request for a determination of whether the contractor or the employee-inventor is entitled to retain such greater rights must be submitted to the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) at the time of the first disclosure of the invention pursuant to paragraph (b)(1) of this clause or not later than 9 months after conception or first actual reduction to practice, whichever occurs first, or such longer period as may be authorized by the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) for good cause shown in writing by the contractor. The information to be submitted for a greater rights determination is specified in 41 CFR §9-9.109-6(e).

(d) Minimum rights to the contractor.

The contractor reserves a revocable, nonexclusive, paid-up license in each patent application filed in any country on a subject invention and any resulting patent in which the Government acquires title. Revocation shall be in accordance with the procedure of paragraphs (c)(2) and (3) of the clause in 41 CFR §9-9.107-5(a). The contractor also has the right to request foreign rights in accordance with the procedures of paragraph (c)(4) of the clause in 41 CFR §9-9.107-5(a).

(e) Employee and subcontractor agreements.

Unless otherwise authorized in writing by the Contracting Officer, the contractor shall:

(1) Obtain patent agreements to effectuate the provisions of the Patent Rights clause from all persons who perform any part of the work under this contract except nontechnical personnel, such as clerical employees and manual laborers.

(2) Unless otherwise authorized or directed by the Contracting Officer, the contractor shall include the Patent Rights clause of 41 CFR §9-9.107-5(a) or 41 CFR §9-9.107-6, as appropriate, modified to identify the parties in any subcontract hereunder having as a purpose the conduct of research, development, or demonstration work; and

(3) Promptly notify the Contracting Officer in writing upon the award of any subcontract containing a Patent Rights clause by identifying the subcontractor, the work to be performed under the subcontract, and the dates of award and estimated completion. Upon the request of the Contracting Officer, the contractor shall furnish a copy of the subcontract to such requester.

(f) Atomic energy.

(1) No claim for pecuniary award or compensation under the provisions of the Atomic Energy Act of 1954, as amended, shall be asserted by the contractor or its employees with respect to any inventions or discovery made or conceived in the course of or under this contract.

(2) Except as otherwise authorized in writing by the Contracting Officer, the contractor will obtain patent agreements to effectuate the provisions of paragraph (f)(1) of the clause from all persons who perform any part of the work under this contract, except nontechnical personnel, such as clerical employees and manual laborers.

(g) Publication.

In order that information concerning scientific or technical developments conceived or first actually reduced to practice in the course of or under the contract is not prematurely published so as to adversely affect patent interest of DOE, the Contractor agrees to submit to the Patent Counsel for patent review a copy of each paper 60 days prior to its intended publication date. The Contractor may publish such information after expiration of a 60-day period following such submission or prior thereto if specifically approved by the Patent Counsel, unless the Contractor is informed (in writing within the 60-day period) that in order to protect patentable subject matter, publication must further be delayed. In this event, publication shall be delayed up to 100 days beyond the 60-day period or such longer period as mutually agreed to.

§9-9.107-7 Clause for foreign contracts.

The clauses authorized for contracts in §9-9.107-5(a) and §9-9.107-6 may be modified by the Contracting Officer in consultation with Patent Counsel to meet the requirements peculiar to foreign procurement.

§9-9.108 (Reserved).

§9-9.109 Administration of Patent Rights clauses.

§9-9.109-1 Patent rights follow-up.

It is important that the Government and the contractor know and exercise their rights in inventions conceived or first actually reduced to practice in the course of or under Government contracts in order to ensure their expeditious availability to the public, to enable the Government, the contractor, and the public to avoid unnecessary payment of royalties, and to defend themselves against claims and suits for patent infringement. To attain these ends, contracts having Patent Rights clauses should be so administered that:

(a) Inventions are identified, disclosed, and reported as required by the contract clause;

(b) The rights of the Government in such inventions are established;

(c) When appropriate, patent applications are timely filed and prosecuted by the contractor, the inventor, or by the Government as appropriate;

(d) The filing of patent applications is documented by formal instruments such as licenses or assignments; and

(e) Expeditious commercial utilization of such inventions is achieved.

§9-9.109-2 Follow-up by contractor.

(a) The Patent Rights clause requires contractors to establish and maintain effective procedures to ensure that inventions made under the contract are identified, disclosed, and, when appropriate, patent applications filed, and that the Government's rights therein are established and protected. When it is determined after the award of a contract that the contractor or subcontractor may not have a clear understanding of the rights and obligations of the parties under a Patent Rights clause, a postaward orientation conference or letter should be used by DOE to explain these rights and obligations. When reviewing a contractor's procedures, particular attention shall be given to ascertaining their effectiveness for identifying and disclosing inventions.

(b) A qualified representative of the contractor shall furnish to the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) interim reports upon request, and upon completion of the contract work, a final report setting forth:

(1) A list of all subject inventions made during the reporting period;

(2) A certification that all subject inventions have been disclosed or that there were no such inventions, and that the contractor's procedures for identifying and disclosing inventions have been followed throughout the period; and

(3) A list of all subcontracts entered into during the reporting period which contain a Patent Rights clause, together with copies of such subcontracts (if not earlier furnished to DOE), or a statement that there were no such subcontracts.

(c) Ordinarily, inventions and discoveries will be reported on a Form DOE 213 (copies of which shall be made available by Patent Counsel) or on such other form that has been approved by Patent Counsel. Reporting of inventions promptly before completion of the work under the respective contracts will aid patent clearance. Submission of annual interim reports, where contracts cover an extended period, will also facilitate the disposition of patent matters and expedite the issuance of final patent clearance.

§9-9.109-3 Follow-up by Government.

(a) With respect to each contract, subcontract, or other agreement under their jurisdiction, the Heads of Procuring Activities are responsible for:

(1) Assuring compliance with the provisions of Part 9-9 in executing or approving any contracts, subcontracts, other agreements, understandings, or other arrangements, or any supplements thereto. The Patent Counsel assisting their activity should be consulted to ensure that only authorized departure is made from the requirements set forth in these regulations and that all substantive and procedural rights required by section 152 of the Atomic Energy Act of 1954, as amended, or section 9 of the Federal Nonnuclear Energy Research and Development Act of 1974, are obtained;

(2) Transmitting the information requested on the Patent Information Sheet, Form DOE 242, to the Assistant General Counsel for Patents;

(3) Reviewing, in consultation with the contractor, subcontractor, or vendor, arrangements for obtaining adequate patent agreements from employees and others performing work under any contract, subcontract, or other agreements containing patent provisions in favor of the Government. (The form of such patent agreement actually in use or proposed for use shall be forwarded for approval to the Patent Counsel assisting the procuring activity.)

(4) Forwarding a notice of completion or termination of the work and a request for patent clearance to the Assistant General Counsel for Patents for each contract, subcontract, or other agreement containing patent provisions giving rise to rights in the Government; and

(5) Withholding payments due to contractors in accordance with paragraph (i) of the Patent Rights clause of §9-9.107-5(a) until, in the case of interim reports, a determination has been made in consultation with Patent Counsel that existing deficiencies have been corrected or that delivery of all reports, disclosures, and other information have been made, or, in the case of final reports, receipt of written patent clearance certification from the Assistant General Counsel for Patents.

(b) The Assistant General Counsel for Patents, upon receipt of the DOE-approved Patent Information Sheet, will assign the patent responsibility and notify the person who transmits the information sheet of the Patent Counsel assigned to conduct the patent surveillance of the reported contract, subcontract, or other agreement. Upon receipt of the notice of completion or termination as provided in paragraph (a)(4) of this section, a notice of patent clearance will

be issued by the Assistant General Counsel for Patents when there has been, to his best knowledge and belief, compliance with the patent provisions.

(c) The Patent Counsel assigned to assist the procuring activity will assist Contracting Officers in selecting and negotiating patent provisions and, in the case of field procuring activities, will coordinate such assistance with the Chief Counsel in accordance with established local procedures. Patent Counsel will generally submit Patent Information Sheets and otherwise assist Heads of Procuring Activities, contractors, Contracting Officers, subcontractors and vendors in: reporting of inventions and discoveries; reviewing and providing patent clearance prior to publication or release of reports and proposed technical articles and prior to public release or disclosure of information regarding scientific and technical developments made in the course of or under the contract; handling claims for patent and copyright infringement; preparation of certificates to initiate patent clearance; and the handling of other patent matters.

(d) Patent application filing and determination of rights to inventions and discoveries.

The Assistant General Counsel for Patents or designee shall:

(1) Make the determination that inventions reported under subparagraph (e)(2)(i) of the Patent Rights clause are subject inventions under the contract;

(2) Determine whether and where patent protection will be obtained on inventions;

(3) Represent DOE before domestic and foreign patent offices;

(4) Accept assignments and instruments confirmatory of the Government's rights to inventions; and

(5) Represent DOE in patent and other intellectual property matters including those under these regulations.

§9-9.109-4 Remedies.

If a contractor operating under a Patent Rights clause fails to establish, maintain, or follow effective procedures for identifying and disclosing inventions as required by the Patent Rights clause or fails to correct any deficiency after notice thereof, the Contracting Officer may require the contractor to make available for examination books, records, and documents relating to inventions in the same field of technology as the contract to enable an agency determination of whether there are such inventions, and may invoke the withholding of payments provision if a contractor fails to disclose an invention deemed by DOE to be a subject invention.

§9-9.109-5 Conveyance of invention rights acquired by the Government.

Whenever the Government acquires the entire rights, title, and interest in an invention pursuant to a contract or by operation of law, assignments shall be obtained from the inventor to the Government, with the consent of the contractor, to perfect or confirm the Government's rights. The form of conveyance of title from the inventor to the contractor must be legally sufficient to convey the rights the contractor has required to convey to the Government.

§9-9.109-6 Waivers

(a) General.

(1) The Head of the Agency or designee may waive all or any part of the rights of the United States (other than certain rights prescribed in paragraph (i) of this section) with respect to any invention or class of inventions made or which may be made by any person or class of persons in the course of or under any contract of DOE, if it is determined that the interests of the United States and the general public as set forth in the Atomic Energy Act of 1954, as amended (42 USC 2182), and the Federal Nonnuclear Energy Research and Development Act of 1974 (42 USC 5908), will best be served by such waivers. In making such determinations, the Head of the Agency or designee shall have the following objectives:

(i) Making the benefits of the energy research, development, and demonstration program widely available to the public in the shortest practicable time;

(ii) Promoting the commercial utilization of such inventions;

(iii) Encouraging participation by private persons in DOE's energy research, development, and demonstration program; and

(iv) Fostering competition and preventing undue market concentration or the creation or maintenance of other situations inconsistent with the antitrust laws.

(2) If it is not possible to attain each of these objectives immediately and simultaneously for any one waiver determination, the Head of the Agency or designee will seek to reconcile these objectives in light of the overall purposes of the DOE patent policy which is governed by Section 152 of the Atomic Energy Act of 1954, as amended, and Section 9 of the Federal Nonnuclear Energy Research and Development Act of 1974.

(3) Over time, however, the application of this waiver policy is expected to attain each of these objectives. In addition to the patent policies provided by legislation, and where not inconsistent therewith, the waiver determinations will also be guided by the revised Presidential Memorandum and Statement of Government Patent Policy issued August 23, 1971 (36 F.R. 16887-16892).

(b) Advance waiver.

In determining whether a waiver to the contractor at the time of contracting will best serve the interests of the United States and the general public, the Head of the Agency or designee shall, as a minimum, specifically include as considerations the following:

(1) The extent to which the participation of the contractor will expedite the attainment of the purposes of the program;

(2) The extent to which a waiver of all or any part of such rights in any or all fields of technology is needed to secure the participation of the particular contractor;

(3) The extent to which the work to be performed under the contract is useful in the production or utilization of special nuclear material or atomic energy;

(4) The extent to which the contractor's commercial position may expedite utilization of the research, development, and demonstration program results;

(5) The extent to which the Government has contributed to the field of technology to be funded under the contract;

(6) The purpose and nature of the contract, including the intended use of the results developed thereunder;

(7) The extent to which the contractor has made or will make substantial investment of financial resources or technology developed at the contractor's private expense which will directly benefit the work to be performed under the contract;

(8) The extent to which the field of technology to be funded under the contract has been developed at the contractor's private expense;

(9) The extent to which the Government intends to further develop to the point of commercial utilization the results of the contract effort;

(10) The extent to which the contract objectives are concerned with the public health, public safety, or public welfare;

(11) The likely effect of the waiver on competition and market concentration;

(12) In the case of a nonprofit educational institution, the extent to which such institution has a technology transfer capability and program approved by the Head of the Agency or designee as being consistent with the applicable policies of this section; and

(13) The small business status of the contractor.

(c) Waiver of identified inventions.

In determining whether a waiver to the contractor or inventor of rights to an identified invention will best serve the interests of the United States and the general public, the Head of the Agency or designee shall, as a minimum, specifically include as considerations the following:

(1) The extent to which such waiver is a reasonable and necessary incentive to call forth private risk capital for the development and commercialization of the invention;

(2) The extent to which the plans, intentions, and ability of the contractor or inventor will obtain expeditious commercialization of such invention;

(3) The extent to which the invention is useful in the production or utilization of special nuclear material or atomic energy;

(4) The extent to which the Government has contributed to the field of technology of the invention;

(5) The purpose and nature of the invention, including the anticipated use thereof;

(6) The extent to which the contractor has made or will make substantial investment of financial resources or technology developed at the contractor's private expense which will directly benefit the commercialization of the inventor;

(7) The extent to which the field of technology of the invention has been developed at the contractor's expense;

(8) The extent to which the Government intends to further develop the invention to the point of commercial utilization;

(9) The extent to which the invention is concerned with the public health, public safety, or public welfare;

(10) The likely effect of the waiver on competition and market concentration;

(11) In the case of a nonprofit educational institution, the extent to which such institution has a technology transfer capability and program approved by the Head of the Agency or designee as being consistent with the applicable policies of this section; and

(12) The small business status of the contractor.

(d) Procedures.

(1) All waiver determinations shall be initiated by a written request providing the information set forth in paragraph (e). Such requests may be submitted by existing or potential contractors in the case of requests for an advance waiver and by contractors or employee-inventors in the case of requests for waiver for identified inventions. A request for an advance waiver may also be made for an identified invention which has already been conceived and which reasonably may be first actually reduced to practice in the course of or under a DOE contract. Such waiver requests must include a copy of the patent or patent application covering the identified invention.

(2) A request for an advance waiver shall be submitted to the Contracting Officer or to contractors for their subcontractors at any time prior to execution of the contract or within thirty days thereafter, but should normally be submitted as part of the contract proposal. If the purpose, scope, or cost of the contract is substantially altered by modification or extension, a new waiver request will be required. Accordingly, in such instance, Patent Counsel should advise the Contracting Officer if the purpose, scope, cost, or other factors are so changed upon which the original waiver was granted as to require submission and approval of a new waiver request covering the proposed modification or extension. When advance waivers are granted, the rights set forth in paragraphs (b), (c) and (d) of the clause of §9-9.107-5(a) should be modi-

fied to conform to the waiver granted.

(3) A request for waiver (other than advance waivers) for an identified invention shall be submitted to the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) at the time the invention is reported to DOE, or not later than nine months after conception or first actual reduction to practice, whichever occurs first, or such longer period as may be authorized by the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) for good cause shown in writing by the contractor or inventor.

(4) All requests for waiver received by DOE or its contractors will be forwarded promptly to the Patent Counsel assisting the procuring activity, together with any reference or supporting documents provided by the requestor and any documents or comments provided by the staff of the activity. If the request for waiver appears to contain insufficient information, the Patent Counsel may seek additional information from the requestor to supplement the request and may also seek additional information from other sources. The Patent Counsel will thoroughly analyze the request in view of each of the objectives and considerations set forth in this §9-9.109-6 and shall also consider the overall rights obtained by the Government in the patent, copyright, and data clauses of the contract. Where it appears that a lesser part of the rights of the United States than requested would be more appropriate in view of the policies set forth in this §9-9.109-6, the Patent Counsel should attempt to negotiate a compromise acceptable to both the requestor and DOE.

(5) The Patent Counsel will prepare and recommend a statement of considerations setting forth the rationale for either accepting or rejecting the waiver request. While the statement need not make specific findings as to each and every consideration of paragraph (b) or (c) of this section, it will cover those that raise significant issues and those that are decisive, and it will explain the basis for the recommmended determination. There may be occasions when the application of the various considerations in (b) or (c) of this section to a particular case could cause conflicting results, and in those instances the differences will be reconciled giving due regard to the overall policies set forth in this §9-9.109-6. Field Patent Counsel will coordinate actions on advance waivers with the Chief Counsel of the field procuring activity concerned as required by local procedures.

(6) The statement shall be forwarded to the Assistant General Counsel for Patents to serve as a recommended basis for the waiver determination. The Assistant General Counsel for Patents will also obtain comments from the appropriate DOE program organization to assist the Head of the Agency or designee in the waiver determination. In situations where time does not permit a delay in contract negotiations for the preparation and mailing of a full written statement, field Patent Counsel may submit a recommendation on the waiver verbally to the Assistant General Counsel for Patents and request a verbal determination from the Head of the Agency or designee. Such action shall be promptly confirmed in writing.

(7) In making waiver determinations, the Head of the Agency or designee shall objectively review all requests for waiver in view of the objectives and considerations set forth in this §9-9.109-6. If this determination and the rationale therefor is not accurately reflected in the recommended statement of considerations, a new statement shall be prepared.

(8) Where the request for advance waiver has not been approved prior to the effective date of the contract and the terms and conditions of the waiver have thus not been made a part of the contract, the Contracting Officer shall promptly notify the requestor by letter of the determination of the Head of the Agency or designee, and the basis therefor. If the advance waiver is approved, the letter shall state the scope, terms, and conditions of such waiver. Where the terms and conditions of an approved advance waiver have not been made a part of the contract, the letter shall inform the requestor that the advance waiver shall be effective (i) as of the effective date of the contract for an advance waiver of inventions identified, i.e., conceived prior to the effective date of the contract, or (ii) as of the date the invention is reported with an election by the contractor to retain rights therein, i.e., for an invention conceived or first actually reduced to practice after the effective date of the contract; provided a copy of

the letter is signed and returned to the Contracting Officer by the requestor acknowledging the acceptance of the scope, terms and conditions of the advance waiver. After acceptance by the contractor of an advance waiver, the Contracting Officer shall cause a unilateral no-cost modification to be made to the contract incorporating the terms and conditions of the waiver in lieu of previous patent provisions. Whenever a requested determination has been denied, the requestor may, within thirty days, request reconsideration. Such a request shall include any additional facts and rationale not previously submitted which support the request. Requests for reconsideration shall be submitted and processed in accordance with the procedures set forth in this paragraph (d).

(e) Content of waiver requests.

(1) All requests for waiver shall include the following information (Forms for submitting requests for advance and identified waivers indicating the necessary information may be obtained from the Contracting Officer or Patent Counsel):

(i) The requestor's identification, business address, and, if represented by Counsel, the Counsel's name and address;

(ii) An identification of the pertinent contract or proposed contract and a copy of the contract statement of work or a nonproprietary statement which fully describes the proposed work to be performed;

(iii) The nature and extent of waiver requested;

(iv) A full and detailed statement of facts, to the extent known by or available to the requestor, directed to each of the considerations set forth in paragraph (b) or (c) of this section, as applicable, and a statement applying such facts and considerations to the policies set forth in paragraph (a) of this section. It is important that this submission be tailored to the unique aspects of each request for waiver, and be as complete as feasible; and

(v) The signature of the requestor or authorized representative with the following statement:

> The facts set forth in this request for waiver are within the knowledge of the requestor and are submitted with the intention that the Head of the Agency or designee rely on them in reaching the waiver determination.

(2) Requests for waiver, for identified inventions shall include, in addition to items (1)(i) to (v) above:

(i) The full names of all inventors;

(ii) A statement of whether a patent application has been filed on the invention, together with a copy of such application if filed or, if not filed, a complete description of the invention;

(iii) If a patent application has not been filed, any information which may indicate a potential statutory bar to the patenting of the invention under 35 USC 102 or a statement that no such bar is known to exist; and

(iv) Where the requestor is the inventor, written authorization from the applicable contractor or subcontractor permitting the inventor to request a waiver.

(3) Subject to DOE regulations, requirements, and restrictions on the treatment of proprietary and classified information, all material submitted in requests for waiver or in support thereof will be made available to the public after a determination on the waiver request has been made, regardless of whether a waiver is granted. Accordingly, requests for waiver should not contain information or data that the requestor is not willing to have made public. If proprietary or classified information is needed to make the waiver determination, such information shall not be submitted unless specifically requested by the Patent Counsel.

(f) Record of waiver determinations.

The Assistant General Counsel for Patents shall maintain and periodically update a publicly available record of waiver determinations.

(g) Waiver situations and types of waivers.

(1) The various factual situations which are appropriate for waivers cannot be categorized precisely inasmuch as the appropriateness of a waiver will depend upon the manner in which the considerations set forth in paragraph (b) or paragraph (c) of this section relate to the facts and circumstances surrounding the particular contracting situation or the particular invention in order to best achieve the objectives set forth in paragraph (a) of this section. However, some examples where waivers might be appropriate are in the following:

(i) Cost-sharing contracts;

(ii) Situations in which DOE is providing increased funding to a specific ongoing privately-sponsored research, development, or demonstration project;

(iii) Situations involving the private use of Government facilities where the contractor is funding all or a part of such costs;

(iv) Situations in which the equities of the contractor are so substantial in relation to that of the Government that the waiver is necessary to obtain the participation of the contractor; and

(v) Situations involving contracts with small business concerning their privately developed technology.

(2) As stated in paragraph (a) of this section, waivers may be granted as to all or any part of the rights of the United States to an invention except for certain rights as set forth in paragraph (i) in this section. Accordingly, the waiver of all patent rights that are inherent to an invention, rather than part of the rights, will not necessarily be appropriate. The scope of the waiver will depend upon the relationship of the contractual situation or identified invention to the considerations set forth in paragraph (b) or (c) in order to best achieve the objectives set forth in paragraph (a) of this section. For example, waivers may be restricted to a particular field of use in which the contractor has substantial equities or a commercial position, or restricted to those uses that are not the primary object of the contract effort. Waivers may also be limited to particular geographical locations, may be made effective only for a specified duration of time, or may require the contractor to license others at reduced royalties in consideration of the Government's contribution to the research, development, or demonstration effort.

(3) In advance waivers of identified inventions, the invention will be deemed to be a subject invention and the waiver will be considered as being effective as of the effective date of the contract. This will be true regardless of whether the identified invention had been first actually reduced to practice prior to the time of contracting or would be reduced to practice under the contract. A purpose of such waivers is to clarify and definitize the rights of the parties to such inventions when the facts surrounding the first actual reduction to practice prior to or during the contract are or will be difficult to establish.

(h) Waivers to educational institutions.

(1) Except to the extent that a nonprofit educational institution may be engaged as a contractor operating a Government-owned facility or undertaking other special contracts, the following considerations apply to granting of advance and identified waivers to educational institutions having an approved technology transfer program capability. To obtain approval of a technology transfer program, an educational institution shall forward its request to DOE as provided in paragraph (2) below.

(2) A nonprofit educational institution desiring to obtain approval of its technology transfer program and acceptability shall provide the agency with the following information:

(i) General information concerning the institution, including:

(A) A copy of its articles of incorporation;

(B) A statement of the institution's purpose and aims; and

(C) A statement indicating the source of the institution's funds.

(ii) A copy of the institution's established patent policy, together with the date and manner of its adoption;

(iii) The name, title, address, and telephone number of the officer responsible for administration of patent and invention matters and a description of staffing in this area, including all offices which contribute to the institution's patent management capabilities;

(iv) A description of the institution's procedures for identifying and reporting inventions and a description of the procedures for evaluation of such inventions for inclusion in the institution's promotional program;

(v) A copy of the agreement signed by employees engaged in research and development, indicating their obligation in regard to inventions conceived or first actually reduced to practice in the course of their assigned duties;

(vi) A copy of the invention report form or outlines utilized for preparation of invention reports;

(vii) A statement of whether the institution has an agreement with any patent management organizations or consultants and a copy of any such agreements;

(viii) A description of the plans and intentions of the institution to bring to the marketplace inventions to which it retains title, including a description of the efforts typically undertaken by the institution to license its inventions.

(ix) A description of the institution's past patent application and patent licensing activities, including the following:

(A) Number of inventions reported to the institution during each of the past 5 years;

(B) Number of patent applications filed during each of the past 5 years;

(C) Number of patents obtained during each of the past 5 years;

(D) Number of exclusive licenses issued during each of the past 5 years;

(E) Number of nonexclusive licenses, other than those to sponsoring Government agencies, issued during each of the past 5 years;

(F) Gross royalty income during each of the past 5 years; and

(G) A general description of royalties charged, including minimum and maximum royalty rates.

(x) A list of subsidiary or affiliate institutions which would be covered by an agreement signed by the institution;

(xi) If the institution is a subsidiary or affiliate organization, the name of the other related organization and a description of the relationship;

(xii) The amount of support from each Federal Agency for research and development activities currently being administered by the institution, giving Government agency and breakdown;

(xiii) A statement of the institution's policies with respect to the sharing of royalties with employees; and

(xiv) A description of the uses made of any net income generated by the institution's patent management program.

(3) Before an institution's technology transfer program and capabilities are approved, the institution shall have a technology transfer program which, as a minimum shall include the five criteria listed below. In addition to these criteria, consideration will be given to whether or not other Government agencies have approved an institutional patent agreement with the requesting institution. The six criteria are:

(i) An established patent policy which is consistent with the four policy objectives in §9-9.109-6(a) and is administered on a continuous basis by an officer or organization responsible to the institution;

(ii) Agreements with employees requiring them to assign to the institution or its designee or the Government any invention conceived or first actually reduced to practice by them in the course of or under Government contracts and awards, or assurance that such agreements are obtained prior to the assignment of personnel to Government-supported research and development projects;

(iii) Procedures for insuring that inventions are promptly identified and timely disclosed to the officer or organization administering the patent policy of the institution;

(iv) Procedures for insuring that inventions disclosed to the institution are evaluated for inclusion in the institution's promotional program; and

(v) An active and effective promotional program for the licensing and marketing of inventions.

(vi) The institution has a policy of preferring, in appropriate circumstances, nonexclusive over exclusive licensing and domestic over foreign manufacture.

(4) In connection with requests for advance waivers, an approved technology transfer program and capabilities shall be considered in lieu of commercial, manufacturing, and marketing capabilities which normally reside in industry. Such approval shall not be considered sufficient in and of itself as justifying the granting of an advance waiver to an institution. Approval of the grant of an advance waiver must be viewed in light of the considerations of §9-9.109-6(b) above and the four objectives set forth in §9-9.109-6(a) above.

(5) In requests for identified waivers, however, the fact that an institution with an approved technology transfer program and capabilities has identified an invention and has expressed a desire to commercialize it through a request for a waiver therefor shall normally constitute a presumption that the institution has met the criteria of §9-9.109-6(c) unless it is indicated that under one or more of the criteria the presumption is inapplicable.

(6) If, in addition to a DOE-approved technology transfer program, an educational institution has a written procedure whereby the institution reviews for patentable subject matter papers concerning scientific or technical developments, the following paragraph (g) may be substituted for paragraph (g) of the Patent Rights (short form) clause of §9-9.107-6 or other Patent Rights clause in the contract.

> (g) In order that information concerning scientific or technical developments conceived or first actually reduced to practice in the course of or under the contract is not prematurely published so as to adversely affect patent interest of DOE, the Contractor agrees to screen for patent review each paper prior to its intended publication date. If a Subject Invention is identified by the Contractor in a paper submitted for review, the paper will be submitted to Patent Counsel prior to publication. Publication may be delayed by Patent Counsel for such time as is necessary to file a patent application thereon, up to a maximum of 100 days from the date the paper was submitted to Patent Counsel, or for a period longer than 100 days as mutually agreed.

(i) Terms and conditions of waivers.

Each waiver shall contain, as a minimum, provisions covering each of the following:

(1) Advance waivers shall apply only to inventions reported in accordance with paragraph(e)(2)(i) of the clause of §9-9.107-5(a) and with which is included an election as to whether the contractor will retain the rights waived in the invention, and specifying those countries in which rights will be retained.

(2) Subject to the rights granted in paragraphs (c)(1), (2) and (3) of the Patent Rights clause of §9-9.107-5(a), the contractor or inventor shall agree to convey to the Government, upon request, the entire domestic right, title, and interest in any subject invention when the contractor or inventor, as appropriate:

(i) Does not elect, in accordance with (i)(1) of this section to retain such rights; or

(ii) Fails to have a United States patent application filed on the invention in accordance with paragraph (i)(5) of this section, or decides not to continue prosecution of such application; or

(iii) At any time, no longer desires to retain title.

(3) Subject to the rights granted in paragraph (c)(1), (2) and (3) of the Patent Rights clause of §9-9.107-5(a), the contractor or inventor shall agree to convey to the Government, upon request, the entire right, title and interest in any subject invention in any foreign country, if the contractor or inventor, as appropriate:

(i) Does not elect, in accordance with paragraph (i)(1) of this section, to retain such rights in the country; or

(ii) Fails to have a patent application filed in the country on the invention in accordance with paragraph (i)(6) of this section, or decides not to continue prosecution or to pay any maintenance fees covering the invention. To avoid forfeitures of the patent application or patent, the contractor or inventor shall notify the Patent Counsel not less than 60 days before the expiration period for any action required by the Foreign Patent Office.

(4) Conveyances requested pursuant to paragraph (i)(2) or (3) of this section shall be made by delivering to the Patent Counsel duly executed instruments and such other papers as are deemed necessary to vest in the Government the entire right, title, and interest in the invention to enable the Government to apply for and prosecute patent applications covering the invention in this or the foreign country, respectively, or otherwise establish its ownership of the invention.

(5)(i) With respect to each invention in which the contractor has an advance waiver and elects to retain domestic rights pursuant to paragraph (i)(1) of this section, the contractor shall have a domestic patent application filed within 6 months after submission of the invention disclosure pursuant to paragraph (e)(2)(i) of the clause of §9-9.107-5(a) or such longer period as may be approved by the Patent Counsel for good cause shown in writing by the contractor or inventor. For identified inventions waived to the contractor or inventor, the contractor or inventor shall have a domestic patent application filed within 6 months after the waiver has become effective. With respect to such inventions, the contractor or inventor shall promptly notify the Patent Counsel of any decision not to file an application.

(ii) For each subject invention on which a patent application is filed by the contractor or inventor, the contractor or inventor shall:

(A) Within 2 months after the filing or within 2 months after submission of the invention disclosure if the patent application previously has been filed, deliver to Patent Counsel a copy of the application as filed including the filing date and serial number;

(B) Include the following statement in the second paragraph of the specification of the application and any patents issued on a subject invention, "The Government has rights in this invention pursuant to Contract No. _____ (or Grant No. _____) awarded by the U.S. Department of Energy;"

(C) Within 6 months after filing the application or within 6 months after submitting the invention disclosure if the application has been filed previously, deliver to the Patent Counsel a duly executed and approved instrument fully confirmatory of all rights to which the Government is entitled, and provide DOE an irrevocable power to inspect and make copies of the patent application filed. If, however, a waiver request is pending, delivery of the confirmation instrument may be delayed until a determination of the waiver request is made;

(D) Provide the Patent Counsel with a copy of the patent within 2 months after a patent is issued on the application; and

(E) Not less than 30 days before the expiration of the response period for any action required by the Patent and Trademark Office, notify the Patent Counsel of any decision not to continue prosecution of the application and deliver to the Patent Counsel executed instruments granting the Government a power of attorney.

(iii) For each invention in which the contractor initially elects pursuant to (i)(1) of this section not to retain the rights waived, the contractor shall inform the Patent Counsel promptly in writing of the date and identity of any on sale, public use, or public disclosure of the invention which may constitute a statutory bar under 35 U.S.C. 102, which was authorized by or known to the contractor, or any contemplated action of this nature.

(6)(i) With respect to each invention in which the contractor elects pursuant to (i)(1) of this section to retain the rights waived in a foreign country, or in which the contractor or inventor has obtained a waiver of foreign rights on an identified invention, the contractor or inventor shall have a patent application filed on the invention in that country, in accordance with applicable statutes and regulations, and within one of the following periods:

(A) Eight months from the date of a corresponding United States application filed by the contractor or inventor, or if such an application is not filed, 6 months from the date the invention is submitted in a disclosure pursuant to paragraph (e)(2)(i) of the clause of §9-9.107-5(a);

(B) Six months from the date a license is granted by the Commissioner of Patents and Trademarks to file foreign applications where such filing has been prohibited by security reasons; or

(C) Such longer period as may be approved by the Patent Counsel.

(ii) The contractor or inventor shall notify the Patent Counsel promptly of each foreign application filed and, upon written request, shall furnish an English version of the application without additional compensation.

(7) The contractor or inventor shall, three years after a waiver is effective as to an invention, and at three-year intervals thereafter, and when specifically requested by the Patent Counsel, furnish Patent Counsel a report setting forth:

(i) The commercial use that is being made, or is intended to be made, of said invention, and

(ii) The steps taken to bring the invention to the point of practical application or to make the invention available for licensing.

(8) The Government shall retain at least an irrevocable, nonexclusive, paid-up license to make, use, and sell the invention throughout the world by or on behalf of the Government (including any Government agency) and States and domestic municipal governments, unless the Head of the Agency or designee determines that it would not be in the public interest to acquire the license for the States and domestic municipal governments.

(9) The Head of the Agency or designee has the right to require the granting of a nonexclusive, exclusive, or partially exclusive license to a responsible applicant or applicants, upon terms reasonable under the circumstances:

(i) To the extent that the invention is required for public use by Governmental regulations;

(ii) As may be necessary to fulfill health, safety or energy needs; or

(iii) Such other purposes as may be stipulated in the applicable agreement.

(10) The Head of the Agency or designee has the right to terminate such waiver in whole or in part unless the recipient of such waiver demonstrates to the satisfaction of the Head of the Agency or designee that effective steps have been taken, or within a reasonable time thereafter are expected to be taken, necessary to accomplish substantial utilization of the invention.

(11) The Head of the Agency or designee has the right, commencing four years after a waiver is effective as to an invention, to require the granting of a nonexclusive or partially exclusive license to a responsible applicant or applicants, upon terms reasonable under the circumstances, and in appropriate circumstances to terminate the waiver in whole or in part, following a hearing upon notice thereof to the public, upon a petition by an interested person justifying such hearing;

(i) If the Head of the Agency or designee determines upon review of such material as is relevant, and after the recipient of the waiver or other interested person has had the opportunity to provide such relevant and material information as the Head of the Agency or designee may require, that such waiver has tended substantially to lessen competition or to result in undue market concentration in any section of the United States in any line of commerce to which the technology relates; or

(ii) The recipient of the waiver demonstrates to the satisfaction of the Head of the Agency or designee at such hearing that effective steps have been taken, or within a reasonable time thereafter are expected to be taken, necessary to accomplish substantial utilization of the invention.

(j) Termination.

(1) Any waiver may be terminated at the discretion of the Head of the Agency or designee, in whole or in part, if the request for waiver is found to contain false material statements or nondisclosure of material facts, and such were specifically relied upon in reaching the waiver determination.

(2) Any waiver, as applied to particular inventions, may be terminated at the discretion of the Head of the Agency or designee, in whole or in part, if the requirements set forth in paragraph (i) of this section (terms and conditions of the waivers) have not been fulfilled and such failure is determined by the Head of the Agency or designee to be material and detrimental to the interests of the United States and the general public.

(3) Prior to terminating a waiver under paragraph (j)(1) or (j)(2) of this section, the recipient of the waiver will be given written notice of the intention to terminate the waiver, the extent of such proposed termination and the reason therefor, and a period of 30 days, or such longer period as the Head of the Agency or designee shall determine for good cause shown in writing, to show cause why the waiver should not be so terminated.

(4) All terminations of waivers shall be subject to the rights granted in paragraph (c)(1) of the clause of §9-9.107-5(f), and termination shall normally be partial in nature, requiring the waiver recipient to grant nonexclusive or partially nonexclusive licenses to responsible applicants upon terms reasonable under the circumstances.

(k) Effective date.

Waivers shall be effective on the following dates:

(1) For advance waivers of identified inventions, i.e., inventions conceived prior to the effective date of the contract, on the effective date of the contract, even though the advance waiver may have been requested after that date;

(2) For identified inventions under advance waivers, i.e., inventions conceived or first actually reduced to practice after the effective date of the contract, on the date the invention is reported with the election to retain rights as to that invention; and

(3) For waivers of identified inventions (other than under an advance waiver), on the date of the letter notifying the requestor that the waiver has been granted.

§9-9.110 Reporting of royalties.

In order that DOE may be informed regarding royalty payments to be made by a contractor in connection with any procurement, construction, or operation where the amount of the royalty payment is reflected in the contract price, or is to be reimbursed by the Government, the negotiator shall:

(a) Obtain from the offeror information concerning any royalty payments expected to be made in connection with the proposed procurement, construction, or operation, together with the names of the licensors and either the patent numbers involved or such other information as will permit identification of the patents and patent applications as well as the basis on which the royalties are to be paid;

(b) Obtain from the offeror a certificate that the contract price includes no amount representing the payment of royalty by the offeror directly to others in connection with the performance of the contract; or

(c) Insert in the contract the clause set forth below:

REPORTING OF ROYALTIES

If this contract is in an amount which exceeds $10,000 and if any royalty payments are directly involved in the contract or are reflected in the contract price to the Government, the contractor agrees to report in writing to the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) during the performance of this contract and prior to its completion or final settlement, the amount of any royalties or other payments paid or to be paid by it directly to others in connection with the performance of this contract together with the names and addresses of licensors to whom such payments are made and either the patent numbers involved or such other information as will permit the identification of the patents or other basis on which the royalties are to be paid. The approval of DOE of any individual payments or royalties shall not stop the Government at any time from contesting the enforceability, validity or scope of, or title to, any patent under which a royalty or payments are made.

Subpart 9-9.2 Technical Data and Copyrights

§9-9.200 Scope of subpart.

This subpart sets forth DOE's policy, procedures, and contract clauses with respect to the acquisition and use of technical data and copyrights in contracts or subcontracts entered into, with or for the benefit of the Government.

§9-9.201 Definitions.

For the purpose of this subpart, the following terms have the meanings set forth below:

(a) "Technical data" means recorded information, regardless of form or characteristic, of a scientific or technical nature. It may, for example, document research, experimental, developmental, demonstration, or engineering work or be usable or used to define a design or process or to procure, produce, support, maintain, or operate material. The data may be graphic or pictorial delineations in media such as drawings or photographs, text in specifications or related performance or design type documents, or computer software (including computer programs, computer software data bases, and computer software documentation). Examples of technical data include research and engineering data, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identification, and related information. Technical data, as used in this subpart, do not include financial reports, cost analyses, and other information incidental to contract administration.

(b) "Proprietary data" means technical data which embody trade secrets developed at private expense, such as design procedures or techniques, chemical composition of materials, or manufacturing methods, processes, or treatments, including minor modifications thereof, provided that such data:

(1) Are not generally known or available from other sources without obligation concerning their confidentiality;

(2) Have not been made available by the owner to others without obligation concerning their confidentiality; and

(3) Are not already available to the Government without obligation concerning their confidentiality.

(c) "Contract data" means technical data first produced in the performance of the contract, technical data which are specified to be delivered under the contract, technical data that may be called for under the Additional Technical Data Requirements clause of the contract, if any, or technical data actually delivered in connection with the contract.

(d) "Unlimited rights" means rights to use, duplicate or disclose technical data, in whole or in part, in any manner and for any purpose whatsoever, and to permit others to do so.

§9-9.202 Acquisition and use of technical data.

§9-9.202-1 General.

(a) The provisions herein pertain to research, development, demonstration and supply contracts, and contracts for the operation, design, or construction of Government-owned facilities which are covered by §9-9.202-4. Under DOE's broad charter to perform research, development, and demonstration work, in both nuclear and nonnuclear fields, and to meet the objectives stated in §9-9.202-2 below, DOE has extensive needs for technical data. The satisfaction of these needs and the achievement of DOE's objectives through a sound data policy are found in the balancing of the needs and equities of the Government, its contractors, and the general public.

(b) It is important to keep a clear distinction between contract requirements for the delivery of technical data on the one hand, and rights in technical data on the other. The legal rights which the Government acquires in technical data in DOE contracts (other than "facilities" contracts) are set forth in the Rights in Technical Data (long form) clause of §9-9.202-3(c)(2). However, this clause does not obtain for the Government the delivery of any data whatsoever. Rather, known requirements for the technical data to be delivered by the contractor shall be set forth as part of the contract (e.g. in the statement of work). An Additional Technical Data Requirements clause is included in this subpart to enable the Contracting Officer to require the contractor to furnish additional technical data, the requirement for which was not known at the time of contracting. There is, however, a built-in limitation on the kind of technical data which a contractor may be required to deliver under either the contract statement of work or the Additional Technical Data Requirements clause. This limitation is found in the withholding provision of paragraph (e) of the Rights in Technical Data (long form) clause of §9-9.203-3(e)(2) which provides that the contractor need not furnish "proprietary data." It is specifically intended that the contractor may withhold "proprietary data" even though a requirement for technical data specified in the statement of work or called for pursuant to the Additional Technical Data Requirements clause would seemingly require the furnishing of proprietary data. This withholding of proprietary data is the primary means by which the contractor may protect its proprietary position.

(c) There are, however, two situations where the Government, or its representative, may need to have limited access to a contractor's proprietary data. First, paragraph (f) of the Rights in Technical Data (long form) clause gives the Contracting Officer's representatives the limited right to inspect at the contractor's facility the contractor's proprietary data which were withheld from delivery under paragraph (e) of the clause for the purpose of verifying that such data were properly withheld or to evaluate work performance. In carrying out the inspection, normally the Contracting Officer's representative is a DOE employee although he may be an employee of a DOE contractor acting under an agreement to treat in confidence the proprietary data to be inspected. However, where the contractor whose data are to be inspected demonstrates that there would be a possible conflict of interest if the inspection were made by such a contractor employee, the Contracting Officer's representative may be limited to a DOE employee. Paragraph (f) has a built-in exclusion from these inspection rights for "specific items of proprietary data" when they are so specified in the contract schedule. Such exclusions limit even DOE's minimum rights of evaluating contract work performance and verifying that technical data withheld by the contractor is proprietary in fact. Such exclusions should be sparingly used, and only in situations where program personnel stipulate to the fact that DOE has no need for access to the specified items to be excluded from paragraph (f), i.e., that the nondisclosure and nonaccessibility will not adversely affect the DOE program involved. It should also be noted that paragraph (f) permits exclusion of "specific items" of proprietary data and, accordingly, should not be used to exclude classes of technical data or all technical data pertaining to specific items or processes or classes of items or processes. The second situation, where the Government may have limited access to a contractor's proprietary data, is provided in optional paragraph (g) of the Rights in Technical Data (long form) clause. When used, optional paragraph (g) provides the Government the right to require the contractor to furnish with limited rights the proprietary data previously withheld under paragraph (e). In this situation, the limited rights in proprietary data and the Government's obligation for limited use and disclosure of such data as set forth in the Rights in Technical Data (long form) clause provides the means by which the contractor protects its proprietary position. Paragraph (g) will be used only where it is determined by DOE that for programmatic reasons there is a need for the delivery of proprietary data to the Government. Where proprietary data is to be delivered under paragraph (g) and subparagraph (a) or (b) of the limited rights legend is to be applied to the data, the contractor may, if he can show the possibility of a conflict of interest regarding disclosure of such data to other contractors, limit or modify subparagraphs (a) or (b) as set forth in §9-9.202-3(c)(3), to exclude or include certain contractors.

(d) The contractor licensing provisions of optional paragraph (h) of the Rights in Technical Data (long form) clause enable DOE to require limited licenses in proprietary contract data to be granted to the Government and responsible parties in certain circumstances. Such a license may parallel or supplement the license obtained in background patents under the provisions of paragraph (k) of the Patent Rights clause of Subpart 9-9.1. Paragraph (h) is normally to be included in contracts for research, development or demonstration where it is deemed by DOE that the limited license afforded therein is necessary to ensure widespread commercial use or practical utilization of a subject of the contract. As explained in §9-9.202-3(e)(4), paragraph (h) provides that upon request by DOE, the contractor will grant to the Government and responsible third parties a license in proprietary data only where such data in the form of results obtained by its use, i.e., essential equipment, articles, products, and the like which were the subject of the contract, are not otherwise available, or cannot be made available in a reasonable time as set forth in paragraph (h).

(e) It is the responsibility of prime contractors and highertier subcontractors, in meeting their obligations with respect to contract data, to obtain from their subcontractors the rights in, access to, and delivery of such data on behalf of the Government. Accordingly, subject to the policy set forth in these regulations, and subject to the approval of the Contracting Officer where required, selection of appropriate technical data provisions for subcontracts is the responsibility of the prime contractor or higher-tier subcontractor. In many but not all instances, inclusion in a subcontract of the Rights in Technical Data (long form) clause of §9-9.202-3(e)(2) will suffice to obtain for the benefit of the Government the rights in and, if appropriate, access to technical data. Access by DOE to technical data, i.e., the inspection rights afforded in paragraph (f) of the Rights in Technical Data (long form) clause, §9-9.202-3(e)(2), normally should be obtained only in first-tier subcontracts having as a purpose the conduct of research, development, or demonstration work or the furnishing of supplies for which there are substantial technical data requirements as reflected in the prime contract. If a subcontractor refuses to accept technical data provisions affording rights in and access to technical data on behalf of the Government, the contractor shall so inform the Contracting Officer in writing and not proceed with the subcontract without written authorization of the Contracting Officer. In prime contracts (or higher-tier subcontracts) which contain the Additional Technical Data Requirements clause, it is the further responsibility of the contractor (or higher-tier subcontractor) to determine whether inclusion of such clause in a subcontract is required to satisfy technical data requirements of the prime contract (or higher-tier subcontract). As is the case for DOE in its determination of technical data requirements, the Additional Technical Data Requirements clause should not be used at any subcontracting tier where the technical data requirements are fully known, and normally the clause will be used only in subcontracts having as a purpose the conduct of research, development, or demonstration. Prime contractors and higher-tier subcontractors shall not use their power to award subcontracts as economic leverage to inequitably acquire rights in the subcontractor's proprietary data for their private use, and they shall not acquire rights on behalf of the Government to proprietary data for standard commercial items unless required by the prime contract.

(f) Related to the acquisition and use of technical data are the contractor's rights in contract data as well as technical data furnished to the contractor by DOE or its contractors. These rights are set forth in paragraph (b)(2) of each Rights in Technical Data clause of this subpart and provide that the contractor may, subject to patent, security and other provisions of the contract, use for its private purposes contract data it first produces in the performance of the contract, provided that the contractor has met its data requirements (e.g., delivery of data in the form of progress or status reports specified to be delivered) as of the date of the private use of such data. It is not necessary that a final report be submitted in order to privately use data if all required progress and interim reports and other technical data then due have been delivered. Paragraph (b)(2) further provides that technical or other data received by the contractor in the performance of the contract must be held in confidence by the contractor in accor-

dance with restrictions accompanying the data.

(g) An additional clause in this subpart includes that of paragraph §9-9.202-3(f)(2) entitled Rights in Data - Special Works, which is to be used in place of or in addition to the Rights in Technical Data (long form) clause in contracts where a purpose of the contract is the production of copyrightable material, a substantial portion of which is to be first produced in the performance of the contract, such as motion pictures, television recordings, books, histories, etc. Where, during contract negotiations, it may be determined to purchase, i.e., "specifically acquire," unlimited rights in technical data, or to lease or obtain a license therein, or to obtain rights in existing data, an appropriate clause therefor should be obtained from Patent Counsel. In situations where technical data including computer software are to be leased or licensed, the terms of any agreement restricting the Government's rights will be included in the contract as either a special provision or an agreement annexed thereto. Another clause, the Rights in Technical Data (short form) clause of §9-9.202-3(g)(2), is provided for use in research contracts with educational institutions and consultants. Such contracts may, for example, include those for conducting symposia, training, or education, or other contracts not involving possible use of proprietary data.

(h) In contracts involving access to certain categories of DOE-owned restricted data, as set forth in 10 CFR Part 725, DOE has reserved the right to receive reasonable compensation for the use of its inventions and discoveries, including its related data and technology. Accordingly, in contracts where access to such restricted data is to be provided to contractors, the following parenthetical phrase shall be inserted after "contract data" in paragraph (b)(2)(ii) of the clause in §9-9.202-3(e)(2), after "technical data" in paragraph (b)(2) of the clause in §9-9.202-3(g)(2), or after "technical data" in paragraph (b)(2)(ii) of the clause in §9-9.202-4(c)(2) as appropriate: (except Restricted Data in category C-24, 10 CFR 725, in which DOE has reserved the right to receive reasonable compensation for the use of its inventions and discoveries, including related data and technology). In addition, there are other types of contract situations (e.g., no cost contracts for studies or evaluation) wherein the contractor is given access to restricted data. In such contract situations, limitations on the use of such data may be appropriate.

§9-9.202-2 Policy.

The technical data policy is directed toward achieving the following objectives:

(a) Making the benefits of the energy research, development and demonstration programs of DOE widely available to the public in the shortest practicable time;

(b) Promoting the commercial utilization of the technology developed under DOE programs;

(c) Encouraging participation by private persons in DOE energy research, development, and demonstration programs; and

(d) Fostering competition and preventing undue market concentration or the creation or maintenance of other situations inconsistent with the antitrust laws.

§9-9.202-3 Procedures (supply, research, development, or demonstration contracts).

(a) Known requirements for technical data. Technical data requirements are determined in relation to the intended use of the data which in turn depends upon the intended use of the contract end item. In many contracts for research, the end item may often be a technical report or series of such reports, while in contracts beyond research, the subject of the contract may be a feasibility model, an engineering or advance development model, or a prototype. The extent to which required technical data may be needed often depends on the level of maturity of design and perfection of the end item, and, for a demonstration plant or prototype, may include data pertaining to performance, operational and environmental testing, repair, maintenance, operation, quality assurance, detailed design, logistics, training, etc. Known technical data requirements shall be programmatically ascertained prior to contracting and shall be in-

cluded in requests for proposals or disclosed during contract negotiations for incorporation as data requirements in the contract statement of work.

(b) Additional requirements for technical data. In contracts for research, development, or demonstration, it is not normally possible or appropriate for the Government to ascertain all actual needs for technical data in advance of contracting. Accordingly, the Additional Technical Data Requirements clause in (c) below, shall normally be used in such contracts (and, if appropriate, in subcontracts) to enable the ordering of technical data as the actual need and requirement therefor became known during the course of the contract. If all technical data requirements are known in advance of contracting and are set forth in the contract statement of work, this clause need not be used. The Additional Technical Data Requirements clause should not normally be used in supply contracts because the required technical data therefor are ordinarily known in advance and thus are specified in the contract statement of work or specification.

(c) Additional Technical Data Requirements clause.

ADDITIONAL TECHNICAL DATA REQUIREMENTS

(a) In addition to the technical data specified elsewhere in this contract to be delivered, the Contracting Officer may at any time during the contract performance or within one year after final payment call for the contractor to deliver any technical data first produced or specifically used in the performance of this contract, except technical data pertaining to items of standard commercial design.

(b) The provisions of the Rights in Technical Data clause included in this contract are applicable to all technical data called for under this Additional Technical Data Requirements clause. Accordingly, nothing contained in this clause shall require the contractor to actually deliver any technical data, the delivery of which is excused by paragraph (e) of the Rights in Technical Data clause.

(c) When technical data are to be delivered under this clause, the contractor will be compensated for appropriate costs for converting such data into the prescribed form for reproduction, and for delivery.

(d) Proposals.

The policy and procedures for treatment of proposal information in solicited and unsolicited proposals are contained in §9-3.150 of these regulations in which it is provided that proposals may be marked with the notice set forth in §9-3.150-2(a). It is DOE policy, in consideration of the contract award, to obtain unlimited rights in the technical data contained in the proposal unless the prospective contractor marks those portions of the technical information which he asserts as being proprietary data. If a contract is to be awarded based on a proposal even though it is marked with the notice in §9-3.150-2(a), the prospective contractor is obliged under §9-3.150-2 (b) to identify the portions thereof which contain proprietary data, and the contract in such instance shall contain the Rights to Proposal Data clause set forth in §9-3.150-2(c) identifying data asserted to be proprietary data by page number. Under §9-3.150-2(b) and §9-3.151-1 which set forth procedures for identifying proprietary data, it is provided that, subject to the concurrence of the Contracting Officer, the proposer may delete proposal information unrelated to the contract, identify the proprietary data in his proposal, or state that there is no proprietary data in the proposal. Data identified as proprietary does not constitute a stipulation by the Government that it is in fact proprietary data.

(e) Rights in technical data.

(1) The Rights in Technical Data (long form) clause set forth in paragraph (2) below will be used in all contracts having as a purpose the conduct of research, development, or demonstration, or in contracts for supplies, or in any other contract where technical data are expected to be first produced under the contract, where technical data are specified to be delivered in the contract, or where the contract contains the Additional Technical Data Requirements clause. Accordingly, all such contracts will contain the Rights in Technical Data (long form) clause of paragraph (2) below, except as noted in §9-9.202-4 and §9-9.202-3(f) and (g) and

except contracts for standard commercial off-the-shelf supplies where technical data such as operating or repair manuals are routinely furnished with the supplies.

(2) Rights in Technical Data clause.

RIGHTS IN TECHNICAL DATA - LONG FORM

(a) Definitions.

(1) "Technical data" means recorded information regardless of form or characteristic, of a scientific or technical nature. It may, for example, document research, experimental, developmental, or demonstration, or engineering work, or be usable or used to define a design or process, or to procure, produce, support, maintain, or operate material. The data may be graphic or pictorial delineations in media such as drawings or photographs, text in specifications or related performance or design-type documents or computer software (including computer programs, computer software data bases, and computer software documentation). Examples of technical data include research and engineering data, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identification, and related information. Technical data as used herein do not include financial reports, cost analyses, and other information incidental to contract administration.

(2) "Proprietary data" means technical data which embody trade secrets developed at private expense, such as design procedures or techniques, chemical composition of materials, or manufacturing methods, processes, or treatments, including minor modifications thereof, provided that such data:

(i) Are not generally known or available from other sources without obligation concerning their confidentiality;

(ii) Have not been made available by the owner to others without obligation concerning its confidentiality; and

(iii) Are not already available to the Government without obligation concerning their confidentiality.

(3) "Contract data" means technical data first produced in the performance of the contract, technical data which are specified to be delivered under the contract, technical data that may be called for under the Additional Technical Data Requirements clause of the contract, if any, or technical data actually delivered in connection with the contract.

(4) "Unlimited rights" means rights to use, duplicate, or disclose technical data, in whole or in part, in any manner and for any purpose whatsoever, and to permit others to do so.

(b) Allocation of rights.

(1) The Government shall have:

(i) Unlimited rights in contract data except as otherwise provided below with respect to proprietary data;

(ii) The right to remove, cancel, correct or ignore any marking not authorized by the terms of this contract on any technical data furnished hereunder, if in response to a written inquiry by DOE concerning the proprietary nature of the markings, the contractor fails to respond thereto within 60 days or fails to substantiate the proprietary nature of the markings. In either case, DOE will notify the contractor of the action taken;

(iii) No rights under this contract in any technical data which are not contract data.

(2) The contractor shall have:

(i) The right to withhold proprietary data in accordance with the provisions of this clause; and

(ii) The right to use for its private purposes, subject to patent, security or other provisions of this contract, contract data it first produces in the performance of this contract, provided the data requirements of this contract have been met as of the date of the private use of such data. The contractor agrees that to the extent it receives or is given access to proprietary data or other technical, business or financial data in the form of recorded information from DOE or a DOE contractor or subcontractor, the contractor shall treat such data in accordance with any restrictive legend contained thereon, unless use is specifically authorized by prior written ap-

proval of the Contracting Officer.

(3) Nothing contained in this Rights in Technical Data clause shall imply a license to the Government under any patent or be construed as affecting the scope of any licenses or other rights otherwise granted to the Government under any patent.

(c) Copyrighted material.

(1) The contractor shall not, without prior written authorization of the Contracting Officer, establish a claim to statutory copyright in any contract data first produced in the performance of the contract. To the extent such authorization is granted, the Government reserves for itself and others acting on its behalf a royalty-free, nonexclusive, irrevocable, world-wide license for Governmental purposes to publish, distribute, translate, duplicate, exhibit and perform any such data copyrighted by the contractor.

(2) The contractor agrees not to include in the technical data delivered under the contract any material copyrighted by the contractor and not to knowingly include any material copyrighted by others, without first granting or obtaining at no cost a license therein for the benefit of the Government of the same scope as set forth in paragraph (c)(1) above. If such royalty-free license is unavailable and the contractor nevertheless determines that such copyrighted material must be included in the technical data to be delivered, rather than merely incorporated therein by reference, the contractor shall obtain the written authorization of the Contracting Officer to include such copyrighted material in the technical data prior to its delivery.

(d) Subcontracting.

It is the responsibility of the contractor to obtain from its subcontractors technical data and rights therein, on behalf of the Government, necessary to fulfill the contractor's obligations to the Government with respect to such data. In the event of refusal by a subcontractor to accept a clause affording the Government such rights, the contractor shall:

(1) Promptly submit written notice to the Contracting Officer setting forth reasons for the subcontractor refusal and other pertinent information which may expedite disposition of the matter; and

(2) Not proceed with the subcontract without the written authorization of the Contracting Officer.

(e) Withholding of proprietary data.

Notwithstanding the inclusion of the Additional Technical Data Requirements clause in this contract or any provision of this contract specifying the delivery of technical data, the contractor may withhold proprietary data from delivery, provided that the contractor furnishes in lieu of any such proprietary data so withheld technical data disclosing the source, size, configuration, mating and attachment characteristics, functional characteristics, and performance requirements ("Form, Fit and Function" data, e.g., specification control drawings, catalog sheets, envelope drawings, etc.), or a general description of such proprietary data where "Form, Fit and Function" data are not applicable. The Government shall acquire no rights to any proprietary data so withheld except that such data shall be subject to the "inspection rights" provisions of paragraph (f), and, if included, the "Limited rights in proprietary data" provisions of paragraph (g) and the "Contractor licensing" provisions of paragraph (h).

(f) Inspection rights.

Except as may be otherwise specified in this contract for specific items of proprietary data which are not subject to this paragraph, the Contracting Officer's representatives, at all reasonable times up to three years after final payment under this contract, may inspect at the contractor's facility any proprietary data withheld under paragraph (e) for the purposes of verifying that such data properly fell within the withholding provision of paragraph (e), or for evaluating work performance.

(3) Optional clause – Limited Rights in Proprietary Data.

In research, development, or demonstration contracts, and supply contracts where it is determined that delivery of proprietary data is necessary with limited rights in the Government, the Rights in Technical Data (long form) clause shall be supplemented by the additional para-

graph (g) set forth below. It should be noted that this paragraph does not entitle the contractor to place a limited rights legend on any technical data furnished to the Government under paragraph (g) below unless the Contracting Officer requests in writing delivery of identified technical data previously withheld under paragraph (e) of the Rights in Technical Data clause. Paragraph (g) provides that proprietary data may be specified in the contract as being excluded from the delivery requirements of paragraph (e). Alternatively, the limited rights legend specified in paragraph (g) may be made applicable to only those classes of proprietary data determined as being necessary for delivery with limited rights. In addition, when furnishing proprietary data with the limited rights legend, subparagraphs (a), (b) and (c) thereunder may be modified as follows. When proprietary data is to be furnished only for evaluation, subparagraph (a) of the limited rights legend shall be used, and subparagraphs (b) and (c), if otherwise inapplicable, may be deleted. When there is a programmatic requirement that proprietary data be disclosed to other DOE contractors only for information or use in connection with work performed under their contracts, subparagraph (b) of the limited rights legend shall be used, and subparagraphs (a) and (c) may be deleted if otherwise inapplicable. In either of the foregoing examples, the contractor may, if he can show the possibility of a conflict of interest because of disclosure of such data to certain contractors or evaluators, exclude such contractors or evaluators from subparagraphs (a) or (b). If the data is required solely for emergency repair or overhaul, subparagraph (c) of the limited rights legend shall be retained, and subparagraphs (a) and (b) may be deleted, unless otherwise applicable. In the event it is determined that all of the subparagraphs (a), (b) and (c) of the limited rights legend are to be deleted, the word "none" shall be inserted in the legend after the colon (:).

(g) Limited rights in proprietary data.

Except as may be otherwise specified in this contract as technical data which are not subject to this paragraph, the contractor shall, upon written request from the Contracting Officer at any time prior to three years after final payment under this contract, promptly deliver to the Government any "proprietary data" withheld pursuant to paragraph (e) of the Rights in Technical Data clause of this contract. The following legend and no other is authorized to be affixed on any "proprietary data" delivered pursuant to this provision, provided the "proprietary data" meets the conditions for initial withholding under paragraph (e) of the Rights in Technical Data clause. The Government will thereafter treat the "proprietary data" in accordance with such legend.

LIMITED RIGHTS LEGEND

This "proprietary data," furnished under "Contract No. _____" with the U.S. Department of Energy (and Purchase Order No. _____ if applicable) may be duplicated and used by the Government with the express limitations that the "proprietary data" may not be disclosed outside the Government or be used for purposes of manufacture without prior permission of the contractor, except that further disclosure or use may be made solely for the following purposes:

(a) This "proprietary data" may be disclosed for evaluation purposes under the restriction that the "proprietary data" be retained in confidence and not be further disclosed;

(b) This "proprietary data" may be disclosed to other contractors participating in the Government's program of which this contract is a part, for information or use in connection with the work performed under their contracts and under the restriction that the "proprietary data" be retained in confidence and not be further disclosed; or

(c) This "proprietary data" may be used by the Government or others on its behalf for emergency repair or overhaul work under the restriction that the "proprietary data" be retained in confidence and not be further disclosed. This legend shall be marked on any reproduction of this data in whole or in part.

(4) Optional clause - Contractor Licensing.

In many contracting situations the achievement of DOE's objectives would be frustrated if the Government, at the time of contracting, did not obtain on behalf of responsible third parties and itself limited license rights in and to proprietary contract data. Where, for example, the

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contractor is required to license background patents, consideration should be given to securing co-extensive license rights to the Government and responsible third parties at reasonable royalties, and under appropriate restrictions, for contract data which are proprietary data in order to practice the technology which is a subject of the contract. When such a license right is deemed necessary, the Rights in Technical Data (long form) clause should be supplemented by the addition of paragraph (h) below. Paragraph (h) will normally be sufficient to cover proprietary contract data for items and processes that were used in the contract and are necessary in order to insure widespread commercial use of a subject of the contract. The expression "subject of the contract" is intended to limit the licensing required in clause (h) below to the fields of technology specifically contemplated in the contract effort and may be replaced by a more specific statement of the fields of technology intended to be covered in the manner described in §9-9.107-5(b)(9) of Subpart 9-9.1 of these Regulations pertaining to "Background Patents." Where, however, proprietary contract data cover the main purpose or basic technology of the research, development, or demonstration effort of the contract, rather than subcomponents, products or processes which are ancillary to the contract effort, the limitations set forth in subparagraphs (1)-(4) of paragraph (h) should be modified or deleted. Paragraph (h) further provides that technical data may be specified in the contract as being excluded from or not subject to the licensing requirements thereof. This exclusion can be implemented by limiting the applicability of the provisions of paragraph (h) to only those classes or categories of proprietary data determined as being essential for licensing. Although contractor licensing may be required under paragraph (h), the final resolution of questions regarding the scope of such licenses, the terms thereof, including provisions for confidentiality and reasonable royalties, is then left to the negotiation of the parties with resolution of the issues being made, if necessary, by a court of competent jurisdiction.

(h) Contractor licensing.

Except as may be otherwise specified in this contract as technical data not subject to this paragraph, the contractor agrees that upon written application by DOE, it will grant to the Government and responsible third parties, for purposes of practicing a subject of this contract, a nonexclusive license in any contract data which are proprietary data, on terms and conditions reasonable under the circumstances including appropriate provisions for confidentiality; provided, however, the contractor shall not be obligated to license any such data if the contractor demonstrates to the satisfaction of the Head of the Agency or designee that:

(1) Such data are not essential to the manufacture or practice of hardware designed or fabricated, or processes developed, under this contract;

(2) Such data, in the form of results obtained by their use, have a commercially competitive alternative available or readily introducible from one or more other sources;

(3) Such data, in the form of results obtained by their use, are being supplied by the contractor or its licensees in sufficient quantity and at reasonable prices to satisfy market needs, or the contractor or its licensees have taken effective steps or within a reasonable time are expected to take effective steps to so supply such data in the form of results obtained by its use; or

(4) Such data, in the form of results obtained by their use, can be furnished by another firm skilled in the art of manufacturing items or performing processes of the same general type and character necessary to achieve the contract results.

(f) Rights in data – special works.

(1) The clauses set forth in paragraph (2) below shall be used in all contracts where the principal purpose or a task of the contract is the production of copyrightable works, even though such works may incorporate uncopyrighted material or material previously copyrighted by the contractor or others. Such contracts include those:

(i) Primarily for production of motion picture or television recordings or scripts, musical compositions or arrangements, sound tracks or recordings, translations, adaptations, and the like;

(ii) For books, compilations, surveys, histories, or technology information pamphlets;

(iii) For works pertaining to management studies, support services, training, career guidance, or similar functions of DOE; and

(iv) For works pertaining to guidance or instruction of DOE officials or employees in the discharge of official duties.

(2) The Rights in Data - Special Works clause below should be modified with the assistance of Patent Counsel where the contract calls for the editing, translation, addition, or other modification of the subject matter of an existing work.

RIGHTS IN DATA - SPECIAL WORKS

(a) The term "Data" as used herein means recorded information regardless of form or characteristic, such as writings, sound recordings, pictorial reproductions, drawings, or other graphic representations, and works of similar nature (whether or not copyrighted) which are specified to be delivered under this contract. The term includes data such as management studies and data produced under support services contracts but does not include financial reports, cost analyses, and other information incidental to contract administration.

(b) All data first produced or composed in the course of or under this contract shall be the sole property of the Government. Except with the prior written permission of the Contracting Officer, the contractor agrees not to assert any rights at common law or in equity or establish any claim to statutory copyright in such data. The contractor shall not publish or reproduce such data in whole or in part or in any manner or form, or authorize others so to do, without the written consent of the Contracting Officer until such time as the Government may have released such data to the public.

(c) The contractor hereby grants to or will obtain for the Government a royalty-free, nonexclusive and irrevocable license throughout the world (1) to publish, translate, reproduce, deliver, perform, use, and dispose of, in any manner, any and all data which are not first produced or composed in the performance of this contract but which are incorporated in the work furnished under this contract; and (2) to authorize others so to do.

(d) The contractor shall indemnify and save and hold harmless the Government, its officers, agents, and employees acting within the scope of their official duties against any liability, including costs and expenses, (1) for violation of proprietary rights, copyrights, or rights of privacy, arising out of the publication, translation, reproduction, delivery, performance, use, or disposition of any data furnished under this contract; or (2) based upon any libelous, defamatory, or other unlawful matter contained in such data.

(e) Nothing contained in this clause shall imply a license to the Government under any patent, or be construed as affecting the scope of any licenses or other rights otherwise granted to the Government under any patent.

(g) Rights in Technical Data clause (short form).

(1) The clause set forth in paragraph (2) below may be used in contracts for basic research including grants, special research contracts with educational institutions, contracts with consultants, contracts for symposia, or for the conduct of training and educational programs, and in other contracts of a similar nature. This clause shall not be used in any contract where proprietary information of the contractor may be utilized in the performance of work under the contract; in such instances the Additional Technical Data Requirements clause of §9-9.202-3(c) and the Rights in Technical Data (long form) clause of §9-9.202-3(e)(2) shall be used. The short form clause of this section shall not be used in situations involving long-term consultancy arrangements for work in DOE programs providing opportunities for specialized work experience at DOE-owned facilities for scientific, engineering, and other employees of private firms and institutions engaged in civilian applications of atomic energy.

(2) Rights in Technical Data clause - short form.

RIGHTS IN TECHNICAL DATA - SHORT FORM

(a) Definitions.

The definitions of terms set forth in 41 CFR §9-9.201 apply to the extent these terms are used herein.

(b) Allocation of rights.

(1) The Government shall have:

(i) Unlimited rights in technical data first produced or specifically used in the performance of this contract;

(ii) The right of the Contracting Officer or his representatives to inspect at all reasonable times up to three years after final payment under this contract all technical data first produced or specifically used in the contract (for which inspection the contractor or its subcontractor shall afford proper facilities to DOE); and

(iii) The right to have any technical data first produced or specifically used in the performance of this contract delivered to the Government as the Contracting Officer may from time to time direct during the progress of the work, or in any event as the Contracting Officer shall direct upon completion or termination of this contract.

(2) The contractor shall have:

The right to use for its private purposes, subject to patent, security or other provisions of this contract, technical data it first produces in the performance of this contract provided the data requirements of this contract have been met as of the date of the private use of such data. The contractor agrees that to the extent it receives or is given access to proprietary data or other technical, business or financial data in the form of recorded information from DOE or a DOE contractor or subcontractor, the contractor shall treat such data in accordance with any restrictive legend contained thereon, unless use is specifically authorized by prior written approval of the Contracting Officer.

(c) Copyrighted material.

(1) The contractor agrees to, and does hereby grant to the Government, and to its officers, agents, servants and employees acting within the scope of their duties:

(i) A royalty-free, nonexclusive, irrevocable license to reproduce, translate, publish, use, and dispose of and to authorize others so to do, all copyrightable material first produced or composed in the performance of this contract by the contractor, its employees or any individual or concern specifically employed or assigned to originate and prepare such material; and

(ii) A license as aforesaid under any and all copyrighted or copyrightable works not first produced or composed by the contractor in the performance of this contract but which are incorporated in the material furnished under the contract, provided that such license shall be only to the extent the contractor now has, or prior to completion or final settlement of the contract may acquire, the right to grant such license without becoming liable to pay compensation to others solely because of such grant.

(2) The contractor agrees that it will not knowingly include any material copyrighted by others in any written or copyrightable material furnished or delivered under this contract without a license as provided for in subparagraph (1)(ii) hereof, or without the consent of the copyright owner, unless it obtains specific written approval of the Contracting Officer for the inclusion of such copyrighted material.

§9-9.202-4 Procedures (Government-owned facilities).

(a) General.

It is essential that DOE maintain continuity in its programs which are implemented by contracts for the operation of Government-owned facilities. Contract data first produced or specifically used in the performance of such contracts must be considered as integral to and remaining with the facility or plant after termination of such contracts and thus available to DOE and its future contractors for the continued use of the facility or plant. However, it is

recognized that these contracts by their nature cannot always be subject to one set of prescribed contract provisions which will always apply. Accordingly, the Rights in Technical Data - Facility clause set forth in paragraph (c)(2) below is to be used as a basic or minimal clause which may be modified or expanded with the concurrence of Patent Counsel to meet particular contract situations.

(b) Subcontracting.

Unless otherwise directed by the Contracting Officer, the contractor shall follow the policy and procedures of §9-9.202-1, 2 and 3 above and shall employ the provisions of the Additional Technical Data Requirements clause of §9-9.202-3(c) and the Rights in Technical Data clause of §9-9.202-3(e)(2) where appropriate, except in subcontracts for the design of special production plants or facilities or specially designed equipment for such facilities or plants, in which instances contractors shall include the provisions of the Rights in Technical Data - Facility clause of §9-9.202-4(c)(2).

(c) Rights in technical data - facility.

(1) Whenever a contract has as a purpose the operation of a Government-owned research or production facility, the clause set forth in (2) below shall normally be included in the contract. Inasmuch as this clause secures to the Government ownership, access to, and, if requested, delivery of all technical data first produced in the performance of the contract and access to and delivery of technical data which are specifically used in the performance of the contract, there is no need to include the Additional Technical Data Requirements clause of §9-9.202-3(c).

(2) Rights in Technical Data clause - facility

RIGHTS IN TECHNICAL DATA - FACILITY

(a) Definitions.

(1) "Technical data" means recorded information, regardless of form or characteristic, of a scientific or technical nature. It may, for example, document research, experimental, developmental, or demonstration, or engineering work or be usable or used to define a design or process or to procure, produce, support, maintain, or operate material. The data may be graphic or pictorial delineations in media such as drawings or photographs, text in specifications or related performance or design type documents, or computer software (including computer programs, computer software data bases and computer software documentation). Examples of technical data include research and engineering data, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identification, and related information. Technical data as used herein does not include financial reports, cost analyses, and other information incidental to contract administration.

(2) "Proprietary data" means technical data which embody trade secrets developed at private expense, such as design procedures or techniques, chemical composition of materials, or manufacturing methods, processes, or treatments, including minor modifications thereof, provided that such data:

(i) Are not generally known or available from other sources without obligation concerning their confidentiality;

(ii) Have not been made available by the owner to others without obligation concerning their confidentiality; and

(iii) Are not already available to the Government without obligation concerning their confidentiality.

(3) "Unlimited rights" means rights to use, duplicate, or disclose technical data, in whole or in part, in any manner and for any purpose whatsoever, and to permit others to do so.

(b) Allocation of rights.

(1) The Government shall have:

(i) Ownership in all technical data first produced in the performance of the contract;

(ii) The right to inspect technical data first produced or specifically used in the performance of the contract at all reasonable times (for which inspection the proper facilities shall be afforded DOE by the contractor and its subcontractors);

(iii) The right to have all technical data first produced or specifically used in the performance of the contract delivered to the Government or otherwise disposed of by the contractor, either as the Contracting Officer may from time to time direct during the progress of the work or in any event as the Contracting Officer shall direct upon completion or termination of this contract, provided, that nothing contained in this paragraph shall require the contractor to actually deliver any technical data, the delivery of which is excused by this Rights in Technical Data clause;

(iv) Unlimited rights in technical data specifically used in the performance of this contract, except technical data pertaining to items of standard commercial design; the contractor agrees to leave a copy of such technical data at the facility or plant to which such data relate, and to make available for access or to deliver to the Government such data upon request by the Contracting Officer; provided, that if such data are proprietary, the rights of the Government in such data shall be governed solely by the provisions of optional paragraph (e) hereof— "Limited Rights in Proprietary Data;"

(v) The right to remove, cancel, correct, or ignore any marking not authorized by the terms of this contract on any technical data furnished hereunder if, in response to a written inquiry by DOE concerning the propriety of the markings, the contractor fails to respond thereto within 60 days or fails to substantiate the propriety of the markings. In either case DOE will notify the contractor of the action taken.

(2) The contractor shall have:

(i) The right to withhold its proprietary data in accordance with the provisions of this clause; and

(ii) The right to use for its private purposes, subject to patent, security or other provisions of this contract, technical data it first produces in the performance of this contract, provided the data requirements of this contract have been met as of the date of the private use of such data. The contractor agrees that to the extent it receives or is given access to proprietary data or other technical, business or financial data in the form of recorded information from DOE or a DOE contractor or subcontractor, the contractor shall treat such data in accordance with any restrictive legend contained thereon, unless use is specifically authorized by prior written approval of the Contracting Officer.

(3) Nothing contained in this clause shall imply a license to the Government under any patent or be construed as affecting the scope of any licenses or other rights otherwise granted to the Government under any patent.

(c) Copyrighted material.

(1) The contractor shall not, without prior written authorization of the Contracting Officer, establish a claim to statutory copyright in any technical data first produced in the performance of this contract. To the extent such authorization is granted, the Government reserves for itself and others acting on its behalf, a royalty-free, nonexclusive, irrevocable, world-wide license for Governmental purposes to publish, distribute, translate, duplicate, exhibit, and perform any such data copyrighted by the contractor.

(2) The contractor agrees not to include in the technical data delivered under the contract any material copyrighted by the contractor and not to knowingly include any material copyrighted by others without first granting or obtaining at no cost a license therein for the benefit of the Government of the same scope as set forth in paragraph (c)(1) above. If the contractor believes that such copyrighted material for which the license cannot be obtained must be included in the technical data to be delivered, rather than merely incorporated therein by reference, the contractor shall obtain the written authorization of the Contracting Officer to include such material in the technical data prior to its delivery.

(d) Subcontracting.

(1) Unless otherwise directed by the Contracting Officer, the contractor agrees to use in subcontracts having as a purpose the conduct of research, development, and demonstration work or in subcontracts for supplies, the contract clause

provisions in 41 CFR §9-9.202-3(c) and 41 CFR §9-9.202-3(e)(2) in accordance with the policy and procedures of 41 CFR §9-9.202-1, 2 and 3.

(2) It is the responsibility of the contractor to obtain from its subcontractors technical data and rights therein, on behalf of the Government, necessary to fulfill the contractor's obligations to the Government with respect to such data. In the event of refusal by a subcontractor to accept a clause affording the Government such rights, the contractor shall:

(i) Promptly submit written notice to the Contracting Officer setting forth reasons for the subcontractor's refusal and other pertinent information which may expedite disposition of the matter; and

(ii) Not proceed with the subcontract without the written authorization of the Contracting Officer.

(d) Optional clause - Limited rights in proprietary data.

In contracts where it is determined that delivery of proprietary data is necessary with limited rights in the Government, the Rights in Technical Data clause of this section shall be supplemented by the additional paragraph (e), set forth below. Paragraph (e) provides that technical data may be specified in the contract as being excluded from the delivery requirements thereof. Alternatively, paragraph (e) may be limited or made applicable to only those classes of proprietary data determined as being necessary for delivery with limited rights. In addition, when furnishing proprietary data with the limited rights legend, subparagraphs (a), (b) and (c) thereunder may be modified as follows. When proprietary data is to be furnished only for evaluation, subparagraph (a) of the limited rights legend shall be used, and subparagraphs (b) and (c), if otherwise inapplicable, may be deleted. When there is a programmatic requirement that proprietary data be disclosed to other DOE contractors only for information or use in connection with work performed under their contracts, subparagraph (b) of the limited rights legend shall be used, and subparagraphs (a) and (c) may be deleted if otherwise inapplicable. In either of the foregoing examples, the contractor may, if he can show the possibility of a conflict of interest because of disclosure of such data to certain contractors or evaluators, exclude contractors or evaluators from subparagraphs (a) or (b). If the data is required solely for emergency repair or overhaul, subparagraph (c) of the limited rights legend shall be retained, and subparagraphs (a) and (b) may, unless otherwise applicable, be deleted. In the event that it is determined that all of the subparagraphs (a), (b) and (c) of the limited rights legend are to be deleted, the word "none" shall be inserted in the legend after the colon (:).

(e) Limited rights in proprietary data.

Except as may be otherwise specified in this contract as technical data which are not subject to this paragraph, the contractor agrees to and does hereby grant to the Government an irrevocable, nonexclusive paid-up license and right to use by or for the Government, any proprietary data of the contractor specifically used in the performance of this contract; provided, however, that to the extent that any proprietary data when furnished or delivered is specifically identified by the contractor at the time of initial delivery to the Government or a representative of the Government, such data shall not be used within or outside the Government, except as provided in the "Limited Rights Legend" set forth below. All such proprietary data shall be marked with the following "Limited Rights Legend":

LIMITED RIGHTS LEGEND

This "proprietary data," furnished under Contract No. _____ with the U.S. Department of Energy (and purchase order No. _____ if applicable) may be duplicated and used by the Government with the express limitations that the "proprietary data" may not be disclosed outside of the Government or be used for purposes of manufacture without prior permission of the contractor, except that further disclosure or use may be made solely for the following purposes:

(a) This "proprietary data" may be disclosed for evaluation purposes under the restriction that the "proprietary data" be retained in confidence and not be further disclosed;

(b) This "proprietary data" may be disclosed to other contractors participating in the Government's program of which this contract is a part for information or use in connection with the work performed under their contracts and under the restriction that the "proprietary data" be retained in confidence and not be further disclosed; or

(c) This "proprietary data" may be used by the Government or others on its behalf for emergency repair or overhaul work under the restriction that the "proprietary data" be retained in confidence and not be further disclosed.

This legend shall be marked on any reproduction of this data in whole or in part.

§9-9.202-5 Negotiations and deviations.

Contracting Officers shall contact the field Patent Counsel assisting their procuring activity, or the Assistant General Counsel for Patents, for assistance to the Contracting Officer in selecting, negotiating, or approving appropriate data and copyright clauses in accordance with the procedures as set forth in §9-9.107-4(k). In particular, advice of Patent Counsel should be obtained regarding the appropriateness or modification of optional paragraphs (g) and (h) of the Rights in Technical Data (long form) clause, the exclusion of specific items of proprietary data from paragraph (f) in said clause, and the exclusion of the Additional Technical Data Requirements clause of §9-9.202-3(c).

ATTACHMENT 3

ADDITIONAL COMMENTS OF JAMES E. DENNY

1. What have been the effects of federal agency patient policies and practices on participation in government research and development contracts, on the development and commercialization of government-sponsored inventions, and on competition in private markets?

The issue of Government patent policy can and does have a substantial effect on the participation of industry in Government R,D&D contract efforts. The effect will differ depending upon the policy alternatives, agency mission, and the type of contractor involved. The 1968 Harbridge House study reviewed this issue in some depth and concluded that at one extreme there are certain corporations, or divisions of corporations, which make a business of performing R,D&D activities for the Government notwithstanding the patent policies involved. At the other extreme are highly patent conscious, commercially oriented companies that will not work with the Government under a title policy. In between these two extremes are a variety of contracting situations and prospective contractors that in certain contracting situations and in certain fields of technology will not cooperate in Government R,D&D efforts.

In DOE's experience, the more commercially oriented the contractor, and the greater the private investment in a previously existing R,D&D effort, the more likely will be the possibility that a contractor will either not approach the Government in response to a request for cooperation, or will not contract with the Government unless resulting inventions are owned by it.

The effect of patent policies on development and commercialization of Government-sponsored inventions likewise varies considerably with the type of technology and invention involved, the Government agency's mission, the stage of development of the invention, the prospective market, and the particular contractor. Here again, the 1968 Harbridge House study indicated that utilization of Government-sponsored inventions was low, but that the utilization rate increased substantially when exclusive rights were left in the hands of a contractor who had a commercial position in the field of technology of the invention. On the other hand, the report concluded that where the Government had the responsibility and funding to carry an invention all the way to the market place, exclusive rights were not necessary to obtain commercialization. Where the Government takes the responsibility for acquiring title to resulting inventions, the Government should likewise take the responsibility for encouraging the commercial utilization of such technology. Otherwise, inventions are probably more efficiently commercialized in the hands of private parties with exclusive rights to the invention.

Regarding the effect of Government patent policy on competition in private markets, the 1968 Harbridge House study searched for, but could not find, substan-

tial, if any, anti-competitive results from the policy of allowing contactors to retain rights to Government-sponsored inventions. The more recent Harbridge House study supported by DOE confirms this impression. In the last analysis, an adequate set of "march-in" rights would appear to take care of whatever possibility may exist for substantial anti-competitive effects.

2. Is there justification for maintaining a license policy with respect to military and other research and development results intended for the government's own use and a title-in-government policy with respect to research and development intended for civilian purposes?

Any approach to patent policy will have advantages and disadvantages depending upon the selection of the critical issues that are to be addressed. For example, one policy approach is to have a strictly uniform patient policy that is applicable to all Government agencies, to all contracting situations, and to all types of contractors, without the concept of flexibility. Patent policies that deviate from this approach become more flexible, but also become more burdensome to administer. If uniformity is selected as a major policy criteria, then the end use of the technology may not be considered a sufficient justification for distinguishing policy approaches.

However, where flexibility is a major policy criteria, a legitimate and justifiable distinction can be made to applying different patent policy approaches depending upon the end use of the technology receiving Government support. Here the end use is for the Federal Government itself, as in military research and developmemt, the need for the technology is established by the Government, for use by the Government, to satisfy a Government need. Accordingly, commerical utilization of such technology by the general public may not even exist, and if it does, it will frequently be substantially different from the original use intended by the Government. In such cases, it is likely that substantial modification or additional development work will be necessary to convert the technology from governmental to commercial use, for which patient rights in the hands of the contractor generally would be a desirable stimulus.

On the other hand, where the technology is intended for use by the general public, as in much of DOE research, the need for the technology has been established by the public, and the Government's role should be to either create and/or help commercialize technology which will respond to that need. In this case, a market for the technology should already exist, and exclusive rights in the hands of the contractor will be useful or necessary depending upon the extent to which the Government intends to carry the technology to the marketplace. Where the Government intends to be merely a stimulus, exclusive rights may well be necessary to achieve commercialization. Where the Government intends to fully commercialize such technology, exclusive rights will probably not be necessary.

3. Should large and small firms or non-profit and for-profit institutions be treated differently in allocating right to inventions made under Federal grants and contracts?

Here again, distinctions between small and large firms, or profit-making and non-profit firms makes sense only to the extent that the patent policy approach under which you are working is intended to be uniform, on the one hand, or responsive to individual types of situations on the other. In the latter case, preference is frequently provided to small firms over large in view of the fact that providing exclusivity to small businesses will less likely add to the concentration of economic power. Additionally, small firms are normally believed to require a greater degree of exclusivity in order to be commerically competitive with large firms. The profit versus non-profit distinction is simply intended to address to "windfall" issue, whereby if substantial sums were to be made from commercializing the invention, such funds in non-profit organizations are normally utilized in what is regarded as "public policy" or eleemosynary types of uses.

4. Under what circumstances, if any, should the government retain title to an invention made in the course of a Federal contract? In what cases should a contractor be forced to surrender background patents? In what situations should the government resume title to an invention or require that it be licensed to other companies?

The Government should retain title to inventions made under Federal contracts in any situation where the exclusive rights provided by title to the invention is not needed to either further develop or commercialize the invention, or in those situations where the free availability of the invention to all that desire to utilize it will provide the necessary incentive to commercialization.

The answer is simple. The problem is determining when such situations exist. In my opinion, most of the available evidence tends to suggest that (a) the Government is generally not a good promoter of commerical utilization of inventions, (b) the

Government frequently is not capable of carrying, or has no mission to carry, the development of technology to the marketplace, and (c) the required funding and expertise to perform this function is not in the hands of most Government agencies. The expense necessary to place these capabilities in the various Government agencies will probably not be worth the cost to the taxpayer in most cases. Where these functions can appropriately be carried out by industry, and with little or no anti-competitive effects on the market place, the whole commericalization process is better left to the contractor that created the technology.

A contractor should never be forced to surrender its background patents. However, many Goverment agencies, including DOE, are alleged to force contractors to surrender their background patent when this is not the case. The DOE policy is to require a contractor, if it has background patents that will dominate the results of the research effort, to license such background patents on reasonable terms and conditions. The requirement to license is usually limited to the specific field of technology that was supported by the DOE contract, and is also limited to situations where the contractor cannot supply market demands. DOE policy in this regard would appear to adequately take care of the public interest, and in any event, is subject to negotiation because it is a highly sensitive and emotional issue.

Under DOE's "march-in" rights policies, the Government can retrieve an invention waived to a contractor, or require the contractor to license others, only where it is necessary to do so in the public interest, where the contractor is not adequately commercializing the invention itself, or where the contractor is misusing the invention to the detriment of competitive market forces. In only these situations should "march-in" rights be utilized. Where the contractor is adequately commercializing the invention, and is not abusing such right, the contractor should be left with the exclusive commercial rights.

5. Should the government require a payback, in addition to income taxes, when government-sponsored inventions are developed and marketed under exclusive rights? As an alternative to discretionary march-in rights, would your favor a self-enforcing licensing requirement whereby the contractor's exclusive rights in an invention would expire after a reasonable time, unless the contractor demonstrated a need for an extension?

The issue of whether the Government should require a payback, or a recoupment of its R, D&D investments, is a policy issue of the highest magnitude on which I would prefer not to take a position. I would only comment, however, that if such a policy is adopted, it should be carefully drafted in order that its implementation not cost more money than it has the capability of collecting. In particular, such a policy should not be uniformly applicable to all contracting situations, to all contractors, and to all inventions. For example, distinctions may be appropriate for small businesses, universities, and other non-profit institutions. The policy should only be applied to situations where discrete packages of technology can be identified to which the Government's contribution versus that of private industry can be reasonably apportioned, and where the method of collecting royalties or revenues can be negotiated in a businesslike manner.

As stated in the answer provided in No. 4 above, I do not believe that "march-in" rights should be exercised until there has been shown to be a need to inforce them. A self-enforcing licensing requirement would have the same effect. As long as the contractor is commercializing the invention, it should be allowed to continue to do so for the full term of the patent unless there is a demonstrated reason for shortening the term of exclusivity. Accordingly, I would not favor such an alternative.

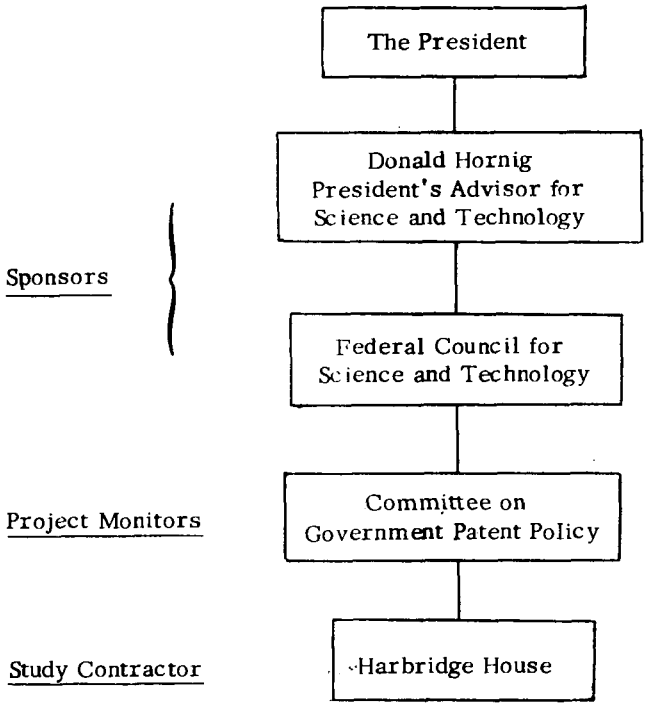
THE HARBRIDGE HOUSE STUDY OF GOVERNMENT PATENT POLICY

A Synopsis Prepared For The
U.S. Senate Commerce Committee

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ORGANIZATION FOR PATENT POLICY STUDY
CONDUCTED FOR THE FEDERAL COUNCIL FOR
SCIENCE AND TECHNOLOGY



STUDY OBJECTIVES

I. TEST THE EFFECTS OF ALTERNATIVE PATENT POLICIES.

II. ACQUIRE AND REPORT DATA NEEDED TO EVALUATE THE PRESIDENT'S PATENT POLICY AND FORMULATE USEFUL LEGISLATION.

III. REPORT INFORMATION USEFUL TO EXECUTIVE AGENCIES IN ADMINISTERING GOVERNMENT-WIDE PATENT POLICY.

STUDY QUESTIONS

I. WHAT EFFECT DOES PATENT POLICY HAVE ON INDUSTRY PARTICIPATION IN GOVERNMENT R&D PROGRAMS?

II. WHAT EFFECT DOES PATENT POLICY HAVE ON COMMERCIAL UTILIZATION OF GOVERNMENT-SPONSORED INVENTIONS?

III. WHAT EFFECT DOES PATENT POLICY HAVE ON BUSINESS COMPETITION IN COMMERCIAL MARKETS?

STUDY APPROACH

I. Phase One: Review Existing Data.

- Literature search.
- Promotional programs of government agencies.
- Known cases of hesitation or refusal to deal with government.
- One hundred NASA waiver requests.

II. Phase Two: Conduct Utilization Survey of Government-Sponsored Inventions Patented in 1957 and 1962.

III. Phase Three: Perform Case Studies of Selected Contractors and Inventions to Gain Better Understanding of Patent Decisions.

- Study 21 high and low utilizers to determine reasons for their performance.
- Study all sample inventions of TVA, Agriculture and Interior to determine effect of agency mission on invention utilization.
- Study 16 educational and nonprofit institutions to determine their role in promoting utilization of government-sponsored inventions.
- Study all survey inventions involved in infringement suits for effects on business competition.
- Study the NIH medicinal chemistry program and drug industry response to determine effect of patent policy on industry participation in, and utilization of the results of the program.

Summary and Analysis of Findings

A. Study Objectives and Approach

The primary purpose of the Harbridge House study has been to provide government policy makers with data to evaluate the effectiveness of government patent policy in achieving policy objectives. The study sought answers to three basic questions which underlie the government's objectives concerning patents arising out of government contracts:

(i) How does patent policy affect commercial utilization of government-sponsored inventions?

(ii) How does patent policy affect business competition in commercial markets?

(iii) How does patent policy affect participation of contractors in the government's research and development programs?

A three-phase study effort was undertaken to answer these questions: In phase one, existing data was gathered to determine what relevant information was already available. Phase two consisted of a utilization questionnaire survey to gather a broad body of new data on a large sample of government-sponsored inventions. And, phase three involved case studies of inventions and contractors in the utilization survey to develop a fuller understanding of the effects of patent policy on them.

The first phase involved four separate tasks. A literature search was conducted to determine what existing data were available on the study questions. In addition, three research tasks were conducted within government activities to (i) determine the promotional programs of eight government agencies; (ii) review reported instances of industry hesitation or refusal to participate in programs of the Department of Interior and the National Institutes of Health (NIH) for reasons relating to patents; and (iii) examine 100 contractor NASA waiver requests to determine the basis for waivers of patent title granted by NASA. These tasks, useful in themselves, also provided background information in conducting phases two and three of the study.

In the second phase of the study, commercial utilization of all government-sponsored inventions patented in 1957 and 1962 [1] were surveyed through questionnaires [2] to gather data on utilization and licensing of a large and statistically significant group of patents. A two-year sample was selected to ensure against bias in patents issued in a given year, and the years 1957 and 1962 were chosen to allow enough time for sample inventions to be applied commercially. Although the sample predates the current

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[1] For government agencies other than DOD, AEC and NASA all patents issued from 1956 to 1966 were included because of the small number of patents issued on inventions of those agencies in 1957 and 1962.

[2] Copies of the questionnaires are included in an appendix to this report.

policy established by the Kennedy Memorandum of 1963, patent rights in sample inventions were allocated in different ways under various programs making it possible to project the results of the study in terms of current policy.

Questionnaires on each invention were sent to organizations which developed them regardless whether the contractor or the government retained title. Similar questionnaires were also sent to firms which requested licenses to government-owned inventions, whether developed under contracts on in government laboratories, to compare conditions under which inventions might be used with and without exclusive rights. Both included questions on the size and business orientation of the responder; the nature of the invention; the role it played in its commercial use; the speed with which it was applied; the type and amount of private funds invested in applying it; the sales attributable to the invention; the extent to which it was available for and resulted in licenses by patentee; and the reasons for non-utilization where it was not used commercially.

Questionnaire responses were received on about 60 percent of the sample inventions and were analyzed to determine the patterns of utilization, and the effect of patent rights and other factors on commercial use, licensing and business competition. The data were also used to select areas for case research in phase three of this study.

The case research in phase three gathered more detailed data on selected government contractors and inventions to understand better the factors which control decisions to utilize government-sponsored inventions, the utilization process, the effect of utilized inventions on business competition and the factors affecting willingness of contractors to participate in government-sponsored R&D programs. Five groups of case studies were conducted:

(i) Twenty-one high and low utilizers of sample inventions were interviewed to determine the reasons for their performance.

(ii) All sample inventions of TVA, and the Department of Agriculture and Interior were investigated to determine the effect of agency mission on invention utilization.

(iii) Sixteen educational and nonprofit institutions representing a cross section of all types and sizes of organization were interviewed to determine what role they play in promoting utilization of government-sponsored inventions.

(iv) All sample inventions involved in infringement suits were investigated to identify what effect they have on business competition.

(v) An industry study involving the medicinal chemistry program of NIH was performed to determine the effect of patent policy on voluntary industry participation in, and utilization of the results of the government program.

B. Effect of Government Patent Policy on Commercial Utilization

The study sought answers to several key questions concerning commercial utilization of government-sponsored inventions. Among these were:

(i) Under what circumstances have government inventions been utilized?

(ii) How important have exclusive patent rights been in promoting their use compared with other factors such as market potential, prior experience and amount of private investment required?

(iii) Under what conditions has utilization been optimized by government ownership of patents? By contractor ownership of patents?

(iv) Has substantial private investment been required to develop government-sponsored inventions for commercial use?

(v) Has such investment been made when everyone has been free to use the invention?

Several factors were found to have an important bearing on the answers to these questions. The intended uses of the sample inventions were found to have a primary effect on their commercial potential. Their intended uses, in turn, were determined by the R&D missions of the sponsoring government agencies. Once the invention was developed, several factors were found to affect their actual use in commercial markets--the extent of market demand for products employing them, the degree of promotion by government agencies which sponsored them, the size of private investment required to apply them, the prior experience and attitude toward innovation of organizations that developed them, and the type of patent rights available to protect the user's investment in bringing the inventions to market.

These factors have had the following net effect on utilization of sample inventions:

Of 2,024 contractor inventions in the two sample years for which information was available, 251 were used commercially.

- Two hundred were utilized by industrial contractors and all but seven were owned by them. Twenty-six of these were utilized by their licensees.

- An additional 51 inventions not utilized by contractors were utilized by their licensees. Ten of these inventions were owned by educational and nonprofit institutions.

- Fifty-five played a critical role in the commercial products in which they were used.

- All but two resulted from DOD contracts.

The study also reviewed 126 government-owned inventions from all sources, in-house and contractor, patented in 1957 and 1962 for which a license was issued to firms other than the inventing contractor. Ten of 126 inventions were reported used by some 50 licensees. Utilization is concentrated in TVA and Agricuture inventions which account for 60 percent of the utilized patents and 90 percent of the commercial users.

Measured in sales, commercial utilization of the inventions studied amounted to $616 million through calendar year 1966:

- $406 million were sales by contractors who owned the inventions.

- $210 million were sales by nonexclusive government licensees.

- All but $271,000 of contractor sales were from DOD inventions.

- All but $57,000 of sales by licensees were from inventions of agencies other than DOD.

Sales of inventions, both with and without exclusive rights, were heavily concentrated in a few patents:

- 88 percent of contractor sales where the invention played a critical role are attributable to five patents in the fields of transistors, vacuum tubes, numerical control devices, computers, and gas turbine engines.

- About half the sales of licensees are attributable to three patents on the manufacture of potato flakes.

Study inventions that were used commercially found quick application in their commercial use. About one-third were applied by the time a patent application was filed, and almost three-quarters were in use when a patent issued.

A factor instrumental in the speed of utilization is prior experience. If rapid utilization is defined as occurring within three years of application for a patent, then firms with experience achieved rapid utilization over 80 percent of the time compared with half that for firms without.

The mix of government and commercial work within a firm also has an important effect. Firms in the middle range of government activity (20 to 80 percent government business) use inventions much more quickly than companies predominantly in either the commercial or the government markets.

1. Effect of Agency Mission and Commercial Potential of Sample Inventions on Utilization

The R&D mission of the sponsoring government agency was found to have a critical effect on the commercial applicability of the sample inventions. The Department of Defense, NASA and AEC accounted for some 90 percent of contracted research and more than 98 percent of the patents arising under contract in the years under study. Inventions covered by these patents were designed to meet operating requirements of these agencies rather than civilian needs in the great majority of cases. Their commercial applications, therefore, were essentially a by-product of governmental uses and depended largely on coincidental overlap between government and commercial requirements. Thus, over 70 percent of the reasons advanced by responders as most important to nonutilization of sample inventions relate to their limited commercial potential. This in no way measures their value for their intended use, but simply indicates the effect of differences between operating requirements of the government and civilian needs in commercial markets.

On the other hand, commercial inventions with significant utilization were among the patents of these agencies in the fields of transistors, vacuum tubes, numerical control devices, computers and gas turbine engines, where the necessary commercial overlap did exist.

The sample inventions of other agencies--such as the Department of Agriculture and Interior, and TVA--were highly oriented to civilian requirements reflecting the civilian orientation of their R&D missions. Since most of the Agriculture and TVA R&D programs are conducted in-house, the sample included few inventions developed by their contract programs. However, these were supplemented with in-house inventions for which the agencies granted licenses. All that were used commercially, were used without exclusive patent rights. This was largely attributable to three factors: the commercial orientation of the inventions, good potential demand for their use, and sufficient government development of the inventions to show their commercial feasibility. Notwithstanding the commercial potential of these government

inventions, agency promotion within industry was important in achieving utilization of Agriculture and TVA patents because of the need to convince firms of their commercial value. In several instances, utilizing firms acquired some measure of patent protection by developing patentable improvement to the government inventions.

Two causes predominated in cases where the inventions of these agencies did not achieve commercial utilization. Lack of full technical development of the inventions was the most frequent and important. No market need due to the complexity of the invention, its high cost compared with other methods or the availability of more practical alternatives was second in importance. It is probable that some measure of exclusive rights might have encouraged private firms to complete technical development of some inventions not fully developed by the government where adequate demand existed to make them attractive investment opportunities.

The R&D programs of HEW and Interior illustrate still another effect of mission on utilization. The programs of these two agencies are oriented to civilian needs, but in many aspects, are directed toward basic rather than applied research. The sample inventions that have resulted from their work have not, for the most part, been sufficiently developed to prove their commercial value. However, should their inventions reach that stage in programs like water desalination, and medicinal chemistry, broad commercial utilization could reasonably be anticipated because of the strong potential demand for commercial innovations in these fields.

2. Private Development Costs

Information on private development costs required to apply sample inventions commercially was somewhat sketchy due to the age of the sample and the confidential nature of the data. But the information gathered showed significant differences in the types of costs incurred on DOD oriented inventions (with exclusive rights owned by the contractor/utilizer in almost all cases), and civilian-oriented agency inventions (with nonexclusive licenses owned by the utilizers).

Private investment was heavily concentrated in technical development of DOD inventions. Fifty-six and eight tenths (56.8) percent of private dollars were spent for development compared with 22.7 percent for production facilities and 20.5 percent for marketing the product. In contrast, only 21.1 percent of private investment was required for technical development of civilian-agency inventions, while 52.2 percent was spent on production facilities and 26.7 percent on marketing.

The data confirms the relationships observed above between agency R&D mission and commercial potential of sample inventions. Civilian agency inventions, in general, are closer to commercial products when government development is complete than are DOD inventions. Thus, users of civilian agency inventions

assume less financial risks in applying them than users of DOD inventions. This has a bearing on the degree of patent protection that may be needed as an incentive to utilization. All other factors being equal, more protection is required where the technical costs and financial risks are greater than where they are not.

3. Patent Rights as Incentives to Commercial Utilization

The study data show that patent rights play widely different roles in the business affairs of organizations in the sample. The sharpest distinction occurs between educational and nonprofit institutions, on the one hand, who can only achieve utilization of their inventions by licensing others, and industrial firms, on the other, who can promote utilization through direct use and licensing.

. Educational institutions in the past have been much more concerned with publishing the results of their research than with promoting patents that may arise from it. Today, however, schools with large government research programs are taking greater interest in their patent portfolios and are seeking through a variety of means to promote them through licenses with industry. Nonprofit research firms also view their patents as a potentially useful source of income and actively seek to license others. In both cases, the inventions most frequently arise from basic research and require substantial private development before reaching the stage where they are commercially useful. Some measure of exclusive rights appears necessary to motivate licensees to invest in the work necessary to commercialize these inventions. Where the institution has an active promotional program and the government has none, commercial utilization would appear to be promoted more effectively by permitting the institution to retain exclusive rights. Where this is not so, more individual analysis is needed to determine what allocation of rights would best foster utilization.

Industrial firms in the sample place differing weights on the need for exclusive rights in using government inventions. At one extreme were firms who rely heavily on patent rights to establish their proprietary position in commercial markets and would hesitate to invest in an invention in which they could not obtain exclusive rights. At the other, were firms so completely in the government market that they attach little or no importance to patent rights for commercial purposes. In between were firms for whom patents provide a variety of incentives. The nature and importance of these incentives to firms in the sample are outlined below.

A lack of interest in patents was characteristic of some research-oriented and manufacturing firms that do a preponderance of their business in the government aerospace and defense markets. No desire to expand into commercial markets and no mechanism for the commercialization of inventions were noted. When these firms obtain patents, their sole purpose is recognition within the company of technical competence.

In a second group of firms patents were secondary to broad technical and management competence in maintaining their position in commercial markets. Firms

expressing this attitude toward patents were generally manufacturers of complex systems and technical products, such as aircrafts, jet engines, computers, or communications equipment. Although as much as 75 percent of their sales may be direct to the government, these firms frequently sell similar products to commercial markets. Inventions developed during the course of R&D activities tend to be auxiliary components and subsystems or incremental improvements to the basic product. These inventions are not as important to these companies in sustaining sales or selling new products as is the basic engineering management and production capability of the firm. New ideas and inventions are incorporated in product modifications or in new models with little consideration given to the protection offered by patent rights. Using a new idea to enhance product performance is regarded as more important than assuring that the company owns the exclusive right to use it.

A third group of firms believe that corporate ownership of patents offers flexibility in design, both in the United States and abroad (through ownership of corresponding foreign patent rights), and provides trading material for cross-licenses with competitive firms. Ownership of a patent, however, as a prerequisite for new product development is a relatively minor factor compared with market considerations and investment requirements associated with commercialization of the invention. A change in government patent policy may affect firms in this category by causing them to choose more carefully the areas in which they are willing to undertake government research. Faced with the possibility of being unable to obtain title to patents they develop, these firms may refuse to contract in research areas that would impair their operational flexibility.

A fourth group of firms actively seek ownership of patents, to establish and maintain proprietary positions in new technologies, as well as in established product areas. Invariably, however, estimates of market potential and corporate investment requirements determine which product areas are developed. The make-up of the patent portfolio may indicate the direction for product development in order to strengthen proprietary positions, but development is rarely, if ever, undertaken solely because patent protection is available. A change in government policy from license rights to title rights would limit the government-sponsored R&D activity of firms in this category because of possible conflict with company-sponsored research activities. Contract opportunities would be examined on an individual basis and, in many cases, the government might be refused.

A fifth group of firms regard patent rights as essential to their business activities, and are careful to avoid government claims or conflicts over ownership of inventions. Their policies generally lead them into one of two business patterns. In the first pattern, firms will assure corporate ownership of patents before initiating work on a government contract. They may assure ownership either by negotiating contracts that permit them to acquire title to patents on inventions they may develop, or by developing and patenting basic inventions with limited private funds and then seeking contract work in order to develop additional

technical competence, push the state of the art, explore a new technology, or determine if commercial applications may begin to be drawn off. In these situations, firms deliberately select areas of government research to match their commercial interests in order to generate product ideas with commercial possibilities. New research firms with strong technical abilities and limited capital typically follow this pattern, as do specialized firms that have concentrated their business in a limited area of technology.

In the second pattern, firms consciously isolate government work from their commercial operations and pursue these activities separately. The sample firms in this category did only a small percent of their business with the government and were quite independent of it. Frequently, inventions derived from government contract work by these firms will be assigned automatically to the government to avoid title conflicts or commingling with company-sponsored R&D. In other cases, government R&D will be undertaken only in areas where there is no potential conflict with corporate proprietary objectives and in order to enhance the corporate image. The technical value of government contracts to the commercial interests of these firms is rarely considered a valuable supplement to in-house research and development.

Many diversified companies follow different patent policies in their commercial and government markets. These firms may place a strong emphasis on maintaining proprietary positions in commercial markets and express a relative lack of interest in patents arising from government work. The primary purpose of securing patents on government-sponsored research discoveries as in the case of the wholly government-oriented firms, is to provide professional recognition for technical personnel.

Lastly, an important difference was observed between the research-oriented firms doing business with DOD, NASA and AEC, and the product-oriented firms whose interests are aligned with Agriculture and TVA. The former were much more aggressive in their search for useful innovations in the work they performed than the latter who tended to rely on the results of government laboratory programs for innovations in their fields. Thus, although the food, textile, and fertilizer industries are less patent-conscious, they are also more conservative in the risks they are willing to take in applying new inventions. This accounts for the frequent need for active government promotion of Agriculture and TVA inventions even when the inventions appear to have clear commercial applications.

4. Effect of Patent Policy

Notwithstanding the varying roles assigned patent rights by the firms described above, the key questions is whether permitting them to retain exclusive rights will, on balance, promote utilization better than acquisition of title by government.

The study data indicate that the answer is yes in at least the following circumstances:

(i) Where the inventions as developed under government contracts are not directly applicable to commercial uses and the inventing contractor has commercial experience in the field of the invention. This occurs most frequently with DOD, NASA and AEC inventions. In the case of DOD, the fact that it does not actively promote commercial use of its patents is an added factor. In these instances the inventing contractor with commercial experience appears to be the logical candidate to attempt utilization either directly or by licensing other; and

(ii) Where the invention is commercially oriented but requires substantial private development to perfect it, applies to a small market, or is in a field occupied by patent sensitive firms and its market potential is not alone sufficient to bring about utilization. Inventions in this category may arise with any agency and may have had only limited government development toward a commercial application.

C. Effect of Government Patent Policy on Business Competition

To evaluate the effects of government patent policy on business competition, the study tried to answer three questions:

(i) What are the effects on competition of the acquisition of exclusive commercial rights to government-sponsored inventions?

(ii) Do they increase or decrease concentration in commercial industries?

(iii) Do they create or eliminate significant areas of market power?

In evaluating the impact of government patent policy on competition, it is important to distinguish the effects of patent policy from other effects which may result from industry participation in government programs. Competitive advantages in commercial markets may well accrue to government contractors through knowledge gained in new technologies, through sharpening of technical skills, and through government funding of R&D work, which has parallel commercial areas of interest. But these are quite separate from the advantages of owning patents to specific inventions. This study has tried to measure only the latter. And, it has tried to measure it in terms of the inventions included in the survey sample. While a broader study of the cumulative effect of government-sponsored inventions patented over several years might have provided more definitive data, we believe that the study data provides

a representative and useful picture of the effects of patent policy on competition.

The study indicates that both in number of inventions utilized and in sales volume, the patents sampled appear to have had small impact on commercial markets. Although over 80 percent of both sample inventions and utilization were concentrated in 50 firms, only 55 inventions owned by contractors--2.7 percent of the sample--played a critical role in their commercial use, and five were responsible for $201 million out of the $40b million in cumulative sales attributable to contractor inventions. This utilization of critical-role contractor-owned inventions is low compared with the total sales of these firms and the industries in which they participate. Of equal importance is the fact that very few instances were reported where owners of government sponsored inventions refused to license their patents. Only 15 inventions--less than 1 percent of the sample--involved such refusals, and these 15 refusals involved just five companies.

The study did show that government retention of title, when coupled with full development and active government promotion of inventions having high commercial potential, has promoted competition. A striking example of this is the fertilizer industry where TVA developed high-concentrate fertilizers, patented them, proved their effectiveness on pilot farms and their commercial feasibility in pilot production, and aggressively promoted their use among farmers and fertilizer manufacturers. Industry sales have increased greatly through the manufacture of these fertilizers by many small regional producers. In circumstances like these, government retention of title can be an effective spur to competition because licenses are available to all comers. But several additional factors must be present for patent policy to have this effect. It must be evident to licensees that the invention has good commercial potential. The invention must be producible in commercial quantities and marketable at a cost that is competitive with alternative product. And the risks of recouping development costs must be no greater than similar investment opportunities available to the licensee.

In most cases, government agencies have to go far beyond discovery of an invention to create these conditions. Some agencies do--as described in the Volume III report on government efforts to promote utilization of government-sponsored inventions. The Department of Agriculture, for example, has an active program of developing inventions to the point of commercial feasibility. Potato flakes and frozen orange juice are two of its well-known successes. That agency, in promoting potato flakes, sponsored pilot production of the product's consumer appeal. The study was then made available to the food industry to stimulate interest in the product.

In other cases, allowing industry to retain title to inventions has promoted competition. The clearest example of this is the small firm which penetrates a market of large competitors on the strength of a patent on a government sponsored invention. Just such a case is described in Volume IV, Part V, Section C.

Notwithstanding the utilization programs employed by government agencies, none except AEC has an express statutory mission to increase business competition in commercial markets for its own sake. When it does occur, however, it is an indirect result of their efforts to accomplish their basic mission. From our observations of the study inventions and insofar as the effect of patent policy is involved, competition does not appear to have been adversely affected by this lack of direct concern, for three reasons:

(i) The rate of utilization of government inventions has been low.

(ii) The agencies--such as TVA and Agriculture, whose inventions are most likely to be utilized--either developed them in-house or took title to them when developed under contract.

(iii) And industrial owners of government-sponsored inventions have been willing to license them upon request or, where they were unwilling to license, alternative technologies were available to to competitors in the great majority of cases.

Based on all observations of the sample inventions we have found little evidence of adverse effects on business competition by permitting contractors to retain title to government-sponsored inventions.

D. Effect of Government Patent Policy on Industry Participation in Government R&D Programs

The effect of government patent policy on industry participation in R&D programs was the most difficult factor to measure because of the difficulty of obtaining data on the question. However, a useful understanding of problems in this area was obtained by studying the medicinal chemistry program of the National Institutes of Health (HEW) and various contracts of the Department of the Interior. This aspect of the study attempted to answer such questions as:

(i) Do competent business organizations refuse to undertake government R&D work--either entirely or in selected areas--because of government patent policy?

(ii) What effect does policy have on application of a contractor's most advanced private technology to government programs?

(iii) Does patent policy have any influence on the flow of information concerning new developments between a contractor's government and privately sponsored work?

The data available to us only allows us to define some first-order effects of the policy in this area.

Industry's main concern about participating in government research has been the compromise of private investment in research and invention. Frequent

objection was made to the "peephole" effect of government programs, whereby the government receives rights in the accumulated results of private work. The "peephole" effect has its counterpart in patent matters where an invention has been conceived at private expense, but reduced to practice under a government program. The traditional patent provisions classify this as a government invention and dispose of its rights under the terms of the contract.

The reach of the contract has been extended in some program to background patents owned by the contractor at the time of contracting. This practice causes the sharpest industry reaction of all because firms feel caught between their wish to participate in government programs and the need to protect their private investment and competitive position.

The major adverse effects of patent policy on participation are program delay, loss of participants, diversion of private funds from government lines of research, and refusal to use government inventions and research when questions regarding a company's proprietary position are raised. These adverse effects occur selectively, but they have occurred at important points in government programs observed in the study.

The key to the participation question, however, lies in the attitude of prospective contractors toward the role of patents in their activities. As noted in connection with utilization, patents have varying importance to organizations doing business with the government. Industrial firms whose major business objective is participation in government work and systems-oriented companies in the study sample were at one end of the scale and were found to assign patents a secondary role compared with technical and management competence. Patents typically were used by the former to provide recognitition to technical personnel and to project the creative quality of their work to their government customers. Systems firms, on the other hand, were found to rely on patents to ensure design freedom, provide material for cross licensing agreements as well as to recognize creativity in their technical personnel. The data indicates that firms in these two categories are not likely to refuse to participate in government R&D for patent reasons. However, systems firms may encounter participation problems at the subcontract level if the government acquires title to all inventions developed under its program.

On the other hand, firms which place a high value on patents for defensive purposes tend to choose among the areas in which they are willing to undertake government research and may decline to participate in programs which impair their operational flexibility. And, firms in research-intensive industries like electronics and new technically-oriented firms seeking to develop a proprietary product-line through government research were found to rely on patents to establish proprietary positions. These firms tend to be selective in their government-sponsored research and may decline to participate in programs which conflict with their privately sponsored research and development or which do not promote their growth objectives for

proprietary lines.

Firms which follow this policy even more fully try to assure corporate ownership of patents before initiating work on a government contract or may consciously isolate government work from their commercial operations. In the latter case, there is usually little interchange of technical innovations between the government and commercial activities of the firm and there may be some loss of relevant technical experience and applications to the government work.

Lastly, large diversified firms often follow different patent policies in different divisions of the organization. Accordingly, they may be willing to participate in government programs with small concern for patents in some areas but with great concern for patent rights in others. It is difficult to generalize about these firms except to notice that their policies tend to follow the patterns of the industries in which their divisions participate. Their behavior may, therefore, resemble any of the categories of firms described above if their divisions have similar business profiles.

With respect to educational and nonprofit institutions refusal to participate for patent reasons is not normally a problem. However, instances were found in Department of Interior programs where patent problems were encountered because of conflicting institutional obligations arising from joint support of a research program or where rights in background patents were sought as a condition of the project. With the rising interest in nonprofit institutions in patents as a source of revenue, greater concern over patent rights can be expected from institutions with large research programs as financial pressures on these organizations continue to increase.

Viewing the participation problem from the standpoint of individual government agencies, the effect of patent policy varies with the nature of their R&D programs and the contractors that participate in them. Participation problems are not a concern to TVA which performs virtually all its research and development itself and, therefore, has little or no contractual interface with industry. They are also minimal in Agriculture programs since that agency contracts almost all its extramural research and development with educational and nonprofit institutions. In addition, the firms that do participate in its programs do relatively little research and development on their own and tend to be less patent conscious than those participating in defense/aerospace work.

The direct effect of policy on NSF and HEW programs also appears to be small because most of their contract research is either basic in nature, offering limited opportunities to develop patentable inventions, or is performed by nonprofit institutions who, for the most part, are interested in the research for itself. However, some problems may be encountered in instances of joint or overlapping research at non-profit institutions where the rights of other parties may be involved. And, a significant indirect effect has been noted in an important HEW health program where voluntary

noncontractual participation by a patent sensitive industry was curtailed because of patent considerations.

The Department of Interior, like HEW and NSF, has a number of programs--such as water desalination--which are oriented toward developing basic technologies. The Agency contracts in these areas with research-oriented industrial firms (many of whom are patent conscious), as well as educational and nonprofit institutions, and acquires title to patents arising under its programs. Under some programs, statutes on which they are based have been interpreted to require the agency to acquire rights in existing patents owned by contractors because of their relevance to the contract effort and future utilization of contract results. These factors--patent conscious organizations and acquisition of rights to contract inventions and existing patents--have resulted in several instances of hesitation or refusal to participate in the government program. Insufficient data was available to establish how widespread the reaction was or its overall effect on Interior programs.

The largest number of opportunities for participation problems occur, of course, in DOD, NASA, and AEC programs because of the size and scope of their contract effort. Only a limited amount of data was available on this question for these agencies but a few general observations may be made. At least as to the majority of DOD inventions, to which contractors are normally permitted to retain title, no problem arises. In addition, NASA's policy of waiving title to inventions to promote utilization under appropriate circumstances provides a method for resolving competing government and industry objectives with regard to patents arising under contract. Lastly, interviews with industrial firms in the survey sample indicate that--except where a large investment in private research, know-how, inventions and/or patents considered to be valuable in commercial markets exist--acquisition or improvement of technical skills is sufficiently important to them in most cases to justify participating in government programs in their areas of interest even though patent provisions are not completely suitable to them.

However, this does not mean that either a title or license policy will equally serve the government's interests under all the above circumstances, since the policy selected may also affect industrial decisions to use contract inventions commercially. Here again, a balancing of government objectives appears necessary to ensure that the net effect of the patent policy promotes the government's overall goals.

TABLE 1

CONCENTRATION OF R&D FUNDS (1965) IN RELATION TO AGENCY AND GOVERNING POLICY CRITERIA AND PATENTS ISSUED (1957, 1962, 1965)

($ in Millions)

Policy Criteria	Agencies	R&D Obligations FY 1965 ($ in Millions)		Patents Issued: Contract Work					
				1957		1962		1965	
		Extramural	Intramural	Title	License	Title	License	Title	License
I. Principal Rights in Government	A. Public Service								
1(a)(1)- End item intended for commercial use by general public.	Agriculture	$ 61.7	$155.7	0	0	1	1	2	0
	Interior	38.5	84.4	1	0	1	0	0	0
	HEW	682.7	174.8	2	1	4	2	3	0
	VA	.8	36.9	0	0	0	0	1	0
1(a)(2)- Purpose of contract to explore fields concerned with public health or welfare.	TVA	.3	5.5	0	0	0	0	0	0
	NSF	183.2	14.5	0	0	0	0	0	1
		$967.2 (9%)	$471.8 (16%)	3	1	6	3	6	1
	B. Public Service and Mission-Oriented								
1(a)(3)- Contract pertains to new fields with Government as sole or principal developer.	Commerce	19.4	48.5	8	2	7	0	0	0
	FAA	$ 41.7	$ 34.5	0	0	0	8	1	2
1(a)(4)- Contract requires operation of Government research or production facility or coordination and direction of work of others.	NASA	3,999.9	871.0	0	4	4	7	19	4
	AEC	1,233.6	32.8	266	33*	289	98*	250	65*
	[1(a)(1), (2) and 1(b) also applicable]	$5,294.6 (48%)	$986.8 (33%)	274	39	300	113	270	71
II. Principal Rights in Contractor	C. Mission-Oriented								
1(b)- Contract builds upon existing knowledge and contractor has technical competence and established nongovernmental commercial position.	DOD	$4,805.6 (43%)	$1,542.9 (51%)	206	958	221	1,501	407	NA
	[1(a)(2), (3) and (4) also applicable]								

* AEC rights in these inventions vary. In some it holds a nonexclusive license only. In others it holds a general license with exclusive rights in field of atomic energy.

Source: Annual Report on Government Patent Policy, Federal Council for Science and Technology, June 1966, and study data.

TABLE 2
ALLOCATIONS OF DOMESTIC R&D OBLIGATIONS AMONG
PROFIT - MAKING, EDUCATIONAL, AND NONPROFIT ORGANIZATIONS FOR
FY 1965
($ in Millions)

R&D Obligations	A. Public-Service Agencies								B. Public-Service and Mission-Oriented				C. Mission-Oriented
	Agric.	Interior	Commerce	HEW	VA	TVA	NSF	Total (Percent)	FAA	AEC	NASA	Total (Percent)	DOD
1. Profit-Making Organizations	2.2	13.5	13.3	27.1	.2	0.	27.4	83.7 (8.5)	39.4	743.3	3766.2	4548.9 (86.0)	4274.5 (89.0)
2. Educational Institutions	57.2	10.7	4.3	475.7	.4	.3	130.9	679.5 (68.9)	.8	402.9	208.4	612.1 (11.9)	326.9 (6.8)
3. Other Nonprofit Organizations	2.3	2.4	1.8	153.5	.2	0.	24.8	185.0 (18.8)	1.5	87.2	17.4	106.1 (2.0)	203.9 (4.2)
4. Other	0.	11.9	0.	26.4	0.	0.	.1	38.4 (3.8)	0.	.2	7.9	8.1 (0.1)	.3 (0.)
TOTAL	61.7	38.5	19.4	682.7	.8	.3	183.2	986.6 (100)	41.7	1233.6	3999.9	5275.2 (100)	4805.6 (100)

TABLE 5
CONCENTRATION OF CONTRACTOR PATENT HOLDINGS IN THE SAMPLE, RESPONSE RATE, AND RATE OF COMMERCIAL UTILIZATION: ALL AGENCIES BOTH SAMPLE YEARS [1]

Number of Firms	Number of Patents in Sample[2]	Number of Patents in Response[3]	Number of Patents in C. U.[4]	Percent[5] of Total Patents in Sample	Percent[5] of Total Patents in Response	Percent[5] of Total Patents in C. U.	Average Utilization Percent[6]
Top Five[7]	721	662	57	31.2	32.6	27.2	8.6
10	1,150	1,047	92	49.7	51.6	43.8	8.8
25	1,635	1,479	142	70.7	73.0	67.6	9.6
50	1,919	1,735	170	82.9	85.6	81.0	9.8
Total	2,316	2,024	210	100.0	100.0	100.0	10.4
In Sample, No Response	1,082						

Number of Firms:
(1) Responding 192
(2) Not Responding 271
(3) Total 463
(4) With At Least One C.U. 65

[1] Total sample includes all patents developed by contractors and issued in 1957 and 1962, except those developed under NASA contracts and 415 AEC inventions.

[2] "Sample" means the total population of patents as defined in footnote 1.

[3] "Response" indicates the number of patents for which questionnaires were returned.

[4] "C.U." indicates that commercial utilization has been achieved for this patent, by the inventing contractor.

[5] Percent in each case is the percent of the total patents of responding firms in the sample, the response, and in commercial utilization. For example, a total of 210 patents in C.U. and the top five firms held 57 or 27.2 percent of these patents in C.U.

[6] Calculated by taking the sum of patents in C.U. over the sum of patents in the response for each size class.

[7] Ranking is by order of number of utilizations given in this response.

TABLE 3
SALES AND DEVELOPMENT COSTS ASSOCIATED WITH COMMERCIAL UTILIZATION OF INVENTIONS BY CONTRACTORS (1957 AND 1962)
($ in millions)

	Amount[1] of Actual Domestic Sales From:		Amount[1] of Actual Foreign Sales From:		Development Costs:				Number of Licenses in Use for Inventions With:	
	Critically Important Inventions	Inventions With a Supporting Role	Critically Important Inventions	Inventions With a Supporting Role	Amount[1] ($)	Average[2] Percent in Technical Development	Average[2] Percent in Production Facilities	Average[2] Percent in Marketing	Critical Role	Supporting Role
Total Sample	193.63	117.07	47.28	47.65	26.11	56.6	22.7	20.5	31	40
DOD	193.48	117.05	47.18	47.65	25.88	56.6	21.9	21.3	29	38
AEC	0	.021	0	0	.201	52.5	45	2.5	1	2
Other Agencies	.15	0	.10	0	.25	70	20	10	1	0
1957 DOD	100.85	104.17	45.80	40.32	3.59	58.3	20	21.7	12	13
1962 DOD	92.63	11.68	1.38	7.33	22.29	56.2	22.7	21.1	17	25

[1] To date of response to questionnaire.

[2] Average for those responding to this question only.

TABLE 4

SALES AND PRIVATE DEVELOPMENT COSTS ASSOCIATED WITH COMMERCIAL UTILIZATION OF GOVERNMENT-OWNED PATENTS BY NON-INVENTOR LICENSEES

($ in millions)

	Amount [1] of Actual Domestic Sales From:		Amount [1] of Actual Foreign Sales From:		Development Costs [2]			
	Critically Important Inventions	Inventions with a Supporting Role	Critically Important Inventions	Inventions with a Supporting Role	Amount [1]	Average Percent in Technical Development	Average Percent in Production Facilities	Average Percent in Marketing
Total Sample	201.12	6.945	2.2	.085	5.389	21.1	52.2	26.7
DOD	.02	.055	0	0	.040	70	30	0
AEC	.40	0	0	0	.020	50	25	25
Agriculture	196.5	.025	2.2	.085	3.118	17.1	47.9	35
TVA	4.20	5.34	0	0	2.211	16.9	58.9	24.2
Other Agencies	0	1.525	0	0	0	0	0	0

[1] To date of response to questionnaire.

[2] Average for those responding to this question only.

TABLE 8
CORRELATION OF PATENT RIGHTS, PRIOR EXPERIENCE, YEAR OF PATENT, AND COMMERCIAL UTILIZATION

Characteristics of Invention	Rate of Commercial Utilization (percent)[1]	Observations (No. Utilized/ Total No. Observations)
Year of Patent		
1. 1962 patent, contractor has title and prior experience	22.8	78/341
2. 1957 patent, contractor has title and prior experience	25.6	50/195
Title (both years)		
1. Contractor has title and prior experience	23.8	128/536
2. Contractor has no title, but has prior experience	13.3	8/60
Prior Experience (both years)		
1. Contractor has prior experience, but no title	13.3	8/60
2. Contractor has no prior experience, but has title	6.6	63/948
3. Contractor has no prior experience and no title	2.2	4/176

[1]Computed by dividing the number utilized by the total number of observations.

TABLE 9
INTERNAL PATENT MANAGEMENT
TEN HIGH UTILIZERS

Company	Size of Firm ($ in millions)	% Government Business	Number of Applications Filed Per Year (Approx.)	% Government-Sponsored Applications*	% Company-Sponsored Applications*
Q	over 1,000	65-80	Not Available	20	80
S	over 1,000	40	960	12	88
A	200-1,000	40	75	33 1/3	66 2/3
G	200-1,000	30-40	150	15	85
R	200-1,000	10	500	10	90
E	50- 200	85	125	14	86
H	50- 200	75	75	25-30	70-75
N	50- 200	70	140	25	75
M	5- 50	10-40	25-30	25	75
J	under 5	20-50	Not Available	Not Available	Not Available

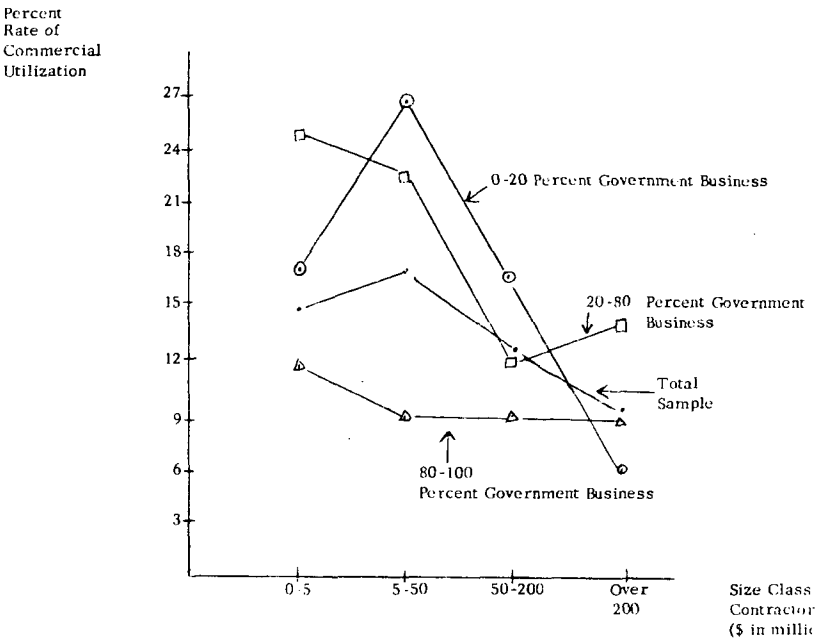
*Percentages are approximate.

TABLE 10
INTERNAL PATENT MANAGEMENT
ELEVEN LOW UTILIZERS

Company	Size of Firm ($ in millions)	Government Business	Number of Applications Filed Per Year (Approx.)	Government-Sponsored Applications*	Company-Sponsored Applications*
B	over 1,000	60	1,000-2,000	2-5	95-98
C	over 1,000	2	510	1 (-)	99+
I	over 1,000	75	300- 350	33 1/3	66 2/3
O	over 1,000	50-90	70	25	75
P	over 1,000	95	175- 200	50	50
T	over 1,000	30	600	10-15	85-90
D	200-1,000	10	1,000	0 (since 1962)	100 (since 1962)
U	200-1,000	55-70	250	20	80
F	5- 50	85	Not Available	Not Available	Not Available
K	5- 50	90	5-6	100	0
L	under 5	Not Available	30	65	35

*Percentages are approximate.

FIGURE I-1
RELATIONSHIP AMONG SIZE OF FIRM, PERCENT GOVERNMENT BUSINESS, AND THE RATE OF COMMERCIAL UTILIZATION[1]



[1]Defined as patents in commercial use/patents in response.

TABLE 12
INVENTION UTILIZATION
TEN HIGH UTILIZERS
(CONTRACTOR INVENTIONS)

Company	Rank in Patent Holdings[1]	Patent Holdings				Number Utilized	Number Utilized With Commercial Sales Over $1 Million	Total Commercial Sales Million-Dollar Inventions
		Title	License	Number	% of Sample			
Company S	1	153	21	174	7.8	43	3	3.0
Company R	6	110	0	110	5.4	13	2	7.2
Company Q	10	52	4	56	2.7	13	1	1.0
Company E	14	36	0	36	1.7	5	1	1.0
Company H	20	22	0	22	1.0	7	0	0.0
Company A	22	20	0	20	.9	7	1	2.0
Company G	24	15	4	19	.9	4	2	70.0
Company J	25	18	1	19	.9	3	0	0.0
Company N	31	13	0	13	.6	5	3	22.2
Company M	45	8	0	8	.3	3	1	1.25
TOTAL				477	22.2	103	14	107.65

[1] Rank based on holdings of both title and license to inventions in the survey sample.

TABLE 13
INVENTION UTILIZATION
ELEVEN LOW UTILIZERS
(CONTRACTOR INVENTIONS)

Company	Rank in Patent Holdings	Patent Holdings				Number Utilized	Number Utilized With Commercial Sales Over $1 Million	Total Commercial Sales Million-Dollar Inventions
		Title	License	Number	% of Sample			
Company I	2	84	47	131	6.5	5	0	0.0
Company B	4	118	1	119	5.8	5	1	22.0
Company T	5	67	50	117	5.7	3	0	0.0
Company P	7	75	7	82	4.0	5	0	0.0
Company C	9	57	5	62	3.0	0	0	0.0
Company U	12	39	3	42	2.0	3	2	50.0
Company O	16	30	0	30	1.4	4	0	0.0
Company L	19	26	0	26	1.2	0	0	0.0
Company D	21	13	9	22	1.0	3	0	0.0
Company F	35	11	0	11	.5	0	0	0.0
Company K	39	8	1	9	.4	0	0	0.0
TOTAL				651	31.5	28	3	72.0

TABLE 16
TIME LAG FROM PATENT APPLICATION TO FIRST COMMERCIAL UTILIZATION
CONTRACTOR ACTIVITY FOR SAMPLE YEARS 1957 AND 1962

Independent Variables	≤ 0 Years	1-3 Years	4-8 Years	≥ 9 Years	9* Years	Total
Sales of Firm						
Less than $5 million	3	4	2	0	3	9
$5 - $50 million	8	6	7	0	1	21
$50 - $200 million	5	11	3	3	6	22
Over $200 million	37	33	22	0	14	92
TOTAL	53	54	34	3	24	144
Prior Activity						
Yes	41	36	13	2	8	92
No	12	19	21	1	16	53
						145
Percent Government Business						
0-20	16	14	20	2	2	52
20-50	16	10	3	0	2	29
50-80	10	11	1	0	7	22
80-100	11	20	10	1	13	42
						145
Field of Technology						
Mechanical	14	22	12	1	6	49
Other	39	33	22	2	18	96
						145
Form of Invention						
Material	12	10	6	0	2	28
Process	2	4	0	0	3	6
Component	22	17	7	1	10	47
End Product	17	24	21	2	9	64
						145
Kind of Agency						
DOD	50	53	31	3	24	137
AEC	2	1	3	0	0	6
Other	1	1	0	0	0	2
						145

*Years between filing and first expected commercial utilization. This column is not included in the row totals.

Senator SCHMITT. Can you suggest reasons why the commercial utilization rate of NASA-generated inventions is so much higher for contractor-owned patents than NASA-owned patents?

Mr. MOSSINGHOFF. I think Mr. Johnson indicated some of the reasons in his testimony. Hopefully we have selected the best contractor to do the job for NASA. He is in the business, he has the ability to evaluate inventions to discern which ones have greater commercial potential. He has the production, marketing, and engineering capability to develop the invention from an idea of the inventor to an item actually produced and sold in the marketplace.

I think Tenney Johnson gave a good summary of that reason.

Another element that should not be overlooked is that it has been my experience that the person most impressed with an invention is the inventor himself or herself. It is their baby and they want to see it used. They want to leave their footprint.

It seems to me that it is important, unless there is an overriding public policy to the contrary, to leave the commercial rights where that inventor is, so you have the single greatest champion of the invention working the problem.

I think those are the two principal reasons.

Senator SCHMITT. That is an interesting point. I think all of us in one way or another in science and technology would be impressed with that if we just thought about it—how protective we are of an idea that we may have had and how rapidly we try to advance that idea, whether it is an intangible idea or some piece of hardware. That is an excellent point.

Are you satisfied that the march-in rights, those which NASA retains under its present policy and those which would be required under S. 1215, are adequate to protect the public interest, and if so, why?

Mr. MOSSINGHOFF. It is difficult to imagine a situation where those march-in rights wouldn't be adequate to protect the public interest. I think when President Kennedy's statement was issued that was the heart of the policy concept, adopting a flexible policy vis-a-vis the Government and the contractor to retain rights. But if the contractor retained rights, it wasn't against the world. He had to act responsibly with those rights. As Tenney referred to, he couldn't just suppress the invention and it must be made available for public health, safety, and welfare reasons.

So the answer to your question is yes. I think that those rights are adequate.

Senator SCHMITT. So you are saying that the fact that march-in rights have not been exercised extensively is the best sign that they are working?

Mr. MOSSINGHOFF. Yes; I believe that. That experience brings into a realm of reality what until now has been a hypothetical issue of whether the cure for cancer is going to be suppressed or whether the carburetor that will get 100 miles to the gallon will be suppressed by some commercial operation.

While NASA has never exercised march-in rights as such, we do require periodic reporting from our waiverees of the steps they are taking to commercialize the invention. And where they are not taking such steps, or have no plans to commercialize the invention, we void the waiver. We have done that in more than 25 percent of

the cases for a total of 266—with respect to a total of 266 inventions, we have voided the waivers and taken the patent back into NASA's portfolio and made it available for licensing.

Senator SCHMITT. How does that contrast with the march-in rights?

Mr. MOSSINGHOFF. It is a part of the march-in rights, but it was done voluntarily between NASA and the waiveree. We require periodic reports——

Senator SCHMITT. They have voluntarily agreed to release the waiver?

Mr. MOSSINGHOFF. In response to the fact that they have not brought the invention to the point of practical application within 3 years. When we find that out, they are put on notice that we are going to require the issuance of licenses if someone requests. And as a voluntary agreement with NASA, they agree to have NASA void the waiver and return title back to the Government.

Senator SCHMITT. In all of those cases you have been able to negotiate a march-in rather than actually having to impose one?

Mr. MOSSINGHOFF. Yes, sir.

Senator SCHMITT. In your view, which patent policy would be more cost effective, NASA's present policy or the one generally outlined in S. 1215?

Mr. MOSSINGHOFF. I am not convinced that our policy is cost effective, Senator. I think there is a lot of Government effort that goes into evaluating inventions, doing patent searches on the inventions, acquiring the patents, and then putting it in the license portfolio. Those of us that participated in this recent analysis—that led to the conclusion that we are getting a commercialization rate of about 1 percent with respect to contractor inventions that we own patents on—we are disappointed by that.

I know the general counsel of NASA wants to go further in that analysis to determine whether or not what we are doing makes sense.

It seems to me that, again for reasons that Mr. Denny indicated, if you leave that invention with the contractor, he has the ability to evaluate it and decide whether he is going to file and whether the patent is going to become part of his portfolio, it will probably be cost effective for the Government.

Senator SCHMITT. S. 1215 specifically provides that the act shall not be construed to deprive an owner of a background patent. What is NASA's position on acquiring background rights to inventions, and do you think something more explicit ought to be included in this measure?

Mr. MOSSINGHOFF. As a general policy, NASA does not acquire background rights to inventions developed by the contractor using its own independent resources.

I think the number of times we have done that is probably between 6 and 12 times in the history of NASA.

Senator SCHMITT. Is there any general criteria that seems to have been met when you exercised background rights?

Mr. MOSSINGHOFF. Some of them, Senator, were when decisions had not been made in the communications satellite area and NASA was very reluctant not to get some assurances—and that is about all it amounted to—assurances that the contractor would not

enjoin others. It did not get into the terms of royalties or licenses that he would issue; but there have been instances when we did get assurances injunctions would not be sought.

I could provide a better answer for the record, if I may.

Senator SCHMITT. I would appreciate that.

[The following information was subsequently received for the record:]

NASA's policy on the acquisition of background patent rights is enunciated in Section 9.107-3(e) of the NASA Procurement Regulations wherein it states: "it is the policy of NASA to pay reasonable compensation for the acquisition of rights in any invention used or to be used by NASA which is covered by a valid patent thereon and enforceable against the Government."

It is further stated that: "nothing in [subpart 9.1] is intended to preclude the use of appropriate contract provisions concerning rights in contractor's background patents, but rights in background patents will normally not be acquired in contracts for supplies and services except by specific negotiation of such rights, unless the patents and the rights thereunder are listed and priced as a separate contract item."

In other words, the acquisition of background patent rights in a contracting mode is the exception rather than the rule and is a matter of negotiation between the parties. The NPRs do not set forth any standard clauses for background patent rights nor are any guidelines provided therefor.

Historically, NASA has sparingly used background patent provisions. They have been limited to procurements of the type which involve products which are intended for commercial use or which may ultimately be required by Government regulations and with respect to which a management judgment is made that background rights are necessary to meet program objectives. Authorization to negotiate background provisions is granted only after program management at Headquarters identify a realistic need.

Because background provisions as used by NASA are subject to negotiation the terms of such provisions have varied. For example, a background patent provision may simply amount to an agreement by the contractor not to enjoin third parties from the use of the patented background invention. In essence the contractor is thus agreeing to negotiate a reasonable royalty or seek compensatory damages at law. A background provision may also provide the Government a license, royalty-free or royalty bearing, for the use of the patents for Governmental purposes. Sometimes there are express requirements to license other responsible applicants on reasonable terms and conditions to practice the background patents. Often, this requirement is limited to specific end-items or specifically defined program objectives rather than being applied across the board to the procurement. A common provision is that the background clause is not applicable where suitable commercial alternatives are available. Another variation with respect to background patents concerns whether the clause is applicable to foreign or domestic patents or both. A background provision will also usually contain a mechanism for resolving disputes as to facts such as what is a reasonable royalty or who is a responsible applicant. Occasionally, rights to a contractor's proprietary data (e.g., trade secrets) are acquired coextensive with rights to a contractor's background patents, depending on program objectives.

Programs which have used such provisions have been concentrated in the satellite communications area and in the quiet engine aeronautical program. For example, in the early 1960's NASA entered into an agreement with Hughes Aircraft Company containing a provision with regard to ten to twelve specifically identified patent applications which covered inventions useful in the first generation of geostationary spin-stabilized satellites that evolved from the SYNCOM program. Under this provision Hughes agreed not to enjoin any third parties from using these inventions. As mentioned earlier this is tantamount to an agreement to license the inventions on reasonable terms.

In another communications satellite program NASA negotiated a background patent provision for inclusion in the contract with Fairchild Industries for the Applications Technology Satellite F&G program. The provision was applicable to the parabolic antenna, including the reflector, deployment mechanism, primary feeds and support structure. As in the other cases, a background rights provision was deemed desirable in order to assure the accessibility of this potentially valuable technology to the future needs of the Government and the public and commercial sector.

NASA's quiet engine program was another program area, as mentioned earlier, that employed background patent and data provisions. The overall objective of this program was to improve noise reduction technology for the benefit of the public and the industrial sector. There was also an expectation that if successful, the results of the program would be required by Government regulation. Accordingly, the background provision was deemed necessary to assure the availability of the technology. [For example, contracts in this area with Boeing, General Electric and McDonnell Douglas included background provisions of varying scope.]

Senator SCHMITT. Mr. Denny, have there been examples of the Department of Energy or ERDA having exercised a retention of background rights? Are there any generalizations that can be made?

Mr. DENNY. In the patent area, it is a standard practice of the Department of Energy—I might first define what we consider a background patent. That is: A patent of sufficient breadth and strength that it is literally a blocking patent; that the technology we are developing under the contract cannot be used unless you use that patent. We defined a background patent that narrowly.

And if there is one, the contractor, in our normal policies, provides two things:

First, a free research and development license to the Government. The concept there is if the contractor has introduced its background technology into our contract and we are trying to commercialize it, we don't want to be charged for it.

Second, if it is a blocking patent, the contractor may be required, if requested by DOE, to license others at reasonable royalties unless the contractor is satisfying market needs on its own.

So it is a very limited form. It is intended to address the suppression kind of concern, and we have up until now found no need to enforce it.

Senator SCHMITT. Do you think any comprehensive Government patent policy should include criteria for the retention of background rights?

Mr. DENNY. No, sir, I do not. We have it in our policy. It came very close to being placed in the ERDA statutory patent policy, and I tried—and this time successfully—my best to keep that from happening. It is an extremely sensitive issue. It is, probably more than anything else, a go-no-go kind of situation in cooperation.

You need the utmost in flexibility. I pleaded with those who were developing the ERDA Act to give ERDA, and now DOE, an opportunity to show their responsibility in acquiring this kind of right—to show that it can be handled on an administrative basis where it is flexible, and where necessary it can be eliminated.

Mr. MOSSINGHOFF. I would agree with that. I think the way you treat background rights in your bill is adequate. It states that the bill should not be construed as affecting it either way.

Speaking for NASA, I believe we have acted responsibly in the few cases where we thought we needed assurances with respect to a blocking patent. I would think that that would be something best left for interpretation, and then if you see problems developing, it could be addressed later.

Senator SCHMITT. Mr. Mossinghoff, do you remember an exercise that the two of us went through with Mr. Johnson in trying to negotiate a patent agreement between NASA and the Department

of Interior where there was an insistence that background rights be retained. It had to do with underground coal mining?

Mr. MOSSINGHOFF. I remember it well. I am sorry it didn't work.

Senator SCHMITT. We only spent 1½ years on it.

Do you feel that the language in S. 1215 is sufficient to prevent that kind of an occurrence? Frankly, that is what first got me interested in patents. When we could not apply advanced technologies rapidly to the more efficient mining of coal.

Mr. MOSSINGHOFF. I think the provision in the bill, coupled with a strong element of good judgment, could prevent that from happening again. There is a need for judgment.

Senator SCHMITT. We would appreciate any further comments you might have in retrospect for the record. I would hate to see those kinds of things happen, particularly where there needs to be an interagency cooperative activity, and because of the difference in judgment or a difference in interpretation of the law in the two agencies, they can't get together.

In the example I cited, everybody agreed it ought to be done, but nobody could agree how it should be done.

Mr. Mossinghoff, would the present patent provisions apply to joint endeavors of NASA's plannings? For example, those involving materials processing in space?

Mr. MOSSINGHOFF. We looked at that very carefully earlier this year. As you know, we are proceeding with the issuance of guidelines for when we will cooperate with private concerns in conducting experiments using the Space Shuttle, and in connection with the materials processing space program particularly we looked at that.

We concluded that as long as a joint arrangement does not anticipate the flow of NASA funds to fund work on the other side of the NASA-cooperator interface, that strictly speaking section 305 of the Space Act will not apply.

I am sure we will obtain a broad Government license to any efforts that are undertaken. And I think we will also probably require assurances from the person we cooperate with that the results will be made available to the public in an expeditious or reasonable way. But the statutory patent policies of NASA will not apply.

If you wish, I could include in the record the memorandum of our Assistant General Counsel for Patent Matters, which details the basis for that conclusion we reached.

Senator SCHMITT. We would appreciate that very much.

[The following information was subsequently received for the record:]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
Washington, D.C., June 19, 1979.

To: G/General Counsel.
From: GP/Assistant General Counsel for Patent Matters.
Subject: Applicability of section 305 of the Space Act to Joint Endeavors.

This responds to your request that I address the issue of whether "section 305 of the National Aeronautics and Space Act of 1958, as amended [hereinafter "Space Act"] applies to inventions made in the course of joint endeavors; for example, endeavors undertaken in the materials Processing in Space Program."

In this memorandum I will review the legislative history of section 305, discuss NASA's interpretation and application of the section over the years, summarize the experience gained, and state the conclusions to be drawn therefrom.

The basic legal issue is whether a "joint endeavor" is a contract of the Administration for the performance of work within the intent of section 305, such that any inventions made in the course of the endeavor are subject to the ownership requirements of subsection 305(a).

For the purposes of this memorandum, a joint endeavor is defined as follows: "A joint endeavor is an arrangement between NASA and a party or parties in which each undertakes to contribute to or participate in a project of mutual benefit, and which usually involves the use of equipment, facilities, services, personnel or information made available by one or more of the parties for use by the others. Such endeavors do not involve the transfer of funds or title to property between the parties, and are not considered a procurement or an assistance transaction within the purview of P.L. 95-224. Services which may be involved do not constitute the employment of one of the party's employees by the other."

In answer to the legal issue raised, it is concluded that a joint endeavor is not subject to the legal constraints of section 305. This conclusion is based on the Space Act and the long-standing administrative interpretation of section 305 by NASA that there are many arrangements which NASA may enter into, a joint endeavor being one such arrangement, that are not contracts covered by subsection 305(a).

1. Section 305 of the Space Act

The pertinent language in the Space Act [1] dealing with the allocation of property rights in inventions is as follows (emphasis added):

Subsection 305(a) requires that [w]henever any invention is made "*—in the performance of any work under any contract of the Administration, and the Administrator determines that—*

(1) *the person who made the invention* was emplyed or assigned to perform research, development, or exploration work and the invention is related to the work he was employed or assigned to perform, or that it was within the scope of his employment duties, whether or not it was made during working hours, or with a contribution by the Government of the use of Government facilities, equipment, materials allocated funds, information proprietary to the Government, or services of Government employees during the working hours; or

(2) *the person who made the invention* was not employed or assigned to perform research, development, or exploration work, but the invention is nevertheless related to the contract, or to the work or duties he was employed or assigned to perform, or was made during working hours, or with a contribution from the Government of the sort referred to in clause (1)"

such invention becomes the exclusive property of the United States unless the Administrator waives rights thereto in conformity with the provisions of subsection 305(f).

Subsection 305(b) specifies that "[e]ach *contract* entered into by the Administrator with any party *for the performance of any work*" is to contain effective provisions for the reporting of inventions "*which may be made in the performance of such work.*"

Section 305(j)(2) defines the term contract as meaning "any actual or proposed contract, agreement, understanding, or other *arrangement,* or subcontract."

It is the meaning, interpretation and application of the phrase "in the performance of any work under any contract of the Administration" when considered in the context of the whole statute, its legislative purpose and intent, and its long standing practical interpretation by NASA, that determines whether a joint endeavor, which meets the literal defnition of "contract" as set forth in subsection 305(j)(2), comes under subsection 305(a).

2. Legislative Purpose and Intent Behind Section 305

The legislative purpose and intent underlying section 305 is not set forth in the Space Act;[2] however, the legislative history of section 305 does provide insight in this regard. Although the legislative history of section 305 has been characterized as "extremely thin" and not providing guidance, or as "very scanty," requiring NASA to use "its best judgement as to what Congress had in mind" with regard to the interpretation of such difficult and complicated legislation,[3] a careful review of the report of the House-Senate Conference on the bill,[4] and the transcripts of the floor debate prior to its passage[5], does reveal a consistent thread of legislative purpose and intent underlying section 305.

The report of the conference, for example, after briefly setting forth the previous House and Senate actions that led up to the need for conference on the issue, states: "Operating on the theory that the Government's interests must be protected, but with the concomitant purpose of protecting private interests and of keeping private

incentive and initiative at a high level, the Committee of Conference adopted entirely new patent provisions.[6]

The report then continues with a very brief explanation of Subsection 305(a), indicating that inventions are to become the property of the United States *"according to a specified standard."* (Emphasis in report). This standard is set forth in subparagraphs (1) and (2) of subsection 305(a), and is based on a relationship of inventions made to both the duties of the contractor employee performing under the contract and contract requirements.[7]

During floor discussion prior to final passage of the Space Act, Rep. McCormack stated in his opening address: "The patent provisions of the House bill is the only part of the bill extensively revised by the conferees. The senate version carried a patent provision closely similar to the provision of the House bill. This was dropped by floor amendment just before passage in the Senate to allow this section to go to conference. The review and redrafting were wise. The select committee created a special subcommittee to study the matter, and after talking with many experts in and out of Government arrived at an new version, drawing upon Senate and House suggestions. The original patent provision was too closely patterned after the stringent requirements of the Atomic Energy Act which are not fully applicable to the space field. The substitute provision agreed to by the conferees protects both the interests of the Government and affords enough flexibility to the Space Administrator to let him meet needs for preserving inventions of the individuals and companies whose efforts it is public policy to encourage."[8]

Representative Keating also commented rather extensively on the patent provisions. Included in his summary of section 305 was the statement:

"The conferees recognized that research and development in aeronautical and space sciences will not be comparable, in most respects, to that in the field of atomic energy, and hence that there is no necessity for a Government monopoly of rights or interests in all inventions and/or discoveries relating to space exploration.

"And the patent provisions in this conference report do not automatically, as I understand the Atomic Energy Act does, give all property rights in inventions to the Government."[9]

The above-noted comments from the conference report and statements made during floor debate, viewed in light of drafting changes that culminated in the final version of section 305, clearly suggest that there was a legislative intent not to follow the restrictive and stringent approach taken in the field of atomic energy, which approach automatically created a "Government-monopoly" on inventions in the entire field based on some rather broad and generalized contractual relationships.[10] To the contrary, the Congresssional intent behind the redrafts that became section 305 was to loosen the grip of government ownership of technology resulting from the space program. This was accomplished by incorporating the "standard" of subparagraphs (1) and (2) into subsection 305(a) wherein the Government acquires rights to inventions only in specified situations in which contractors and employees thereof are required to perform work of an inventive nature for the Administration.

Thus, even though the legislative history lacks a detailed analysis of the various provisions of section 305 and their interplay, two key points are evident from the conference report and the floor statements, quoted above. First, there was an underlying legislative purpose to maintain private incentive and initiative; and second, there was a legislative intent that the restrictive provisions of the Atomic Energy Act, which essentially preempt private ownership of patent rights in an entire field of endeavor, were not to be carried over to space activities. Accordingly, NASA has from the onset adopted a liberal adminsitration of section 305 and has made this known to Congress.[11] This is illustrated by the numerous examples discussed below.

3. NASA Interpretation and Application of Section 305

Consistent with the pronouncement to liberally administer section 305, and in harmony with the aforementioned legislative purpose and intent, NASA has over the years taken a more restricted interpretation as to the type of contracts that are subject to the title-taking constraints of subsection 305(a) than is literally suggested by the broadly worded definition of subsection 305(j)(2).[12] Accordingly, it has been the long standing official interpretation and administrative practice of NASA to limit the application of subsection 305(a) to activities performed for NASA that have the potential for making inventions.[13] This is reflected in NASA's regulations and practices over the past two decades, as the following review illustrates. This review covers a number of arrangements that NASA determined were not covered by subsection 305(a), a joint endeavor being one such arrangement. In each instance

the determination made by NASA, and relied on by the other party, has had a direct effect on the vesting of property rights to inventions made by that party.[14]

a. Proposals Submitted to NASA

A literal interpretation of subsections 305(a) and 305(j)(2), taken together, would require the Government to take title to any privately funded inventions made in the course of preparing a proposal (i.e., a "proposed contract") for submittal to NASA. Such interpretation, however, is manifestly at odds with the legislative purpose of section 305(a) to protect private interests and to maintain private incentive and initiative. Thus, NASA took a restrictive interpretation of the phrase "any . . . proposed contract" appearing in subsection 305(j)(2), and limited it to work performed upon an understanding that a contract would be awarded, such as when a written authorization is given to proceed with the work pending formalization and execution of a contract.[15]

b. Contracts for Supplies, Construction and Utility Services

In developing NASA's procurement regulations, interpretations of section 305 were made to determine the types of contracts that were subject to subsection 305(a), and therefore required the inclusion of a provision as specified in subsection 305(b). NASA concluded that the legislative intent was to apply section 305 only to those types of contracts requiring the performance of inventive type work for NASA, and so advised Congress.[16] This interpretation is reflected in the NASA Procurement Regulations, which limit the use of a patent rights clause that would invoke section 305 to specified types of contracts having a prospect of inventive work being performed.[17]

c. Launch Service Agreements

NASA has provided launch services to non-NASA entities during most of its history. Many of the launches have been provided on a reimbursable basis for private domestic concerns, wherein the launched spacecraft has been developed and owned by the concern for whom NASA provided such services. In addition, there have been numerous reimbursable launches for other U.S. Government agencies, foreign countries and international organizations.

(i) *The AT&T Launch Agreement.*—The first launch service agreement was with American Telephone and Telegraph (AT&T) (July, 1961) to launch the experimental Telstar communication satellites. This agreement differed considerably from the typical research and development contract entered into by NASA since the satellites were to be designed, built, funded and owned by AT&T, and AT&T was also to reimburse NASA for its "out of pocket launch costs." Thus, the roles of the parties were reversed from the normal contractual situation in that NASA was being paid to perform work for AT&T.

The agreement was made subject to section 305, and NASA took, and then waived back, title to all inventions made by AT&T in the design and development of the Telstar satellite, but retained a worldwide, royalty free license for governmental purposes. In addition, NASA acquired the right to grant licenses to others for the practice of such inventions throughout the world for any purposes whatsoever upon such terms and conditions as the Administrator may prescribe. This right to license others was unrestricted as to both the parties to be licensed and the purposes for which the inventions may be practiced.

The rationale for acquiring these rights under the AT&T agreement was the existence of exceptional circumstances; that is, the desire to keep options open in an uncertain area until such time as the Congress and the President acted on an approach to be taken in establishing a communication satellite system.[18]

(ii) *Subsequent Launch Agreements.*—The next launch service agreement where the applicability of section 305 was raised was in 1964, when NASA negotiated an agreement with the Communications Satellite Corporation (Comsat) to launch on a reimbursable basis, Comsat's funded and owned satellites. In formulating a patent policy for this agreement note was made, and consideration given, to the position previously taken by NASA with respect to NASA/AT&T Telstar launch agreement. It was concluded, however, the reasons that gave rise to the particular NASA/AT&T patent policy no longer existed.[19] It was observed that while the NASA/Comsat launch agreement was a "contract for the performance of work" and hence could be construed to be covered by section 305, under the specific terms of the agreement NASA was to perform the work for Comsat, as contrasted with the typical situation where the contractor performs work for NASA.[20] In other words the conventional roles were reversed under this type of agreement.

NASA made the interpretation that the launch service agreement with Comsat was not subject to section 305 because no work was to be performed for NASA, and

thus there was to be no transfer of NASA funds to Comsat. However, to insure against a later amendment of the agreement calling for the performance of work *by the corporation for NASA* it was decided to include a section 305 patent clause in the agreement as a precautionary measure. To this end, the clause began with the language "If and to the extent that any work is performed *for NASA* under this agreement. * * *[21] Thus, NASA made the further interpretation that, in addition, inventive type work had to be performed *for NASA* in order for section 305 to apply.[22]

The interpretation that a launch service agreement does not constitute a contract for the performance of work for NASA, and hence not a contract subject to subsection 305(a), has been consistently followed since 1964.[23] In fact, experience has shown over the years that the standard launch service agreements have never required any work to be performed *for NASA,* and the above-mentioned precautionary section 305 patent rights clause is no longer used.

4. Joint Endeavors

The above review illustrates a number of instances where NASA has made an official interpretation and adopted administrative practices to support the position that not all contracts are subject to subsection 305(a). Joint endeavors represent yet another instance where NASA has made an interpretation that an agreement or arrangement which literally meets the definition of contract under subsection 305(j)(2) is not a contract in the context of subsection 305(a).

With the development of advance facilities, such as wind tunnels, sensing and communications satellites and a space transportation system, and the creation of high technology, such as supercritical wing and ADP systems, NASA found it to be in its interest, both national and international, to enter into arrangements whereunder NASA would contribute the use of its facilities or technology to other parties in return for the other parties agreeing to furnish their products or services to carry out a program or project of mutual interest. The parties then share the results and benefits of the project. Often these activities are carried out as a joint endeavor, as previously defined.

Joint endeavors may vary as to the number of parties involved, the type and amount of contributions made by the parties, as well as the technical nature of the endeavor undertaken. In general these activities and arrangements differ considerably from a formal NASA contract and somewhat from those activities previously discussed in that they are usually informal in nature, are sometimes bottomed on a best efforts basis, do not involve the reimbursement or exchange of funds between the parties, and are not deemed as requiring employment of one party's employees or contractors by the other party in making the contribution of facilities, equipment or services to the joint activity.

NASA's first interpretation as to whether section 305 applied to a joint endeavor occurred in April, 1959, in response to an inquiry by a private company regarding an arrangement whereby NASA would contribute one of its facilities for the testing of privately developed equipment, and NASA and the owner of the equipment would share the resulting test data.[24] The position was taken that, while such an arrangement had the appearance of a contract with NASA, the fact that the company contributed equipment to the joint endeavor would not mean the company assumed any obligations to perform any work for NASA in the sense of subsection 305(a). Hence the interpretation was made that subsection 305(a) would not be applicable to any inventions made by the company or its employees during the testing of the company's equipment or any activities incident thereto. The interpretation was also made that should any of the company's employees participate in the testing, and should they as a result make an invention, the invention would not be covered by subsection 305(a) because it would not have resulted from the performance of any work *for NASA.*[25]

Subsequent to this intital interpretation, NASA has had many occasions to determine whether an arrangement or agreement structured as a joint endeavor was to be considered a contract subject to subsection 305(a). The interpretation has been consistent that, under joint endeavors neither party is assuming any obligations to perform inventive type work for the other, and accordingly each party retains rights to any inventions that may be made in the course of carrying out its activities that are contributed to the effort.[26] This interpretation and the resulting practices are illustrated by the examples set forth below.

(a) Use of NASA Facilities.

Where NASA's contribution is the use of a ground-based facility, and the other party furnishes equipment or services, NASA does not apply section 305, but ac-

quires license rights to any inventions resulting from such use through negotiated provisions in the agreement.[27]

NASA has a similar policy where the contribution is the use of its orbiter to carry the other party's payload for testing, demonstration, or performing other operations or analysis in space.[28]

(b) Use of Satellite Data and High Technology

Other joint endeavors in which NASA has not applied section 305, involve activities wherein NASA's contribution is its satellite data[29] or its high technology such as supercritical wing technology in exchange for results of the analysis thereof. When the resulting activities are not of the inventive nature, no patent provisions are included; when it is anticipated that inventions may be made, a patent provision may be included by negotiation.[30]

(c) Contributions of Technical Interface and Technical Monitoring Assistance

NASA also entered into a joint endeavor with the McDonnell Douglas Corporation (and a similar one with the Boeing Company) whereunder McDonnell Douglas developed at its expense a spin stabilized payload assist module (SUSS/PAM) for launching payloads from the orbiter, and NASA provided technical interface and monitoring assistance and services.[31] Subsection 305(a) was not deemed applicable to this joint endeavor, but under negotiated provisions NASA would acquire rights to inventions made by McDonnell Douglas in developing the SUSS/PAM in event of termination for default.[32]

(d) Cooperative Launch Activities

In addition, NASA has entered into arrangements whereby NASA launches, at no cost to the other party, spacecraft and/or experiments provided at no cost to NASA by the other party, with the understanding that NASA and the other party are to share in the results, usually by exchange and/or publication of the information and data derived from the resulting activity. Again, section 305 has not been deemed applicable to these arrangements, but a provision may be included, by negotiation, to acquire license rights for governmental purposes if it is determined that the resulting activity is of a inventive nature. Other than such license rights, invention rights reside with the respective parties (or their employees or contractors) of the joint endeavor.[33]

(e) Contribution of Major Hardware

Other NASA joint endeavors have involved activities where the various parties have made significant hardware contributions to a common program. As in the previously discussed joint endeavors, subsection 305(a) has not been deemed applicable, and any invention rights involved reside with the party (or its employees or contractors) who contributed the hardware. License rights, for governmental purposes, are acquired if it is determined that the resulting activity is of an inventive nature.[34]

5. Summary and conclusions

It is clear from the foregoing that during its nearly two decade history NASA has entered into numerous actual or proposed contracts, agreements, understandings or other arrangements, all within the literal definition of "contract" of subsection 305(j)(2), that were not deemed subject to subsection 305(a). In some instances they were for the procurement of goods and services (supply contracts using appropriate funds); in other instances they were for launch services or the use of NASA facilities on either a reimbursable or joint basis; and in still other instances they involved contributions of hardware on a joint basis. They issue does not turn on whether the arrangement between the parties falls within the literal definition of contract as defined in subsection 305(j)(2). Rather, the common basis for the decision not to consider these types of "contracts" under subsection 305(a) was a determination, consistent with the ligislative history, purpose and intent, that they did not involve *the performance of work of an inventive type for the Administration* in the context of subsection 305(a).

This determination is equally valid with respect to joint endeavors, wherein each party performs, or has performed, work on its own behalf in order to make contributions to the common project. To the extent that any inventive activity is performed by a party's employees or contractors, it is performed by or for that party for the purpose of enabling that party to make contributions to the joint endeavor. That is, one party is not performing, or not having performed, work for the other party, but rather, for itself. Neither party is empowered to direct, assign or require work of an inventive nature to be performed by the employees or the contractor employees of the other party. Thus, a joint endeavor is no different than the numerous other

arrangements NASA has determined not to be subject to subsection 305(a) in that it does not require the performance of work of an inventive type for NASA.

In addition, there is nothing in the legislative history of section 305, nor of NASA's long-standing interpretation and administrative practices relating thereto, to suggest the determination should be any different because the technology involved may find commercial application, as may be the case for joint endeavors under the Materials Processing in Space Program. If it is determined that the activity does not involve the performance of work of an inventive type for NASA, subsection 305(a) is not applicable notwithstanding the nature of the technology involved or its commerical potential.

Because joint endeavors are not contracts under subsection 305(a), any rights to inventions made in the course of a joint endeavor undertaken in the Materials Processing in Space Program must be acquired by negotiation. It is recommended that at a minimum NASA continue the established practice of acquiring a royalty-free license to practice, for governmental purposes, all inventions made in the course of the resulting activities of a joint endeavor undertaken in the Materials Processing in Space Program. Consideration may be given to acquiring license rights of the same scope to practice any inventions specifically made in the course of any preparatory or background activities, to the extent necessary to practice inventions made in the course of the resulting activities. Beyond this, it will be necessary to consider each proposed joint endeavor case-by-case. However, it is recommended that, consistant with the policy set forth in NMI 8610.8 dealing with reimbursable launches, [35] NASA obtain assurances, by way of directed licensing rights, that the results of any joint endeavor activity which may have a significant impact on the public health, safety or welfare be made available to the public on terms and conditions reasonable under the circumstances.

It is therefore concluded that:

(*a*) NASA does enter into many types of arrangements falling within the literal definition of contract under subsection 305(j)(2) that are not contracts in the context of subsection 305(a);

(*b*) a joint endeavor is an example of one type of arrangement that is not a contract in the context of subsection 305(a);

(*c*) a joint endeavor under the Materials Processing in Space Program is no different regarding the intepretation and application of subsection 305(a) than any other joint endeavor, and therefore is not a contract in the context of subsection 305(a); and

(*d*) the allocation of property rights in inventions under any joint endeavor is a matter of agreement between the parties that must be specifically set forth in the joint endeavor.

ROBERT F. KEMPF.

NOTES

1. 72 Stat. 426; 42 U.S.C. § 2451 *et seq.;* particularly 42 U.S.C. § 2457.

PROPERTY RIGHTS IN INVENTIONS

SEC. 305(a) Whenever any invention is made in the performance of any work under any contract of the Administration, and the Administrator determines that—

(1) the person who made the invention was employed or assigned to perform research, development, or exploration work and the invention is related to the work he was employed or assigned to perform, or that it was within the scope of his employment duties, whether or not it was made during working hours, or with a contribution by the Government of the use of Government facilities, equipment, material, allocated funds, information proprietary to the Government, or services of Government employees during working hours; or

(2) the person who made the invention was not employed or assigned to perform research, development, or exploration work, but the invention is nevertheless related to the contract, or to the work or duties he was employed or assigned to perform, and was made during working hours, or with a contribution from the Government of the sort referred to in clause (1),

such invention shall be the exclusive property of the United States, an if such invention is patentable a patent therefor shall be issed to the United States upon application made by the Administrator, unless the Adminstrator waives all or any part of the rights of the United States to such invention in conformity with the provisions of subsection (f) of this section.

(b) Each contract entered into by the Adminstrator with any party for the performance of any work shall contain effective provisions under which such party

shall furnish promptly to the Adminstrator a written report containing full and complete technical information concerning any invention, discovery, improvement, or innovation which may be made in the performance of any such work.

(c) No patent may be issued to any applicant other than the Administrator for any invention which appears to the Commissioner of Patents to have significant utility in the conduct of aeronautical and space activities unless the applicant files with the Commissioner, with the application or within thirty days after request therefor by the Commissioner, a written statment executed under oath setting forth the full facts concerning the circumstances under which such invention was made and stating the relationship (if any) of such invention to the performance of any work under any contract of the Administration. Copies of each such statement and the application to which it relates shall be transmitted forthwith by the Commissioner to the Administrator.

(d) Upon any application as to which any such statment has been transmitted to the Administrator, the Commissioner may, if the invention is patentable, issue a patent to the applicant unless the Administrator, within ninety days after receipt of such application and statement, requests that such patent be issued to him on behalf of the United States. If, within such time, the Administrator files such a request with the Commissioner, the Commissioner shall transmit notice thereof to the applicant, and shall issue such patent to the Administrator unless the applicant within thirty days after receipt of such notice requests a hearing before a Board of Patent Interferences on the question whether the Administrator is entitled under this section to receive such patent. The Board may hear and determine, in accordance with rules and procedures established for interference cases, the queston so presented, and its determination shall be subject to appeal by the applicant or by the Administrator to the Court of Customs and Patent Appeals in accordance with procedures governing appeals from decisions of the Board of Patent Interferences in other proceedings.

(e) Whenever any patent has been issued to any applicant in conformity with subsection (d), and the Administrator thereafter has reason to believe that the statement filed by the applicant in connection therewith contained any false representation of any material fact, the Administrator within five years after the date of issuance of such patent may file with the Commissioner a request for the transfer to the Administrator of title to such patent on the records of the Commissioner. Notice of any such request shall be transmitted by the Commissioner to the owner of record of such patent, and title to such patent shall be so transferred to the Administrator unless within thirty days after receipt of such notice such owner of record requests a hearing before a Board of Patent Interferences on the question whether any such false representation was contained in such statement. Such question shall be heard and determined, and determination thereof shall be subject to review, in the manner prescribed by subsection (d) for questions arising thereunder. No request made by the Administrator under this subsection for the transfer of title to any patent, and no prosecution for the violation of any criminal statue, shall be barred by any failure of the Administrator to make a request under subsection (d) for the issuance of such patent to him, or by any notice previously given by the Administrator stating that he had no objection to the issuance of such patent to the applicant therefor.

(f) Under such regulations in conformity with this subsection as the Administrator shall prescribe, he may waive all or any part of the rights of the United States under this section with respect to any invention or class of inventions made or which may be made by any person or class of persons in the performance of any work required by any contract of the Administration if the Administrator determines that the interests of the United States will be served thereby. Any such waiver may be made upon such terms and under such conditions as the Administrator shall determine to be required for the protection of the interests of the United States. Each such waiver made with respect to any invention shall be subject to the reservation by the Administrator of an irrevocable, nonexclusive, nontransferable, royalty-free license for the practice of such invention throughout the world by or on behalf of the United States or any foreign government pursuant to any treaty or agreement with the United States. Each proposal for any waiver under this subsection shall be referred to an Inventions and Contributions Board which shall be established by the Administrator within the Administration. Such Board shall accord to each interested party an opportunity for hearing, and shall transmit to the Adminstrator its findings of fact with respect to such proposal and its recommendations for action to be taken with respect thereto.

(g) The Administrator shall determine, and promulgate regulations specifying the terms and conditions upon which licenses will be granted by the Administration for

the practice by any person (other than an agency of the United States) of any invention for which the Administrator holds a patent on behalf of the United States.

(h) The Administrator is authorized to take all suitable and necessary steps to protect any invention or discovery to which he has title, and to require that contractors or persons who retain title to inventions or discoveries under this section protect the inventions or discoveries to which the Administration has or may acquire a license of use.

(i) The Administration shall be considered a defense agency of the United States for the purpose of chapter 17 of title 35 of the United States Code.

(j) As used in this section—

(1) the term "person" means any individual, partnership, corporation, association, institution, or other entity.

(2) the term "contract" means any actual or proposed contract, agreement, understanding, or other arrangement, and includes any assignment, substitution of parties, or subcontract executed or entered into thereunder; and

(3) the term "made," when used in relation to any invention, means the conception or first actual reduction to practice of such invention.

2. The Declaration of Purpose and Policy in section 102 of the Space Act does not address the disposition of rights in inventions covered in section 305. 42 U.S.C. 2451.

3. See, for example, the testimony of John A. Johnson, General Counsel of NASA during *Hearings Before a Subcommittee of the Select Committee on Small Business of the United States Senate on The Effect of Federal Patent Policies on Competition, Monopoly, Economic Growth and Small Business,* 86th Cong., 1st. Sess., pages 255 and 267; and during *Hearings Before the Subcommittee on Patents, Trademarks, and Copyrights, of the Committee of the Judiciary,* pursuant to S. Res. 55 on S. 1089 and S. 1176, 87th Cong; 1st Sess., Part 1, page 161.

4. House Rept. No. 2166, 85th Cong., 2nd Sess. (July 15, 1958) at 22-24. an extension discussion of the events that led up to this conference report can be found in Appendix A of *An Evaluation of the Patent Policies of the National Aeronautics and Space Administration, Report of the Committee on Science and Astronautics, U.S. House of Representatives, 89th Cong., 2nd Sess.* Some key events discussed are:

(a) The introduction of the original House and Senate bills (H.R. 1181 and S. 3609, on April 14, 1958) containing no patent provisions.

(b) The subsequent hearings on S. 3609, during which the Deputy Secretary of Defense recommended that no special patent provisions be included in the legislation, based on the expectation that the policies and procedures of NACA (similar to those of DOD) would be applied by regulation.

(c) The reporting of H.R. 12575 (replacing H.R. 1181) out of House committee (May 24, 1958), with a section 407 entitled "Patent Rights," patterned after similar provisions of the Atomic Energy Act.

(d) The unanimous passing H.R. 12575 (June 2, 1958) with no debate or comment on section 407.

(e) The subsequent expressions of displeasure by industry and the private bar over section 407, primarily because of its similarity with what they considered the restrictive and arbitrary provisions of the Atomic Energy Act.

(f) The reporting out by the Senate Committee (June 11, 1958) of amended S. 3609 with a new Section 303, almost identical to section 407 of H.R. 12575.

(g) The successful floor amendment by Sen. Johnson during debate on amended S. 3609 to have section 303 deleted and the matter referred to conference.

(h) The subsequent appointment, by Rep. McCormack (Chairman of the Select Committee on Astronautics and Space Exploration) of a patent subcommittee (chaired by Rep. Natcher) to review the matter prior to any House-Senate conference. This subcommittee recommended an approach which provided, inter alia, that the Administrator would be entitled to ownership to inventions made under contract only when certain findings (based on the relationship of the invention to the duties of the employee of the contractor making the invention) were made; and as a separate matter would be authorized to waive ownership of inventions to which the Administration was entitled in the national interest. Thus the report of the Natcher subcommittee indicated an intent not to automatically vest ownership in the Administration under all contractual situations (no matter how broadly defined), as under the Atomic Energy Act. This report, unpublished, is entitled *"Report of The Patent Subcommittee, House Committee on Astronautics and Space Exploration re Section 407, H.R. 12575.*

(i) The adoption of the final version of section 305, coupled with favorable floor comment. While worded and structured differently than section 407 appearing in the report of the Natcher subcommittee, it contained many of the salient features

recommended in the report. Thus, when the conference report refers to the adoption of "entirely new patent provisions," it is in reference to the earlier draft of section 407 in H.R. 12575, and not in the rewrite of section 407 by the Natcher subcommittee. This is emphasized by the floor statements of Rep. Keating, which follow the report of the Natcher subcommittee rather closely in explaining the basis for new section 305.

5. 104 Congressional Record 13978 (1958)

6. House Rept. No. 2166, at 22.

7. On this point the report of the Natcher subcommittee (see note 4(h) above) states, by way of explanation of its redraft of section 407(a): "The new version is not designed to be applicable to inventors or others directly employed by the Agency as Government employees. The rights of Government employees in such matters are already set forth by Executive Order (E.O. 10096, Jan. 23, 1950)."

The report then continues with an explanation of subsection 407(b) by stating "This spells out two conditions under which the Administrator is entitled to claim ownership in invention." The two conditions described are essentially the same as subparagraphs (1) and (2) of subsection 305(a), and are analogous to the basic policy set forth in paragraph 1. of E.O. 10096. Thus, there appears to be an intent to establish a relationship whereby, for the Administrator to be entitled to claim ownership to invention rights, the contractor employee is to be required to perform work for the Administration, indirectly through contract, in a manner analogous to the direct requirement for employees of the agency to perform such work.

8. 104 Congressional Record 13978 (1958) at 13986-13987. The provision dropped by floor amendment was section 303 (similar to section 407 in H.R. 12575) which was critized as being too much like the restrictive and arbitrary provisions of the Atomic Energy Act. Also, the statement that "—the stringent requirements in the Atomic Energy Act—are not fully applicable to the space field—" is one of the principal conclusions of the report of the Natcher subcommittee.

9. Supra, note 8, at 13987-13988. Rep. Keating's statements, like those of Rep. McCormack, are markedly consistent with, and supportive of, the conclusions and recommendations of the report of the Natcher subcommittee.

10. The Natcher subcommittee, for example, noted in its report (see note 4(h)) that the original section 407, as it stood, tended to be "arbitrary and restrictive" and might "stifle interest and private endeavors in the space research and development field."

11. Testimony of John A. Johnson, General Counsel of NASA, during *Hearing Before the Special Subcommittee on Patents and Scientific Inventions of the Committee on Science and Aeronautuics, U.S. House of Representatives,* on H.R. 1934 and H.R. 6030, 87th Cong; 1st Sess., at page 17.

12. There is no question as to the binding effect of a statutory definition of a term. However, as observed by authorities on statutory construction, such as the treatise of *Sutherland Statutory Construction,* Sec. 4707 [Sands, 4th ed 1973] [hereinafter Southerland]:

"Definitions are themselves * * * written in words whose meaning, whether viewed separately or in conjunction with the terms being defined and other language comprising their context, may be determinable only through further practice of the methods of interpretation."

" * * * words of an act may be restricted by its subject in order to avoid repugnance with other parts of the act (cite omitted) * * * [and] [t]he application of the words of a single provision may be * * * restricted to bring the meaning of the clause in question into conformity with the intention of the legislature * * *."

13. The official interpretation reflected in the regulations and long standing practices of an administrative agency charged with the duty of enforcing a statue has great weight in determining the operation of a statute. Although not binding on a court, it is unlikely that such interpretation would be overturned unless found to be clearly erroneous. *Southerland,* Sec. 4905 (and cases cited therein); C.D. Stands, 4th ed. 1973; also 82 C.J.S. Statutes, Secs. 358, 359 (and cases cited therein).

14. The courts are particularly reluctant to overule a long-standing administrative interpretation of a statute where to do so would unsettle titles, or prejudice persons who have acquired contract or property rights in reliance on such construction. 82 C.J.S. Statutes, Sec. 359 (and the cases cited therein). Needless to say, a literal construction of subsection 305(a) and 305(j)(2) at this time would have the effect of unsettling a myriad of rights in any inventions that may have been made in those instances where NASA has exercised reasonable judgment in making practical interpretations consistent with the legislative purpose (e.g., as has been done regarding the preparation of proposals, supply contracts, reimbursable launch service agreements, and numerous joint endeavors).

15. The Assistant General Counsel for Patents memorandum dated June 23, 1959 to the General Counsel on The Applicability of the "Property Rights in Inventions" Section of the National Aeronautics and Space Act of 1958 (Section 305) to inventions made in the performance of research and development work, the cost of which is not charged to NASA.

Two significant points made in the memorandum are:

(a) "It is inconceivable that the Congress would have intended that NASA could establish a relationship with a party whereby all the inventions made by that party or its employees under the circumstances defined in Provisions (1) and (2) of subsection 305(a) would become the exclusive property of the Government merely by NASA proposing to such party that it do work for the Administration"; and

(b) "In order not to work a completely incongrous result, it is recommended that NASA interpret the terms 'proposed contract,' as used in subsection 305(j)(2) in defining 'contracts,' as relating back to work done upon an understanding that a contract would be awarded."

16. That interpretation was made clear in the testimony of John A. Johnson, NASA General Counsel, during *Hearings Before The Subcommittee on Patents and Scientific Inventions of the Committee on Science and Astronautics of the U.S. House of Representatives,* on Public Law 85-568, 86th Cong. 1st Sess. In answer to a question by Rep. Fulton (pg 14) regarding the distinction between research and development contracts and supply contracts in the field of aeronautics and space, the General Counsel testified: "We did make that distinction. We have made it administratively—and we were without any published legislative history on this to help use—because we simply could not believe, in the context of this section, that every time we entered into a contract for the supply of some office supplies or something of that kind it was intended that this kind of patent clause should into it. We have confined our patent clause to—we have a rather elaborate formula in our regulations; but, to oversimplify it, it is basically a research and development type contract. We felt, after all, that this was the only reasonable intention we could read into this section of the law; but the language is so broad that some of the initial commentators on this section made it appear more horrible than it actually is in practice."

In his response to the General Counsel's answer Rep. Fulton made the point that the "law is too broad" and went on to—"compliment the NASA, the Administrator, and the people who have been advising him on making the distinction as to the type of contract that the patent provisions apply to."

17. The NASA Procurement Regulations (Chapter 18 of Title 41 of the Code of Federal Regulations) requires the use of a section 305 patent rights clause only in contracts which entail technical, scientific or engineering work of a kind performed in a contract having as one of its purposes (1) the conduct of basic or applied research, (2) the design or development, or manufacture for the first time, of any machine, article of manufacture, or composition of matter to satisfy NASA's specifications or special requirements, (3) any process or technique for attaining a NASA objective not readily attainable through the practice of a previously developed process or technique, or (4) the testing or practice of a previously developed process or technique to determine whether the same is suitable or could be made suitable for a NASA objective. This official interpretation was initially taken in 1959 (14 CFR 1201.101-2(a)), and is still followed (see NASA PR 9.107-4, revised Dec. 1976).

18. Statement of Mr. James B. Webb, Administrator, National Aeronautics and Space Administration, Before the Committee on Science and Astronautics, House of Representatives, August 10, 1961. (NASA News Release No. 61-173). This consideration is seen as reflected in the following language taken from Mr. Webb's statement: "The significance of the patent provisions agreed to by NASA and AT&T is that whatever form of organization may be determined to be in the public interest and approved by the Federal Communications Commission for providing communication to the public through satellite relays, that organization will be able to use inventions made by AT&T while in this cooperative relationship with NASA."

The patent provisions of the NASA/AT&T agreement were unique in many respects: (1) inventions "conceived or first actually reduced to practice in the performance of work under or in anticipation of the Agreement on or after May 18, 1961 were, by specific agreements of the parties, to "be regarded as being made in the performance of work under a contract * * * within the meaning of section 305" of the Space Act; (2) title to such inventions was waived in advance to AT&T but in addition to the usual rights under section 305, NASA also retained the right to sublicense United States business throughout the world in the field of communications satellites; and (3) with respect to inventions made by AT&T during the period of the contract but *unrelated* to the contract save for being contemporaneously

made and of similar use, the Government was to receive a broad royalty-free license together with the right to require sublicenses. For a thorough analysis of the AT&T arrangement, which has not been followed in any other instance, see Allnutt, Patent Policy for Communications Satellites: A Unique Variation, 46 Marquette L. Rev. 63 (1962).

19. Assistant General Counsel for Patent Matters memorandum of February 3, 1964 to the General Counsel on Recommended Patent Clause for the Cooperative Agreement Between NASA and the Communications Satellite Corporation.

The memorandum notes that the position recommended therein for the Comsat agreement is quite different from that previously taken in the AT&T agreement. It points out, however, that the rather marked departure (taken in the NASA/AT&T agreement) from standard NASA patent practices was essentially prompted by two reasons neither of which is "effective today."

As to the first reason, it was pointed out that the need to insure freedom of action in the communication satellite field pending a Congressional decision on a communications satellite system no longer existed in view of the establishment of the Communications Satellite Corporation under the Communication Satellite Act of 1962. 76 Stat. 421, 47 U.S.C. 721(b)(1062).

The second reason dealt with the practical difficulty of determining whether AT&T inventions relating to Telstar were made under the NASA-AT&T agreement or as a result of AT&T's independent research programs. To avoid this difficulty, the Government under the NASA/AT&T agreement acquired rights to all such inventions.

The memorandum took the position that NASA was not entitled to any rights to inventions made by Comsat or its contractors since "if Congress intended for NASA to attempt to acquire patent rights in inventions developed in the corporation funded research, either to insure royalty-free use of such inventions by the Government, or as a means of assuring effective competition among the corporation's suppliers, there is no doubt that such a prescription would have been included in the Act * * * The view that NASA is not entitled to demand such an interest in the cooperative agreement is reinforced by the fact that the FCC and not NASA is charged under the Act with the responsibility of insuring effective competition among the corporation's contractors."

20. Ibid.

21. Agreement Between the National Aeronautics and Space Administration and Communications Satellite Corporation For Satellite Launching and Associated Services to Be Furnished By NASA In Connection With The Launching of Intelsat II and Certain Intelsat I Satellites, dated July 22, 1966, Article X—Property Rights in Inventions.

22. As a further clarification of this interpretation of section 305, ART II—Par. 1.C. of the NASA/Comsat Agreement (note 21) contained the following language:

> "c. The Corporation represents that it proposes to do the following, which will not, however, constitute work performed under this Agreement.
>
> (1) Provide for the design, development, and testing of all spacecraft.
>
> (2) Perform all spacecraft pre-launch tests at ETR.
>
> (3) ——"

23. The most recent interpretation is found in paragraph 6(a) of NASA Management Instruction (NMI) 8610.8 of January 21, 1977 (14 CFR 1214.104(a)) entitled *Reimbursement for Shuttle Services Provided to Non-U.S. Government Users:*

> "6. PATENT AND DATA RIGHTS
>
> *a.* NASA will not acquire rights to inventions, patents or proprietary data privately funded by a user, or arising out of activities for which a user has reimbursed NASA under the policies set forth herein. However, in certain instances in which the NASA Administrator has determined that activities may have a significant impact on the public health, safety or welfare, NASA may obtain assurances from the user that the results will be made available to the public on terms and conditions reasonable under the circumstances."

24. Letter of April 6, 1959 from NASA General Counsel to Patent Counsel, General Electric Company, Cincinnati, Ohio.

25. Ibid.

26. This is not to say that NASA does not obtain rights to inventions which may result from joint activities under an endeavor. However, such rights are obtained by negotiation and agreement, and not by the imposition of subsection 305(a). Typically, when the resulting activities are of an inventive type, NASA acquires at least a royalty-free license to practice, for governmental purposes, any inventions arising from such results. On a case-by-case basis greater rights may be acquired to assure

that the results of a joint endeavor are made available to the public upon reasonable circumstances.

27. For example, NASA's policy for the use of its installation research facilities by individual researchers is set forth in the NASA Supplement for the Federal Personnel Manual, Chapter B11, issued September 29, 1977, which provides: "Rights to any inventions conceived or first reduced to practice during, and resulting from use of Government facilities should be stated in the agreement." Normally NASA should obtain a royalty free license for the U.S. Government to practice the invention for governmental purposes.

28. This policy is reflected, for example, in the Announcement of Opportunity for Materials Processing Investigations on Space Shuttle Missions (A.O. No. OA-77-3, Feb. 8, 1977) seeking investigations comprising applied and basic research projects in branches of materials science where the weightlessness and ultra high vacuum obtainable in orbital flight can be exploited to unique advantage. It is stated, in paragraph V.2.: "For a Cooperative Project, NASA will obtain a royalty free license to practice for U.S. governmental purposes any inventions and patents resulting from the experiment and the right to use and disclose the resulting data for U.S. governmental purposes."

29. Typical arrangements where a significant NASA contribution is its satellite data are:

(a) "Agreement Between National Aeronautics and Space Administration and the GEOSAT Committee, Inc." for the purpose of demonstrating improved remote sensing techniques for mineral and petroleum exploration;

(b) "Cooperative Agreement Between the California Department of Water Resources and the National Aeronautics and Space Administration for an Application Systems Verification and Transfer (ASVT) Project involving Irrigated Land Assessment For Water Management," to evaluate the utility of LANDSAT as a source of data for use as input to water management models and decisions;

(c) "Cooperative Agreement Between The Appalachian Regional Commission and The National Aeronautics and Space Administration For Appalachian Lineament Analysis" to conduct a joint project involving LANDSAT-derived information for certain land use purposes; and

(d) "Memorandum of Understanding Between NASA and the Agency [ESA] for LANDSAT ground stations" wherein NASA provided LANDSAT data and ESA established a system for the reception, pre-processing, archiving and dissemination of such data.

30. Thus for example, in a model "Cooperative Endeavor Agreement" under which NASA made certain of its scientific and technical data available under specified conditions and the recipient provided NASA with reports of the result of applying such data to commercial aircraft, the following patent provision was included:

> "5. PATENTS
>
> (a) NASA, acting on behalf of the U.S. Government, has filed application for Letters Patent in the United States and certain foreign countries on an invention made by Richard T. Whitcomb and entitled, Airfoil Shape for Flight at Subsonic Speeds. The supercritical aerodynamic technology furnished by NASA to Lear Avia under this Agreement is based, in large part, upon the novel concepts, theories, formulae, and technology encompassed by this invention. In recognition of these contributions offered by the Government, Lear Avia agrees that should its application of such technology to commercial aircraft, as contemplated under this Agreement, result in patentable modifications or improvements to the supercritical aerodynamic technology, Lear Avia will provide NASA with the disclosure of such inventions and grant to the U.S. Government a nonexclusive, irrevocable, royalty-free license to practice such inventions throughout the world for government purposes.

Such agreements have been entered into with Lear Avia, Cessna, Beech, and Gates Lear Jet.

31. Agreement of November 24, 1976, between McDonnell Douglas Corporation and NASA concerning the design, manufacture, test and delivery of a spin stabilized payload assist module for launching spacecraft.

32. Supra, note 31. Article IX—Termination for Default

33. Examples of arrangements of this type are:

(a) "Memorandum of Understanding Between The Federal Minister for Scientific Research of The Federal Republic of Germany and The United States National Aeronautics and Space Administration" for Project HELIOS, having the general objective to provide new understanding of fundamental solar processes and solar

terrestrial relationships by the study of phenomena such as solar wind, magnetic and electric fields, cosmic rays, and cosmic dust.

(b) "Memorandum of Understanding Between The United States National Aeronautics and Space Administration and The Netherlands Agency for Aerospace Programs" for the Infrared Astronomical Satellite to perform an all-sky survey of extraplanetary, galactic and extragalactic infrared sources.

(c) "Memorandum of Understanding Between The United States National Aeronautics and Space Administration and The European Space Agency for The International Solar Polar/Out-Of-Ecliptic Mission" to conduct coordinated observations of the interplanetary medium and the Sun simultaneously in the northern and southern hemispheres of the solar system.

(d) Letter agreement between NASA and The Centre National d'Etudes Spartrales, France, selecting a proposal entitled "Multipurpose French Cooperative Environment Tests to be Conducted on NASA LDEF," for participation in the NASA Long Duration Exposure Facility (LDEF) Mission. The proposal was submitted in response to the NASA Announcement of Opportunity AO-OAST-76-1, and has as a scientific objective the investigation of the effect of long term space exposure on thin metal film and evaporated cathodes, optical coatings, holographic gratings, thermal coatings, structural materials, and fiber optics.

(e) Letter agreement between NASA and the University of Sydney, Australia, selecting a proposal entitled "Aggregation of Human Red Blood Cells," in response to NASA Announcement of Opportunity AO-OA-77-3 (see note 28). The scientific objective of the proposed experiment is to observe the aggregation of human red blood cells under conditions approaching zero-gravity.

No patent provisions were included in examples (a)-(c), but examples (d) and (e) included the following: "It is further understood that should any inventions and patents result from this project, NASA is granted a royalty-free license to practice such inventions and patents for U.S. Government purposes."

34. Representative examples of joint endeavors involving contributions of major hardware are:

(a) "Memorandum of Understanding Between The National Aeronautics and Space Administration and The European Space Research Organization for a Cooperative Programme Concerning Development, Procurement and Use of a Space Laboratory In Conjunction With the Space Shuttle," wherein ESA and its members developed the Spacelab (some of the subcontract research and development work performed by US companies) to be utilized with the NASA developed orbiter;

(b) "Memorandum of Understanding Between The National Aeronautics and Space Administration and The National Research Council of Canada For a Cooperative Program Concerning the Development and Procurement of a Space Shuttle Attached Remote Manipulator System (RMS)," wherein Canada developed the RMS to be employed on the NASA developed orbiter;

(c) "Memorandum of Understanding Between The European Space Agency and The United States National Aeronautics and Space Administration," under which ESA is to develop major hardware to be incorporated into the NASA developed telescope; and

(d) "Memorandum of Understanding Between The Department of Communications of Canada and The Centre National D'Etudes Spartrales of France and The National Aeronuatics and Space Administration of The United States of America," wherein Canada is to develop significant hardware (some to be produced in the U.S. under subcontract) to be used in and with a U.S. developed satellite.

No patent provisions were included in examples (a)-(d), above.

35. Supra, note 23.

Senator SCHMITT. Am I correct in my understanding that if NASA is merely providing a transportation capability or a capability to work in space, that section 305 of the Space Act would not apply.

Mr. MOSSINGHOFF. That's right, as long as there is a clear delineation on either side of the line on what we will provide and what the contractor will provide. And if that cooperator or contractor funds its own research and development that goes into the effort, we have concluded that technically section 305 does not apply. So we have a little more flexibility in fashioning a patent clause under the agreement that gets done what we want to get done.

Senator SCHMITT. Mr. Denny, you are the chairman of the Federal Coordinating Council Subcommittee on Intellectual Property which has been discussing this issue in a broad way for a couple of years, and have been trying to reach a concensus among the interested agencies. Senator Stevenson and I would like to know if you have reached any agreement.

Mr. DENNY. The answer is either "No" or "Yes," several times. It is a difficult issue, and it is debated hotly and continuously.

Senator SCHMITT. Red Skelton would say, "a flock of them flew over that time."

Mr. DENNY. Right now it is my understanding that the committee representatives, the White House, and the agency are looking at that policy, and they hope to come up with an administration position in the near future, but they do not have one at this time.

Senator SCHMITT. Do you know if the administration, prior to announcing that policy, plans to consult with the Congress on such policy?

Mr. DENNY. No, sir, I do not.

Senator SCHMITT. What options do the major R. & D. agencies support?

Mr. DENNY. I don't know. I can tell you the Department of Energy's position, which is also variable. We think in large measure we have the best patent policy Congress has ever produced. It has more guidance and more specialized authority than has been enacted before.

We cherish it, unless something better comes along, and we look with interest on the attempts toward a more uniform—a less burdensome—particularly myself, a less burdensome type of patent policy, along the lines of S. 1215.

Senator SCHMITT. Has the Justice Department expressed a view that you can give this committee? Or should we ask them?

Mr. DENNY. I think you better ask them, sir.

Senator SCHMITT. Your executive branch committee is reporting specifically to whom at the next level up?

Mr. DENNY. I am chairman of the Subcommittee on Intellectual Property—that reports to the Committee on Intellectual Property and Information that is chaired by Dr. Jordan Baruch, the Assistant Secretary of Commerce for Science and Technology.

Senator SCHMITT. And eventually the options or the recommendations you develop will be transmitted to whom?

Mr. DENNY. From there, they will either go to the Federal Coordinating Council, or directly to the White House. I think to the President's Science Adviser, who chairs the Federal Coordinating Council, to that office, I believe.

Senator SCHMITT. When do you expect to have options or recommendations presented to the White House? Is there any schedule you are working toward?

Mr. DENNY. The only thing that I have been informed, Senator, is that the options are under consideration and there is hoped to be a solution later this year.

Senator SCHMITT. Is S. 1215 compatible with the options being discussed?

Mr. DENNY. Yes; certainly within the range.

Senator SCHMITT. Mr. Mossinghoff, NASA has participated in these subcommittee efforts, I believe. Does NASA have any specific option that they favor at this time? I am not necessarily looking for an endorsement of S. 1215.

Mr. MOSSINGHOFF. The most recent time NASA took a position on the efforts of the Committee on Intellectual Property and Information was our participation in the drafting of the bill which was published in the 1978 report of the Federal Coordinating Council on Science, Engineering, and Technology.

We would still support that approach as being consistent with the data that I have discussed in terms of getting inventions utilized. We recognize there are some strong views within the administration that also need to be accommodated and are certainly willing to work with any of those—with any of those counterproposals or alternative proposals.

I would characterize your bill, S. 1215, as being midway between the status quo for most agencies—which is the President's policy—and the bill that appears in the report of the Federal Coordinating Council for Science, Engineering, and Technology. But we have not taken a specific position on your bill, as Mr. Denny pointed out.

Senator SCHMITT. Mr. Denny, in the modern jargon of this issue, there is a so-called "ERDA/reverse ERDA/Bayh-Dole option." Can you describe, in 25,000 words or less, what is meant by "ERDA/reverse ERDA/Bayh-Dole option?"

Mr. DENNY. Yes.

Senator SCHMITT. Hopefully, less.

Mr. DENNY. It basically—the concept is to adopt ERDA patent policy where the results of the research program are intended to be used by the general public. That policy is a presumption in favor of the Government taking title with a waiver option. In any research program where the purpose is to develop research for use by the Government, as opposed to the public, it reverses that presumption. That is, the presumption is that the contractor will take title unless situations are found where they should not, very much as in S. 1215. Hence, a "reverse ERDA" policy.

The "Bayh-Dole" concept to the option is added by a presumption across the board in favor of title to small business and nonprofits—a waiver would be assumed in all situations whether the research was intended for use by the public or by the Government.

Senator SCHMITT. And the "Bayh-Dole" bill which relates to universities and small business, is consistent with that policy? Is that correct?

Mr. DENNY. Yes, sir. I think there is one exception, though. I think the "Bayh-Dole" approach in the "ERDA/reverse ERDA/Bayh-Dole" approach has a requirement for technology transfer programs to be approved, as it is I believe in your bill. And I do not think that is a limitation in the "Bayh-Dole" bill.

Senator SCHMITT. Mr. Denny, are you aware of any specific instances where a potential Government contractor has refused to contract with an agency because of its patent policy?

Mr. DENNY. Yes, sir, I am.

Senator SCHMITT. You mentioned that in your testimony.

Mr. DENNY. It is an extremely difficult thing to document, but from my own experience it has happened. It happens with compa-

nies. I have seen it happen with divisions of companies, and I have seen it happen with basically entire industries.

Senator SCHMITT. We have available a General Accounting Office report which I am sure you have seen prepared at the request of Senators Bayh and Dole, related to Department of Energy patent policies and procedures.

This report documents some of the delays that are brought on by the problems that you mentioned in your testimony. One of the more extreme cases was the Texas Instruments, Inc., invention of a material for solar absorption surface panels. It apparently took 41 months to get a waiver from the time it was requested. Do you think that the policy articulated in S. 1215 would improve this situation?

Mr. DENNY. Without question, Senator.

Senator SCHMITT. Would that affect participation in Government contract?

Mr. DENNY. You can't tell. There probably would be an effect in in those cases where the company is lukewarm for Government support in the first place.

You have to understand that DOE is—is dealing with private industry in fields, where they have been operating in many cases without Government support for years, and they have millions of dollars worth of investments. These companies may not deal with the Government under a title policy.

In other cases, the technology to be commercialized is going to take substantial sums, and in those situations I feel quite certain Government moneys are a desirable addition and a title policy may be acceptable. In other cases, they would rather not do business with us.

So I am sure—your question seems to address a gray area—that I mentioned there are cases where they say it is just not worth the trouble.

[The material referred to follows:]

COMPTROLLER GENERAL OF THE UNITED STATES,
Washington, D.C., July 17, 1979.

Hon. BIRCH BAYH,
U.S. Senate.

DEAR SENATOR BAYH: On September 15, 1978, you and Senator Dole wrote that you had introduced a bill to establish a uniform Federal patent procedure for small business and nonprofit organizations and intended to hold hearings in the 96th Congress. You asked that we provide testimony, including a discussion of the procedures of the Departments of Energy and Health, Education, and Welfare for determining the patent rights for inventions arising from Government supported research and development. The procedures of these departments were to be contrasted with those of other Federal agencies.

As a result of discussions with representatives of your office and Senator Dole's and your letter of January 8, 1979, we also obtained information on the patent policies and procedures of the Department of Defense and the National Aeronautics and Space Administration.

We gave testimony before the Senate Judiciary Committee on May 16. A background paper on Government patent policy and detailed comments on the bill were submitted for the record. Answers to your questions were furnished for the record on June 21.

A summary of the patent policies and practices of the four agencies are included as enclosures to this letter. We obtained this information by working with patent officals of the respective agencies, but we did not ask the agencies for formal review or comment. The material is also being furnished to Senator Dole. This completes

our work to safisfy your request. We are pleased to have been able to support your efforts toward a uniform Federal patent policy.

Sincerely yours,

ELMER B. STAATS.

Enclosures.

ENCLOSURE I.—DEPARTMENT OF ENERGY, PATENT POLICIES AND PROCEDURES

The Department of Energy's (DOE) patent policy is based on Section 152 of the Atomic Energy Act of 1954, as amended; Section 9 of the Federal Nonuclear Energy Research and Development Act of 1974; and, to the extent not inconsistent with these statutes, the Presidential Memorandum and Statement of Government Patent Policy as revised August 23, 1971. Title 41 of the Code of Federal Regulations, Part 9-9, implements these statutory and Presidential guidelines.

DOE patent polices require the Government to acquire title to subject inventions made under contracts, grants, and other arrangements for research, development, and demonstration, but also provide for waiver of certain rights. When the Government retains title, the contractor retains a nonexclusive, revocable, paid-up license in the invention and the right to file and retain title in any foreign country in which the Government does not elect to secure patent rights.

The Department's policies provide that the Secretary may waive the patent rights of the Government to any invention made or to be made under contract with DOE if he determines that the interest of the United States and the general public will best be served by such waiver. There are two types of waivers—advance and individual. An advance waiver is requested at the time of contracting. If granted, the waiver results in a contract provision in which DOE waives its patent rights to all inventions made or conceived under the contract. An individual waiver is requested when a particular invention is made or conceived under a contract.

DOE's legislation established four objectives in making waiver determinations:

Making the benefits of the energy research, development, and demonstration programs widely available to the public in the shortest practicable time;

Promoting the commercial utilization of such inventions;

Encouraging participation by private persons in DOE's energy programs; and,

Fostering competition and preventing undue market concentration or the creation or maintenance of other situations inconsistent with antitrust laws.

DOE's regulations implementing its legislation also provide 13 specific criteria for the Secretary's consideration in granting advance waivers and 12 specific criteria for individual waivers.

WAIVER OF RIGHTS TO UNIVERSITIES AND SMALL BUSINESSES

Specific criteria in DOE's legislation and implementing regulations (issued July 13, 1977) provide for preferential treatment for small businesses and nonprofit education institutions. Waivers are generally granted to small businesses if the contract involves their privately developed technology.

For advnace waivers, DOE considers approved technology programs the equivalent of manufacturing and marketing capabilities, thus providing universities an equal footing with industry in requesting advance waivers. However, an approved program is not sufficient in itself to justify an advance waiver. The waiver request must be considered in light of the four objectives and 13 criteria established by the regulations.

DOE does not usually grant individual waivers to contractors, including small businesses, for identified inventions if DOE continues to fund development. The only basis for considering an exception is the extent to which the contractor will cost share development. DOE places great weight on cost sharing in making its waiver decisions.

For nonprofit educational institutions with technology transfer programs and capabilities that have been approved by DOE, the Department also generally grants individual waivers when it does not continue funding development after an invention is identified.

DOE's decision on each waiver request is supported by a "Statement of Considerations" which spells out the reasons for either granting or denying the waiver. Each statement cites at least one objective and the specific criteria mandated by the legislation, and explains the basis for the recommended determination. All waiver determinations are coordinated with and concurred in by the appropriate program division.

INSTITUTIONAL PATENT AGREEMENTS

DOE interprets its legislation as prohibiting the use of institutional patent agreements for waiving title to universities having approved technology transfer capabilities. The rationale for the Department's interpretation is founded on its waiver policies which are derived from the legislation discussed above.

However, for universities having DOE approved technology transfer programs, the Department adopted an abbreviated waiver petition in April 1979. This petition was developed to limit the information universities would have to submit when petitioning DOE for waiver of domestic patent rights to an identified invention.

PROCESSING ADVANCE AND INDIVIDUAL WAIVERS

As of December 31, 1978, DOE had received 422 petitions for waivers from about 5,600 invention disclosures made on more than 6,000 contracts. The Department granted 216, or 51 percent; denied 46, or 11 percent; and closed or had withdrawn 48, or 11 percent. The remaining 112, or 27 percent, were in process. These consisted of 54 petitions for advanced waivers and 58 for individual waivers.

Three hundred of the 422 petitions received by DOE were for advance waivers and 122 for individual waivers. DOE gives processing priority to advance waiver petitions because they usually are made prior to contracting and, therefore, could affect contract negotiations. Thus, only 18 percent of the advance waiver petitions were in process on December 31, 1978, while 48 percent of the individual petitions were in process. With a caseload of 112 waiver petitions in process at the end of 1978, DOE was about one year behind in processing.

We analyzed processing time on 30 individual waivers which DOE identified as calendar year 1977 cases. The Department's processing time for closed cases ranged from three to twenty-five months, averaging about 13 months. Determinations on seven cases had not been rendered as of December 31, 1978. These petitions had been outstanding from 14 to 29 months, averaging 19 months from the date the petition was received by DOE.

Analysis of DOE's 1977 and 1978 determinations disclosed that 121 waivers were granted and 49, or 40 percent, were to small businesses and universities. During this same period DOE denied 17 requests, of which 5, or 29 percent, were petitions of universities. Two university petitions were denied without prejudice because the Department was continuing to fund the invention. No small business petitions were denied.

CASE STUDIES

We reviewed 13 cases where contractors or inventors petitioned DOE for waiver of rights to identified inventions. Two cases were reviewed at the request of the Senate Subcommittee on the Constitution. The other 11 cases were selected because they were the oldest cases open when our review commenced in October 1978. During our review, 10 of the 13 petitions were approved, one was denied without prejudice (the contractor can petition again after DOE ceases project funding) and one was closed because the inventor failed to submit the required information. The remaining case also was closed because the petitioner did not submit required information but was reopened upon request for reconsideration. The time required to make determinations on the cases ranged from 10 to 41 months, averaging about 22 months from the time DOE received a formal petition.

We found the reasons for the delays in making determinations varied from case to case. In three cases the delays were attributable to DOE.

One case involved a vortex gas liquid heat exchanger developed by an employee of Sandia Laboratories. The inventor filed a waiver petition in February 1976. In June 1976, the Division of Military Applications informed the General Counsel's office at headquarters that the invention was not a subject invention conceived with DOE funding and that neither the Department nor Sandia planned to further develop or commercialize it. DOE, however, did not notify the inventor until almost two years later, in February 1978, that it would assert no rights in the invention. DOE personnel attributed the delay to an administrative oversight caused by the press of other business. They also pointed out that the inventor did not pressure DOE to resolve the case.

In another case, Texas Instruments, Inc. invented a material for solar absorption surface panels and petitioned for a waiver in September 1975. In November 1976, the Department's Chicago patent office recommended to the General Counsel's office that a waiver be granted. The Chicago office believed that a waiver would make the invention available to the public in the shortest time and would also promote the commercial utilization of the invention. However, the waiver was not granted until February 1979, or 41 months after it had been requested. A significant

portion of the delay was attributed to obtaining the program office's assessment of DOE's plans for further funding and concurrence in the waiver.

In the third case (selected by the Subcommittee), Stanford University requested a waiver in November 1976 to a fast transient digitizer device developed by an employee at the Stanford Linear Accelerator Center. In its petition, Stanford claimed that the device was not a subject invention. The University, however, had not previously informed DOE of this in its invention disclosure report. In response to a Department inquiry, Stanford advised in April 1977 that it wanted full domestic and foreign rights to the invention but was not sure whether filing patent applications would be economically justified. During the same month, DOE's California patent office recommended to its General Counsel's office that the waiver be granted. The office noted that the invention was being fabricated and tested for potential use in the Department's weapons testing program under a contract with EG&G, Inc., at a DOE-owned, contractor operated facility. EG&G, however, was not developing the device to the point of commercial application and did not plan to commercially manufacture the device.

In August 1978, DOE informed Stanford that its refusal to file a patent application on the invention until after the waiver determination could be viewed as a lack of intent to commercialize. DOE subsequently denied the waiver without prejudice on January 3, 1979, on the basis that it was still funding the invention. Case records indicate that nothing occurred on this case for a ten month period (October 1977 through July 1978), and the invention was being developed by EG&G largely due to the inventor's efforts. Over 25 months elapsed between Stanford's request for waiver and DOE's denial.

The second case identified by the Subcommittee for our review involved Purdue University. Purdue requested a waiver on September 29, 1977, to an invention made under a DOE contract and a National Science Foundation (NSF) grant. The invention consisted of a selective solvent extraction process utilizing cellulosic materials.

In October 1977, Dow Chemical expressed commercial interest in the solvent involved in the process. In a letter to the inventor in January 1978, Dow reaffirmed its interest in the solvent technology, but stated that it would prefer to wait until it had a clearer definition of the patent situation from DOE and NSF before beginning work. Purdue did not inform DOE of Dow's interest in the solvent.

In January 1978, DOE's Chicago patent office, recommended to the General Counsel's office that the waiver be granted. However, in February 1978, the Division of Solar Technology objected because the Division had awarded Purdue a new $220,000 contract to further develop the invention.

NSF released its interests in the invention to DOE in April 1978. Congressman Fithian of Indiana informed DOE in April 1978 of the State of Indiana's interest in the invention and urged that the waiver be granted. Also, in April 1978, an Indiana based firm informed DOE that it had indicated to Purdue that it would commit $3.8 million to build a plant to prove the commercial feasibility of the invention. According to Congressman Fithian, this firm had also applied for a Federally guaranteed loan for this purpose.

In June 1978, Congressman Fithian informed DOE that the State of Indiana would make $750,000 available to Purdue on July 1, 1978, to pursue scaled-up research on the invention. On July 24, 1978, or 10 months after Purdue petitioned, DOE granted the waiver contingent upon the State of Indiana granting the $750,000. Purdue accepted the terms of the waiver on August 21, 1978. Dow Chemical had informed Purdue on August 11, 1978, that it was no longer interested in licensing the solvent technology.

Delays on the remaining 9 cases were attributed as follows:

For 5 cases, after requesting waivers, the petitioners submitted unsolicited proposals to DOE for funding to further develop the inventions.

In 2 cases the petitioners failed to provide the required information.

In 1 case there were problems in getting the Department of Defense to lift a secrecy order imposed by the Navy on the patent application.

In another case the inventor failed to obtain invention release from his employer, file a complete petition, and notify DOE of change of address.

LICENSING

DOE does not actively promote licensing of its 4,244 domestic patents and patent applications. As of March 31, 1979, 435, or about 11 percent of its inventions, had been licensed. The Department had issued 1,211 nonexclusive and 2 exclusive licenses. Because DOE does not follow-up with its licensees, the Department does not know how many of its inventions are being developed and marketed.

Foreign patent applications are filed by DOE on less than 20 percent of its domestic patents. The Department maintains approximately 2,000 foreign patents on about 500 of its inventions. In calendar year 1978 DOE's royalties from foreign licenses on eight inventions totaled about $174,500. Domestic patents are licensed royalty-free.

MARCH-IN RIGHTS

The Nonnuclear Energy R&D Act specifies the minimum rights DOE must acquire under each waiver. These include the following march-in rights:

The right to require the contractor to license others at reasonable royalties if the invention is required for use by Government regulation, or is necessary to fulfill health, safety, or energy needs;

The right to terminate the waiver in whole or in part if the contractor is not taking effective steps necessary to commercialize the invention, or will not take such steps within a reasonable time; and

The right to require licensing at reasonable royalties, or to terminate the waiver in whole or in part if it is shown at a public hearing held 4 years after the grant of a waiver that the waiver had tended to violate the antitrust laws, or the contractor has not taken, and is not expected to take, effective steps to commercialize the invention.

DOE's nuclear activities are also covered because similar provisions are a basic part of the Presidential Memorandum and Statement of Government Patent Policy and the Federal Procurement Regulations.

DOE's regulations stipulate that the normal exercising of its march-in rights requires the licensing of others rather than terminating the waiver. Contractors have maintained that the possibility of DOE terminating the waiver serves as a deterrent for investing risk capital in commercialization. DOE believes, however, that if the contractor is investing money in the development of the invention, it should feel assured that the waiver cannot be terminated unless there is a violation of the antitrust laws. DOE said that, overall, its contractors have not found march-in rights retained by the Government particularly objectionable and declared that these provisions are not a serious impediment to the Department's contracting function.

DOE said that march-in rights to protect the public's interest were developed to take care of and address the patent policy issues of contractor windfall profits, suppression of technology, and the detrimental effects to competition from granting contractors rights to inventions. The Department believes that march-in rights, although available to the Government for more than 10 years, have not been utilized because such problems are illusionary and not actual. If and when negative effects result from allowing a contractor to retain title to an invention of commercial importance, march-in rights are there to address them. Otherwise, DOE believes they will never be used.

ENCLOSURE II.—DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PATENT POLICIES AND PROCEDURES

On April 11, 1953, the Federal Security Agency and other related agencies were consolidated into the Department of Health, Education, and Welfare (HEW). The patent regulations of the Federal Security Agency served as the model for the Department's existing regulations (45 C.F.R. Parts 6–8). Although the Department's regulations have been revised to incorporate the objectives of the Presidential Memorandum and Statement of Government Patent Policy and other special provisions affecting HEW, the regulations have not changed philosophically from their early years.

In general, HEW's regulations provide discretion to the Assistant Secretary for Health to

(1) Permit an organization (whether or not for profit) to retain rights to inventions identified during the performance of either HEW grants or contracts.

(2) Enter into an Institutional Patent Agreement (IPA) with a nonprofit organization whose patent policies are consistent with HEW's aims and the public's interest. An IPA provides the organization first option to future inventions made under HEW grants.

In 1958 the Department's regulations were amended to permit commercial concerns to retain the first option to future inventions when conducting cancer chemotherapy drug research under HEW contracts. This step was needed to help ensure the participation of the best qualified pharmaceutical firms, following indications that the industry would not participate without such an amendment. This exception, however, has been denied to newer drug development programs in the Nation-

al Institute of Drug Abuse and the National Institute of Child Health and Human Development. According to HEW, industry participation has been difficult to obtain because of the Institutes' inability to guarantee rights to future inventions.

The Department's regulations also parallel and incorporate by reference Executive Order 10096, which governs allocation of Government employee inventions. Disposition of substantially all HEW employee inventions results in Government ownership. These inventions comprise a major portion of the Department's patent portfolio and are available for licensing.

GAO REPORT ON HEW PATENT PRACTICES

A long period of HEW uncertainty over the discretionary allocation to the innovating organization of inventions resulting from Department funded grants and contracts was brought to a close by GAO's report to the Congress, "Problem Areas Affecting Usefulness of Results of Government Sponsored Research in Medicinal Chemistry", August 14, 1968.

GAO reported that HEW's practice of retaining title-in-the-Government for inventions resulting from research in medicinal chemistry was blocking development of these inventions and cooperative efforts between the university and commercial sectors. GAO found that hundreds of new compounds developed at university laboratories had not been tested and screened by the pharmaceutical industry because these manufacturers were unwilling to undertake the expense without some possibility of obtaining on a timely basis exclusive rights to further development. GAO criticized HEW for its failure to use the discretion permitted by its regulations in either entering into IPAs or making timely determinations on requests for greater rights after identification of inventions.

In response, the Department reinstated its IPA program, revising and standardizing its agreement to ensure uniform treatment of institutions. In September 1975 the Federal Council for Science and Technology endorsed a modified HEW IPA program for discretionary use by all Executive Branch R&D agencies and a July 1978 Federal Procurement Regulation provided guidance on IPA use. As of December 1978 the Department had implemented IPAs with 75 institutions.

In 1974 HEW surveyed individual petitioning institutions and institutions with IPAs which had obtained greater rights to inventions in the performance of HEW-funded research since the GAO report. The institutions reported that 78 exclusive and 44 nonexclusive licenses had been negotiated under patents and applications filed on 329 inventions. HEW estimated that the licensees committed approximately $75 million of private risk capital to develop these inventions. By the end of fiscal year 1976 the number of HEW-funded inventions held by institutions had increased to 517.

The institutions also reported, however, that the rights to over 60 percent of the inventions they retained had not been licensed and may never be licensed. Thus, the retention of rights by institutions does not guarantee that the inventions will be developed and marketed.

Following the GAO report, the Department's regulations were amended to provide for exclusive licensing. As of December 1978, 19 exclusive and 90 nonexclusive licenses had been granted. HEW's Patent Branch said that, although it has done its best to license the Department's patent portfolio, it has not been able to duplicate the technology transfer accomplished by the universities. Successful technology transfer, the Branch said, requires the presence and cooperation of the inventor and/or inventing organization as an advocate of its invention or the possibility of licensing is severely decreased.

CASE STUDIES

We reviewed five cases at the request of the Senate Subcommittee on the Constitution. One involved HEW's licensing of a small business firm. The other four cases concerned individual waivers to nonprofit institutions.

Licensing case

American Science and Engineering (AS&E), a small business firm, petitioned HEW in September 1976 for an exclusive license to its circle array tomography (CAT) scanner system and associated cable handling mechanism. In November 1976 the National Cancer Institute (NCI), which had funded the project, favored issuance of a nonexclusive license to AS&E. In December NCI requested that an exclusive license be granted. This request followed a meeting between the HEW Patent Branch, NCI, and AS&E officials where the company contended that their new type CAT scanner could not be easily and cheaply adapted by other manufacturers. Also

in December, AS&E petitioned HEW for foreign patent rights, which the Assistant Secretary for Health granted in January 1977.

In an internal memorandum dated February 1977, the National Institute of Neurological and Communicative Disorders and Stroke questioned the proposed issuance of an exclusive license to AS&E because another company had developed a similar system. The Office of the Assistant Secretary for Health, however, following the recommendation of the National Institutes of Health Inventions and Patents Board, advertised in the Federal Register on April 7, 1977, that it intended to grant AS&E an exclusive license unless, before June 6, 1977, the Department received either statements as to why the license would not be in the best interests of the United States or applications for nonexclusive licenses.

Although statements and/or license applications and notices of interest in filing applications were received from seven firms (none of which were small businesses), the National Institutes of Health Inventions and Patents Board recommended at a meeting on June 10, 1977, that a 3-year limited exclusive license be granted to AS&E. After granting the license on June 17, 1977, the Assistant Secretary for Health cancelled both the license and AS&E's foreign rights on July 21, 1977.

Regarding cancellation of the license, the Assistant Secretary wrote: "I am compelled to take this action because the limited exclusive license was granted in violation of the applicable policies and regulations. Under the Presidential Statement on Government Patent Policy (36 F.R. 16887, August 26, 1971) and the Federal Procurement Regulations (41 CFR 1-9.107-3 (a)) which implement that Policy Statement, the Department did not have authority to grant AS&E a limited exclusive license to practice the inventions developed under its contract with the National Cancer Institute unless that license was a necessary incentive to bring the inventions to the point of practical application or unless the Government's contribution to the inventions was small compared to that of AS&E. The responses to the notice of intent to grant an exclusive license to AS&E, which appeared in the Federal Register (42 F.R. 18151, April 7, 1977), established that an exclusive license was not a necessary incentive to bring the inventions to the point of practical application. The contract under which the inventions were made was fully funded by the National Cancer Institute and thus the Government's contribution to the inventions was not small compared to that of AS&E. The exclusive license to AS&E was therefore granted without authority and in violation of the Presidential Statement on Government Patent Policy and the Federal Procurement Regulations."

The General Accounting Office believes the AS&E case demonstrates that an agency operating under the Presidential policy can move in almost any direction when determining rights to inventions.

Waiver cases

One case involved two inventions by University of Texas scientists relating to the hormone thymosin used for treatment of malfunctioning immune systems which can make people susceptible to arthritis and several kinds of cancer. These inventions were made with National Institutes of Health (NIH) funding and reported to HEW in September 1977, when the University also petitioned for rights. This was over four months after the University obtained a patent on one invention and over 10 months after it filed a patent application on the second invention.

HEW's Patent Branch received NIH comments in October and November 1977 and sent a determination to the Assistant General Counsel for review in December. This determination granting rights to the University was not acted on by the Assistant General Counsel until August 30, 1978, when it was sent to the Assistant Secretary for Health, who signed it in September.

It appears that development of the inventions was not impaired because the Assistant General Counsel delayed granting rights to the University. In July 1977 the inventor reported that a drug firm's studies of the invention showed that the compounds are not toxic.

In another case a Columbia University scientist with an NIH grant invented a solution for treatment of persons with severe burns. Although the University filed a patent application in December 1974 and the invention was published in International Surgery's June–July 1975 issue, the invention was not reported to HEW until March 1976.

Research Corporation, an invention management firm, together with Columbia petitioned HEW for rights in October 1976. Research Corporation estimated that it would take from 5 to 8 years and an investment of about $850,000 to market the invention. Therefore, a time limited exclusive license would have to be offered before a commercial firm would make such an investment.

NIH informed HEW's Patent Branch in December 1976 that it did not object to Columbia and Research Corporation retaining title, but the Patent Branch did not

send such a determination to the Assistant General Counsel until October 1977. Patent Branch officials could not explain why this delay occurred.

The Assistant General Counsel then delayed the determination another 11 months until September 1978 when it was sent to and signed by the Assistant Secretary for Health.

A third case involved an invention entitled, "Undecapeptide and Tumor Assay." This invention, discovered by the Weizmann Institute of Science under an NIH contract, could be useful in a follow-up for post-operative diagnosis and prognosis on cancer patients. The Institute first reported the invention to HEW in 1974, when the Department decided that patent protection was not warranted. Subsequently, in June 1976, the full results of the research were published in scientific journals.

The following October a drug firm approached the Weizmann Institute indicating it would be willing to prepare, file, and prosecute a U.S. patent application as consideration for an option to an exclusive license for some limited period. The Institute requested HEW's permission to file a U.S. application in November 1976. The Department granted permission on December 1, 1976, and the application was filed later that month. Through Yeda Research and Development Company Ltd., its patent agent, the Institute petitioned HEW for rights in February 1977. In the petition, Yeda stated its intention to grant the drug firm exclusivity as an incentive to market the invention.

In response to a HEW Patent Branch request for additional information, Yeda informed the Department in August 1977 that from two to three years and from one to five million dollars would be required to develop the invention to the point of submission to the Food and Drug Administration. NIH, in its comments to the Patent Branch in September 1977, stated that it was virtually impossible to predict the usefullness of the invention and its role in diagnostic testing. NIH said that it had no objection to permitting Yeda to retain title and that it was unlikely that the invention would be developed without an exclusive license to a potential manufacturer. On November 4, 1977, the Patent Branch sent a determination granting rights to Yeda to the Assistant General Counsel for review.

However, on September 8, 1978, the Assistant General Counsel sent a determination retaining title for the Government to the Assistant Secretary for Health. The Assistant General Counsel found no legal justification for the waiver, noting that Yeda had not promoted the invention and would not supply any of the risk capital needed to develop it. The drug firm had assisted Yeda with the patent application and waiver petition and would develop the invention. The Assistant General Counsel further found that exclusive licensing appeared necessary and recommended retaining title for the Government. On January 24, 1979, the Assistant Secretary denied Yeda's petition.

In the remaining case two University of Arizona scientists invented a potential method for testing the effectiveness of drugs in individual cancer cases without administering the drugs to the patient. The University reported the invention to HEW's Patent Branch and requested a waiver in July 1977. The invention was also published in the July 1977 issue of Science.

NIH in September 1977 informed the Patent Branch that it did not object to the University retaining title to the invention, but added that it had contracts with other institutions for realted research and that commercial interest would be high enough that an exclusive license would not be needed to stimulate development of a marketable product. In reply to a Patent Branch request, the University in October 1977 provided additional information for NIH evaluation, estimating that development would take from 3 to 5 years and would cost a licensee from $2,250,000 to $5,000,000. In November NIH informed the Patent Branch that the University's petition should be granted even though many questions regarding the invention's clinical utility were still unanswered. The Patent Branch on December 29, 1977, sent a determination granting title to the University to the Assistant General Counsel for review.

The Assistant General Counsel's office advised the Patent Branch in April 1978 that the petition would not be favorably considered in the near future and in September 1978 returned the determination to the Patent Branch for further evaluation. Meanwhile, in July 1978 the Patent Branch had learned of a potential licensee's interest in funding development of the invention in return for an exclusive license. The Patent Branch returned the determination to the Assistant General Counsel in November 1978. This determination, granting title to the University, was approved by the Assistant Secretary for Health on March 23, 1979.

ENCLOSURE III.—DEPARTMENT OF DEFENSE PATENT POLICIES AND PROCEDURES

The policies and regulations of the Department of Defense (DOD) are based on the Presidential Memorandum and Statement of Government Patent Policy. Most DOD contracts allow contractors with an established commercial position to retain title to their inventions in accordance with Section 1(b) of the Presidential Policy.

Because nonprofit institutions lacked an established commercial position, DOD interpreted the Presidential Policy as requiring the use of a deferred determination clause—where rights are determined after an invention has been identified. However, for many years the Department got around this by using the "special situations" provision of Section 1(c) of the Policy to put a title-in-the-contractor type of clause (license clause) in contracts with universities on a DOD list of nonprofit organizations with "approved" patent policies.

On August 29, 1975, DOD, with no advance notification, issued Defense Procurement Circular (DPC) 75-3, revising its Armed Services Procurement Regulation (ASPR). This circular terminated the Department's use of its list, and thereby did away with the approved patent policy concept as a special situation under Section 1(c). In lieu thereof, the circular provided that any prospective contractor having an effective program for the transfer of technology, as demonstrated by its licensing of inventions, would be entitled to a license clause in a contract where a deferred patent rights clause would otherwise be appropriate.

Educational and nonprofit institutions were required to demonstrably have such programs in order to be entitled to the license clause, whether or not their patent policies had previously been approved. Additionally, the revision required that the work to be performed under the contract must be in a field of technology directly related to an area of technology in which the university had an effective licensing program.

The Senate Subcommittee on the Constitution asked GAO to examine DOD's decision to discontinue its special situations treatment of nonprofit institutions. We found that the DOD revision was intended to implement the revised Presidential Memorandum and Statement of Government Patent Policy and was the subject of an ASPR case established in March 1975.

At an ASPR Committee meeting in May 1975, the Patents Subcommittee Chairman briefed committee members on the proposed revisions. The case record shows: "The OASD (I&L) Staff Representative present indicated that he no longer objected to the publication of the revised ASPR provision and recommended that the normal requirement for Industry comments be waived. The Subcommittee Chairman then briefly described the differences between the proposed ASPR coverage and the recently published FPR coverage. As a result of the discussion at this meeting, the Committee agreed that the finally approved coverage should be published in the next DPC; that a letter should be prepared by the Subcommittee Chairman to the Industry Associations normally solicited for comment, informing them that their comments were not requested prior to publication because the ASPR coverage parallels the FPR and Industry was provided two opportunities to comment on that coverage. Moreover, DOD representatives were part of the group that developed the FPR coverage and therefore were able to review the Industry comments on that coverage."

On July 9, 1975, the Committee approved the ASPR revision, and reviewed and approved the letter to industry. This letter, subsequently dated August 29, 1975, was sent to educational and nonprofit institutions on DOD's list of universities with approved patent policies. The letter, which was signed by the Department's representative serving on the Committee on Government Patent Policy, did not explain DOD's rationale for not obtaining comments prior to publication of DPC 75-3.

In September 1975 the Committee on Government Patent Policy adopted the recommendations of its University Patent Policy Ad Hoc Subcommittee. That report basically recommended that all agencies of the Executive Branch provide universities and nonprofit organizations a first option of title retention to substantially all inventions generated by them with Federal support if they are found to have an established technology transfer capability.

In November 1975 the California Institute of Technology replied to DOD's letter: "* * * the University community is confused and surprised by the fact the DPC 75-3 appears to move in substantially the opposite direction to the philosophies of and proposals made in the July 1975 report of the University Patent Policy Ad Hoc Subcommittee * * *. It is our understanding that DOD has strong representation on said Ad Hoc Committee."

The Institute also commented on DOD's implementation of the revised ASPR: "We have already had several instances of attempting to qualify for a 'license' clause in connection with individual contracts and grants. Apart from the fact that

these procedures will materially increase the work load of contracting personnel on both sides, it would appear that the criteria being utilized in this area is counterproductive. Specifically, we are being required to indicate successful past licensing in the specific field of technology of each proposal. The net result, particularly in universities engaged in basic research and continually moving into new fields, will be to slowly diminish the areas in which a university contractor might qualify for advance waiver. It should be recognized that a successful licensing activity at a university provides a capability in all fields and that industrial representatives seeking new technology at universities are interested in all fields of technology in which the university may be involved. It is strongly urged that the Department of Defense reconsider the narrow interpretation placed upon the expression 'directly related to the field of technology' as currently applied by Contracting Officers and DOD Patent Counsel, and accept the much more practical proposition that a well-organized and proven patent licensing program at a university can be effective in all fields of technology."

Because of the additional administrative burden, many research institutions subsequently elected not to submit the information DOD required for the title retention clause. As a result, statistics published in the Federal Council for Science and Technology's Report on Government Patent Policy showed that there was an 80 percent increase in the use of deferred determination clauses by DOD during fiscal year 1976. Our review of cases processed during that year showed that, although contractors' requests for greater rights in identified inventions were approved in all cases, the Department took from 1 to more than 7 months to make those determinations.

The University Patent Policy Ad Hoc Subcommittee of the Committee on Government Patent Policy reported that it appeared that a deferred determination often acts against the expeditious development and utilization of inventions by delaying a decision that could have been made at the time of funding. Administrative costs of both the Government and universities are unnecessarily increased by the need to prepare, review, and respond to requests for rights on a case-by-case basis.

The Navy noted in February 1976 that not only had an additional administrative burden been placed on universities, but that the time necessary for contracting and patent officers to make a determination on the appropriate patent clause had increased drastically. In 1977 the Air Force, after conducting a thorough review of the revised policy, determined that the practice of qualifying institutions for each contract was moving in a direction counter productive to a cost effective, reasonable acceptable policy.

Despite its representation on the Ad Hoc Subcommittee which endorsed them, DOD has not implemented the use of Institutional Patent Agreements.

Enclosure UV.—National Aeronautics and Space Administration, Patent Policies and Procedures

NASA patent policies and practices are based on Section 305 of the National Aeronautics and Space Act of 1958, the 1971 Presidential Memorandum and Statement of Government Patent Policy, and Executive Order 10096. Section 305 provides that any invention conceived or first reduced to practice in the performance of work under a NASA contract becomes the exclusive property of the Government, unless the NASA Administrator determines that the interests of the United States will be served by waiving all or part of the Government's rights. Rights to inventions made in-house by NASA employees are determined by the agency pursuant to provisions of Executive Order 10096, dated January 23, 1950.

REPORTING AND EVALUATION INVENTIONS

Section 305 of the Space Act provides that NASA contracts contain provisions requiring reporting of inventions, discoveries, improvements, and innovations. NASA evaluates those for which it has or may acquire the rights to file for a patent. This evaluation is basically a two step process and applies to both contractor inventions and inventions of its own employees.

The first step, basically a technological evaluation, is to determine the technical significance of the invention, its potential use by or for the Government, and its commercial potential. If further interest is justified, it is then evaluated for patentable novelty. This is basically a legal evaluation to determine whether a patent can be obtained, and if so, its scope. The determination to file for a patent is based on a composite of these two evaluations and is made by the NASA Patent Counsel. Once a domestic patent application is filed there is a review to determine whether foreign patent protection should be sought, and if so, in what countries.

As an incentive for the reporting of inventions, NASA makes a monetary award for each invention on which a patent application is filed. The amount of the award is based on consideration of such factors as the technological significance of the invention, its value to NASA in carrying out its programs, and the commercial use or potential of the invention.

For calendar years 1959 through 1978, 37,474 invention disclosures were reported to NASA and 3,302 patents were issued. Excluding the 1,043 invention disclosures still being processed at December 31, 1978, NASA had obtained one patent for about each eleven inventions reported by its employees and contractors.

Section 305 also establishes a procedure for NASA to review all patent applications pending in the U.S. Patent and Trademark Office on inventions which appear to the Commissioner of Patents and Trademarks "to have significant utility in the conduct of aeronautical and space activities." Additionally, Section 305 provides procedures for a Board of Patent Interferences hearing to establish title whenever the NASA Administrator believes that an invention not reported to NASA was made under a NASA contract. From January 1959 through July 1977, NASA reviewed 9,990 applications and contested 174 of them. NASA succeeded in obtaining patent rights in 114 of these cases.

OWNERSHIP RIGHTS

NASA obtains rights to inventions reported by its contractors unless its Administrator waives these rights. The agency's waiver policy, established by Section 305 of the Space Act, is implemented by the NASA Patent Waiver Regulations (14 C.F.R. 1245.1). These regulations also incorporate the objectives and criteria set forth in the Presidential Memorandum and Statement of Government Patent Policy.

Rights to inventions made in-house by agency employees are determined by NASA based on provisions of Executive Order 10096, i.e. in the same manner as other agencies covered by this Order.

Inventions and contributions board

The NASA Administrator's waiver of rights may be to an individual invention or to a class of inventions, and is granted upon the recommendations of an Inventions and Contributions Board (ICB). The ICB is appointed by the Administrator and consists of a chairman and no less than six members who are senior NASA program officials. The ICB meets at least monthly and provides recommendations on waiver requests, licensing of inventions, and monetary awards.

NASA waiver policy

NASA's Administrator is empowered to grant two types of domestic waivers. Advance waivers are those granted for any invention which may be made under a given contract. Individual waivers are those granted for inventions identified and reported subsequent to the start of a contract. The Administrator can also grant foreign waivers.

Advance waivers

NASA's ICB will recommend grant of an advance waiver unless:

(1) a principal purpose of the contract is to create, develop or improve products, processes, or methods which are intended for commercial use by the general public at home or abroad, or which will be required for such use by governmental regulations; or

(2) a principal purpose of the contract is for exploration into fields which directly concern the public health, public safety, or public welfare; or

(3) the contract is in a field of science or technology in which there has been little significant experience outside of work funded by the Government, or where the Government has been the principal developer of the field and the acquisition of exclusive rights at the time of contracting might confer on the contractor a preferred or dominant position; or

(4) the services of the contractor are for the operation of a Government-owned research or production facility or for coordinating and directing the work of others.

To recommend an advance waiver, the ICB must also find that the work called for under the contract is to build upon existing knowledge or technology; is to develop information, products, processes, or methods for use by the Government; and is in a field of technology in which the contractor has acquired technical competence directly related to an area in which the contractor has an established nongovernmental commercial position. These criteria are prescribed by the Presidential Memorandum and Statement.

NASA's Patent Waiver Regulations also take into account the "exceptional circumstances" and "special situations" provisions of the Presidential Memorandum and Statement.

Examples of exceptional circumstances recognized by NASA include: a contract where participation of the contractor may only be secured through the grant of waiver and the contractor is deemed essential to a NASA program; a contract having as a principal objective the application of aerospace-related technology to other uses in accordance with an established NASA technology application program and where the grant of the waiver would materially advance this objective; or, a cooperative endeavor where the contract calls for a significant contribution of funds by the contractor to the work to be performed.

Also, in the case of an individual invention identified prior to contract execution, exceptional circumstances may be found (1) where waiver is a necessary incentive to call forth risk capital and expenditures to bring the invention to the point of practical or commercial application and (2) where either the contractor has established substantial equities at his own expense in the development of the invention or, the grant of an advance waiver will significantly advance availability of the invention to the general public.

Examples of special situations include: a newly formed company having a definite program for establishing a nongovernmental commercial position in the field of the contract or a directly related area; an established company lacking an established nongovernmental commercial position in the field of the contract or a directly related field, but having established plans and programs for achieving such a position; and an educational or nonprofit institution having an established patent policy and an effective program for acquiring rights to inventions and bringing the results of such inventions to commercial application by itself or through others.

For calendar years 1959 through 1978, NASA received 906 petitions for advance waivers. The Administrator granted 463. Contractors reported 216 inventions or classes of inventions (on which they intended to file patent applications) under these contracts.

Individual waivers

NASA's ICB will recommend grant of a waiver after identification and reporting where the Board makes the following findings:

(1) The invention is not directly related to a governmental program for creating, developing, or improving products, processes, or methods for use by the general public at home or abroad.

(2) The invention is not likely to be required by governmental regulations for use by the general public at home or abroad.

(3) The invention does not directly concern the public welfare.

(4) The invention is not in a field of science or technology in which there has been little significant experience outside of work funded by the Government, or where the Government has been the principal developer of the field and the acquisition of exclusive rights in the invention would not likely confer on the petitioner a preferred or dominant position.

The Board must also find that, in view of the petitioner's plans to bring the invention to the point of practical application, the incentives provided by waiver will increase the likelihood that the benefits of the invention would be readily available to the public at an early date.

If the Board is unable to make one of the four findings to support a waiver, the Board may still recommend that waiver of rights be granted by the Administrator if it finds that such waiver is a necessary incentive to call forth risk capital and expenditures to bring the invention to the point of practical application, or that the Government's contribution to the invention is small compared to that of the contractor.

NASA contractors reported 31,357 inventions to the agency for calendar years 1959 through 1978. They requested 1,366 waivers and the Administrator granted 1,035. About 3 percent of the inventions reported were waived.

PATENT UTILIZATION

NASA believes that one of its objectives under the Space Act is to enhance the leadership of the United States in aeronautical and space activities and make the results of these activities available to the public. Thus, NASA has implemented various programs to promote the commercial development and utilization of aeronautical and space technology. NASA said its patent policies and procedures have been adopted to augment these programs and its decisions regarding the allocation and utilization of patent rights are made with this objective in mind.

Patent utilization/licensing

NASA's program for licensing inventions to which it has acquired title is based on Section 305 of the Space Act and is implemented by NASA Patent Licensing Regulations (14 C.F.R. 1245.2). Both nonexclusive and exclusive licenses are available.

In order to locate prospective licensees who want to commercialize an invention, NASA uses a variety of methods to inform the public of its technology available for licensing. Abstracts of the agency's inventions appear in its publications. Additionally, NASA inventions available for licensing are listed in the Federal Rgister and the Official Gazette of the U.S. Patent and Trademark Office.

The National Technical Information Service also publishes a weekly journal entitled "Government Inventions for Licensing" which includes NASA abstracts and licensing information. NASA said that it has not been able to identify or relate any licensing inquiries for agency owned inventions to the NTIS journal. NASA also said it holds and participates in licensing conferences and workshops and its Industrial Applications Centers disseminate both abstracts of inventions available for licensing and information on how to obtain licenses.

NASA promotes nonexclusive licenses, but may grant exclusive licenses if it determines that the invention is not likely to be brought to commercialization under a nonexclusive license or by further Government funding and that the exclusive license will provide the necessary risk capital to achieve commercial use of the invention. NASA normally does not require royalties for a nonexclusive license but may for an exclusive license.

Domestic licensing

Each application for a domestic license is initially reviewed in NASA's Office of General Counsel. If the application conforms to the regulations and the license requested appears appropriate, the application is forwarded to the Inventions and Contributions Board. The ICB recommends to the Administrator whether a nonexclusive or exclusive license should be granted and any terms and conditions of the license.

If a determination is made to grant a nonexclusive license, the terms and conditions are negotiated by the Office of General Counsel. If the determination is made to grant an exclusive license, notice of this intent, along with the identification of the invention, licensee, and special terms and conditions, are published in the Federal Register. The exclusive license will be granted unless, within 30 days of the notice, a statement is received from any person setting forth reasons why it would not be in the interests of the United States to grant the proposed license, or an application for a nonexclusive license is received which states that the invention is likely to be brought to practical application within a reasonable period of time.

As of December 31, 1978, NASA had 251 licenses in force on 133 of its 3,512 domestic patents and applications. Nine of these licenses were exclusive and 242 nonexclusive.

NASA negotiates a specific date for commercialization with its licensees and requires that the invention be practiced for the term of the license, which usually is less than the term of the patent. Licensees are required to report annually on their progress in commercializing the inventions. NASA recently inquired about commercialization efforts of its 242 nonexclusive licensees; 138 or 57 percent responded. Fifty, or about 20 percent of the total licensees, reported they were pursuing development and marketing efforts.

Foreign licensing

Inventions on which NASA obtained patents in foreign countries are available for licensing in those countries. NASA's foreign licensing objectives are to further the interests of U.S. industry, enhance U.S. economic interests, and advance U.S. international relationships.

Foreign licenses can be either exclusive or nonexclusive. In granting foreign licenses, preference is given to the applicant who has previously been granted a license for the invention in the United States. NASA requires royalties or some other consideration under all foreign licenses.

As of December 31, 1978, NASA had 787 foreign patents on 184 inventions. Fifty-nine were licensed exclusively to 7 licensees.

Patent utilization/waivers

Where NASA waives property rights to inventions made under its contracts, the Inventions and Contributions Board periodically monitors the waiver recipients. Through 1977 NASA waived rights to 1,046 inventions, but subsequently voided 258

of these. NASA said that 193 or about 18.5 percent of its waived inventions were utilized or commercialized.

NASA's data on 523 inventions waived prior to 1975 showed: 84 in use in a commercial process, product, or service; 15 fully developed with Government use; 91 under development; 68 available for licensing; 228 without active commercialization or licensing efforts; and 37 obsolete.

Waiver recipients reported that the 15 fully developed inventions wre ready for commercial use, but they had found only Government use in additon to NASa's use.

Most of the 91 inventions under development were being developed by the waiver recipient. Where development was being done by licensees, the inventions resulted primarily from university and nonprofit research organizations.

The only effort being undertaken for 68 inventions was to find a licensee. Many of these inventions resulted from universities and research organizations which did not have manufacturing capability. In some cases where the waiver recipient was a manufacturer, the invention was reported as being outside of its business or manufacturing activity.

NASA believed the 228 inventions without commercialization or licensing activity may have some utility. The agency, however, attributed the lack of interest in these to the following: no commercial need or market; inventions too costly to develop; inventions not cost competitive; technology too sophisticated; market too small to justify production; funding not available; and invention shelved indefinitely because of other priorities.

Thirty-seven inventions were obsolete because (1) other or better products and methods were available; (2) they were superceded by other technology; (3) they were not compatible with present systems; or (4) the state-of-the-art had passed them by.

MARCH-IN RIGHTS

NASA includes march-in rights in its waiver instrument. The Administrator reserves the right to require the granting of a nonexclusive or exclusive license for the practice of the invention:

(1) Unless, within 3 years after the patent is issued, the waiver recipient has taken effective steps to bring the invention to the point of commercial application and thereafter continues to make its benefits reasonably accessible to the public, or

(2) Unless, within 3 years after the patent is issued, the waiver recipient has taken effective steps to make such patent available for licensing on terms that are reasonable, or

(3) As may be appropriate to satisfy governmental regulation for public use or as may be necessary to fulfill health or safety needs or other public purposes.

Under the terms of the waiver instrument, the recipient agrees, if requested by NASA, to provide a written report to the agency not more often than annually on the commercial use of the invention. NASA evaluates these reports to ascertain compliance with conditions of the waiver.

NASA has not enforced its "march-in" rights by directing waiver recipients to license others under the conditions specified in the waiver instrument. Rather, when the recipient does not comply with requirements, the waiver is voided and title to the invention is taken back by NASA. The invention then is made available for licensing to third parties under the agency's licensing regulations. On December 31, 1977, NASA had voided 258 waivers. All of these were voluntary on the part of the waiver recipient. NASA said that most of the waivers were voided at the request of the recipient and not for failure to comply with "march-in" provisions in the waiver instrument.

Senator SCHMITT. Gentlemen, we are going to have to move on to a panel of business representatives.

I want to thank you again for this discussion, and if you happen to be talking with anyone in the administration, whoever they may be, would you make the suggestion—and you can attribute it to me, that they, as soon as they are ready to talk, will find some people over here in the Congress ready and willing to talk with them in the formulation of a Government-wide patent policy.

Mr. DENNY. I will make sure that message is delivered.

Senator SCHMITT. Thank you.

Our next panel are four gentlemen representing certain aspects of the inventing and contracting industry, Mr. Peter F. McCloskey,

president, Electronics Industries Association; Karl G. Harr, Jr., president, Aerospace Industries Association of America; Hugh E. Witt, director, Government Liaison, United Technologies Corp.; Harold Lonsdale, president, Bend Research, Inc., Bend, Oreg.

STATEMENTS OF PETER F. McCLOSKEY, PRESIDENT, ELECTRONIC INDUSTRY ASSOCIATION; KARL G. HARR, JR. PRESIDENT, AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.; HUGH E. WITT, DIRECTOR, GOVERNMENT LIAISON, UNITED TECHNOLOGIES CORP.; AND HAROLD K. LONSDALE, PRESIDENT, BEND RESEARCH, INC.

Senator SCHMITT. If you want to submit your full testimony for the record, it will be so included. Please summarize your statement, if you can, so we will have time for some questions and answers. Don't leave out anything that you think is of importance for today's discussion.

Mr. McCloskey, would you begin?

Mr. MCCLOSKEY. Thank you, Senator.

I am Peter F. McCloskey, president of the Electronic Industries Association—EIA—and appear today on its behalf.

We appreciate the opportunity to testify on S. 1215, the Science and Technology Research and Development Utilization Policy Act.

EIA is made up of over 300 domestic manufacturers of electronic products with an annual sales volume of $68 billion. The range of companies encompass both small and large firms. The industry engages in research and development of $6 billion a year. Of this amount, $2.7 billion is federally sponsored R. & D.

Therefore, the electronic industry, which is noted as being a high technology industry, has a direct and vested interest in protecting the resulting intellectual property innovations and therefore in the patent policy of the various Federal agencies.

As you can see, it has a direct vested interest in the patent policy of the various Federal agencies.

We support S. 1215. While there are some areas of the legislation we would like to see clarified, or where additions would be helpful to implementing its overall intent to increase innovation, the bill as a whole properly balances the role of Federal R. & D. and the overall U.S. industrial innovation process.

The association has long been involved in the debate on Federal patent policy with a dual interest.

First, member companies have found the diverse policies of the various agencies to be somewhat confusing and at odds with each other.

Consequently, we have long sought a uniform policy in the interest of heightened contractor involvement.

Second, there is a pervasive feeling that the uniform policy should be one to encourage contractor participation. Stated otherwise, the policy should remove disincentives to perform Federal R. & D. work. Satisfaction of these interests would clearly work to the benefit of the economy and the public at large.

S. 1215 appears to be a rational approach in addressing those two interests. Viewed from the public's perspective, this is particularly true when acknowledging the additional safeguards built into the legislation to protect the public's interest through appropriate

march-in rights and ancillary provisions to protect fully the Government's interests.

Placing title in the contractor for inventions under federally sponsored R. & D.—and doing so for all agencies—can only work to assure broader contractor participation, a higher quantity and quality of innovation and an attendant flow down to the American consumer of the benefits from commercialization of these inventions.

This point has been obscured in the recent evolution of agency patent policies. This most likely has resulted from attempts to serve ulterior purposes or from a basic misunderstanding of the underlying incentives to innovation. S. 1215, however, refocuses attention to two vitally important points.

First, those existing agencies with a policy calling for the Government taking of title in all cases lessen the incentive to subsequent commercialization which would otherwise be present if the contractor held the patent.

More importantly, however, the taking of title by the Government in those cases traditionally is accompanied by attempts to make rather significant demands on the so-called background rights, and patents, of the participating contractor.

This valuable know-how, involving proprietary information in many cases, was initially developed by the contractor at private expense. It serves as the technological driving force behind innovative companies.

To ask a company to give up some of this know-how unnecessarily in order to undertake a Federal R. & D. project raises a difficult judgment question. Ironically, the most successful firms—the best innovators—are faced with giving up more of this valuable background technology.

This penalty then becomes a greater disincentive to these firms. What results is a dichotomy that those with the most to contribute to the Federal R. & D. effort face the greatest disincentives.

Our statement is made up of two segments. The first deals with some questions and suggestions as to the specifics presented to us in the letter from Senator Stevenson inviting our participation in these hearings.

Turning to those questions—the first deals with the effect of agencies 'patent policies on participation by contractors in federally sponsored R. & D. and the subsequent impact on commercialization of inventions.

It is difficult to quantify the exact effect of such policies. We have been made aware of instances where an agency title policy was a sufficient disincentive to cause a contractor not to participate.

Contractors who have spent private resources to develop valuable technological know-how and background patents must be reticent of participation in a program which tends to dissipate this competitive advantage.

In effect, the contractor must balance the impact of this participation in a Federal R. & D. program with the need to protect the investment of the company's shareholders, represented by background rights and know-how.

The question as to commercialization of inventions can be viewed from a different perspective. While on the one hand it has been our experience that only relatively few Government-held patents are ever commercialized, the failure to leave title in the contractor shuts off a substantial incentive to commercialize.

The second question attempts to draw a distinction between R. & D. intended for military and direct Government use and R. & D. with respect to products intended for civilian purposes.

While there may be some reasons for this distinction, considering varying public interests, we think a more prudent policy is that outlined in this legislation. This would provide for a uniform policy for all agencies but allow for a variance of that policy to protect narrow but appropriate public and Government interests.

We would prefer not to see the legislation reoriented toward making a broad and artificial distinction between these two end-use areas. That would only tend to lead industry back into the current varying and counter-productive policies on an agency-by-agency basis.

As an observation, it must be remembered that an invention in one area may find greater use in yet another area. Thus a form of an electronic resistor developed under a military contract may have a greater use in the commercial marketplace. To draw a general distinction as suggested by this question would be a mistake.

As to the third question, proposing different policies in allocating rights to large and small firms, it is our view that such a policy is not warranted.

If the intention of the Federal patent policy is to draw upon the talents of the best contractors and technology, then the theory of increased participation derived by leaving title in the contractor would apply equally to all sizes of firms.

Clearly, in terms of removing disincentives and opening the door to subsequent commercialization, small and large companies are similarly situated. Arguments have been raised that major contractors have a larger reservoir of know-how which would warrant a separate treatment in allocating rights.

Similarly, it has been suggested that obtaining the patent itself is not actually as important to a large firm as to a small firm.

We think, however, the overriding consideration of a patent policy insuring participation by the most qualified firms far outweighs either of these theoretical and somewhat doubtful considerations.

Senator SCHMITT. For the record, at that point, would you state the involvement of small business in your association?

Mr. MCCLOSKEY. We have approximately 300 members, Senator. And of those, well over half would be small business.

The first part of the fourth question deals with Government retention of title. We believe S. 1215 establishes acceptable guidelines spelling out those areas where the Government should retain title to protect specific governmental or public interests except that section related to classified work. EIA endorses this approach in our overall endorsement of the legislation. And we will refer to the classified exemption later on in our comments.

The second part of the fourth question deals with contractors' surrendering of background patents. I would merely reiterate our earlier statement that the background patents, and technological know-how possessed by innovative contractors, were all developed at private expense. This know-how represents the "life blood" of a high technology company.

The Government should avoid placing the contractor in a position of choosing either to participate in a program thereby dissipating these rights or not to participate.

Simply put, if it is the Government's objective to obtain the best R. & D. talent available, then there must be a strict limitation on those circumstances where a contractor is forced to surrender background patents or know-how.

The fifth question deals in essence with a recoupment theory or a payback to the Federal Government for Government-sponsored inventions. We are opposed to such a policy for three reasons.

First, it is extremely impractical, if not impossible, to determine what particular revenue or return is generated from a specific patent—considering that the patent may be used in combination with other patents or know-how in licensing packages, or whether the income results from sales expertise or good will.

Second, it should be understood that the public benefits from the commercialization of patents not only from taxes on a corporation's income but in the creation of new jobs and stimulus to the economy. These are not insubstantial contributions.

Finally, a contractor faced with a recoupment theory will necessarily build that cost into his pricing policy anyway. In the end the consumer will inevitably pay for the recoupment—an obviously self-defeating proposition.

The remainder of our statement deals with technical questions. We want to commend you, Senators Stevenson and Cannon, for the thrust of your legislation, which is a constructive step and appropriate at this time, when our innovative process seems to be slowing down.

Thank you very much.

Senator SCHMITT. You will have that opportunity. The record will be open for such additional comments as you or any others may wish to make.

[The statement follows:]

STATEMENT OF PETER F. MCCLOSKEY, PRESIDENT, ELECTRONIC INDUSTRIES ASSOCIATION

Mr. Chairman and members of the committee: I am Peter F. McCloskey, President of the Electronics Industries Association (EIA) and appear today on its behalf. We appreciate the opportunity to testify on S. 1215, the Science and Technology Research and Development Utilization Policy Act.

EIA is made up of over 300 domestic manufacturers of electronic products with an annual sales volume of 68 billion dollars. The range of companies encompasses both small and large firms. The industry engages in research and development of 6 billion dollars a year. Of this amount 2.7 billion dollars is federally sponsored R&D. Therefore the electronics industry, which is noted as being a high technology industry, has a direct and vested interest in protecting the resulting intellectual property innovations and therefore in the patent policy of the various Federal agencies.

We support S. 1215. While there are some areas of the legislation we would like to see clarified, or where additions would be helpful to implementing its overall intent

to increase innovation, the bill as a whole properly balances the role of Federal R&D and the overall U.S. industrial innovation process.

The Association has long been involved in the debate on federal patent policy with a dual interest. First, member companies have found the diverse policies of the various agencies to be somewhat confusing and at odds with each other. Consequently we have long sought a uniform policy in the interest of heightened contractor involvement. Secondly, there is a pervasive feeling that the uniform policy should be one to encourage contractor participation. Stated otherwise, the policy should remove disincentives to perform Federal R&D work. Satisfaction of these interests would clearly work to the benefit of the economy and the public at large.

S. 1215 appears to be a rational approach in addressing those two interests. Viewed from the public's perspective, this is particularly true when acknowledging the additional safeguards built into the legislation to protect the public's interest through appropriate march-in rights and ancillary provisions to protect fully the government's interests. Placing title in the contractor for inventions under Federally sponsored R&D—and doing so uniformly for all agencies—can only work to assure broader contractor participation, a higher quantity and quality of innovation and an attendant flow down to the American consumer of the benefits from commercialization of these inventions.

This point has been obscured in the recent evolution of Agency Patent policies. This most likely has resulted from attempts to serve ulterior purposes or from a basic misunderstanding of the underlying incentives to innovation. S. 1215 however refocuses attention to two vitally important points.

First, those existing Agencies with a policy calling for the Government taking of title in all cases lessen the incentive to subsequent commercialization which would otherwise be present if the contractor held the patent.

More importantly, however, the taking of title by the government in those cases traditionally is accompanied by attempts to make rather significant demands on the so-called background rights, and patents, of the participating contractor.

This valuable know-how, involving proprietary information in many cases, was initially developed by the contractor at private expense. It serves as the technological driving force behind innovative companies. To ask a company to give up some of this know-how unnecessarily in order to undertake a Federal R&D project raises a difficult judgment question. Ironically, the most successful firms—the best innovators—are faced with giving up more of this valuable background technology. This penalty then becomes a greater disincentive to these firms. What results is a dichotomy that those with the most to contribute to the Federal R&D effort face the greatest disincentives.

Our statement is made up of two segments. The second deals with some questions and suggestions as to the specifics of S. 1215. The first portion is an attempt to be responsive to the questions presented to us in the letter from Senator Stevenson inviting our participation in these hearings.

Turning now to the questions—the first deals with the effect of agencies' patent policies on participation by contractors in federally sponsored R&D and the subsequent impact on commercialization of inventions. It is difficult to quantify the exact effect of such policies. We have been made aware of instances where an agency title policy was a sufficient disincentive to cause a contractor not to participate. More importantly, however, as stated earlier there is a general perception within the industry that where an agency has a policy of taking title to an invention there exists a continuing disincentive. Contractors who have spent private resources to develop valuable technological know-how and background patents must be reticent of participation in a program which tends to dissipate this competitive advantage. In effect the contractor must balance the impact of this participation in a Federal R&D program with the need to protect the investment of the company's shareholders. This investment resides in some measure in this reservoir of background rights and know-how.

The question as to commercialization of inventions can be viewed from a different perspective. While on the one hand it has been our experience that only relatively few government-held patents are ever commercialized, the failure to leave title in the contractor shuts off a substantial incentive to commercialize.

The second question attempts to draw a distinction between R&D intended for military and direct government use and R&D with respect to products intended for civilian purposes. While there may be some reasons for this distinction considering varying public interests, we think a more prudent policy is that outlined in this legislation. This would provide for a uniform policy for all agencies but allow for a variance of that policy to protect narrow but appropriate public and government interests. We would prefer not to see the legislation reoriented towards seeking any

broad and artificial distinction between these two end-use areas. That would only tend to lead industry back into the current varying and counter-productive policies on an agency-by-agency basis. As an observation, it must be remembered that an invention in one area may find greater use in yet another area. Thus a form of an electronic resistor developed under a military contract may have a greater use in the commercial marketplace. To draw a general distinction as suggested by this question would be a mistake.

As to the third question proposing different policies in allocating rights to large and small firms, it is EIA's view that such a policy is not warranted. If the intention of the Federal Patent policy is to draw upon the talents of the best contractors and technology, then the theory of increased participation derived by leaving title in the contractor would apply equally to all sizes of firms. Clearly, in terms of removing disincentives and opening the door to subsequent commercialization, small and large companies are similarly situated. Arguments have been raised that major contractors have a larger reservoir of know-how which would warrant a separate treatment in allocating rights. Similarly, it has been suggested that obtaining the patent itself is not actually as important to a large firm as to a small firm. We think, however, the over-riding consideration of a patent policy insuring participation by the most qualified firms far outweighs either of these theoretical and somewhat doubtful considerations.

The first part of the fourth question deals with government retention of title. We believe S. 1215 establishes acceptable guidelines spelling out those areas where the government should retain title to protect specific governmental or public interests except that Section related to classified work. EIA endorses this approach in our overall endorsement of the legislation.

The second part of the fourth question deals with contractors' surrendering of background patents. I would merely reiterate our earlier statement that the background patents, and technological know-how possessed by innovative contractors, were all developed at private expense. This know-how represents the "life blood" of a high technology company. The government should avoid placing the contractor in a position of choosing either to participate in a program and dissipate these rights or not to participate. Simply put, if it is the government's objective to obtain the best R&D talent available, then there must be a strict limitation on those circumstances where a contractor is forced to surrender background patents or know-how.

The fifth question deals in essence with a recoupment theory or a payback to the federal government for government-sponsored inventions. We are opposed to such a policy for three reasons. First, it is extremely impractical, if not impossible, to determine what particular revenue or return is generated from a specific patent—considering that the patent may be used in combination with other patents or know-how or in licensing packages, or whether the income results from sales expertise or good will. Secondly, it should be understood that the public benefits from the commercialization of patents not only from taxes on a corporation's income but in the creation of new jobs and stimulus to the economy. These are not insubstantial contributions. Finally, a contractor faced with a recoupment theory will necessarily build that cost into his pricing policy. In the end the consumer will inevitably pay for the recoupment—an obviously self-defeating proposition.

As the second part of our statement, we now submit several technical comments and questions on S. 1215 as currently drafted.

As to Section 103 "Definitions", paragraph 9, we are confused as to the difference between the phrase "made under the contract" or "made under a contract". We believe this Section needs to be clarified as to intent. We recommend the former. Similarly, under paragraph 12 of Section 103 the definition of "practical application" appears too stringent. We would suggest a rewrite to indicate that "application" means "to manufacture in the case of a composition or product, to practice in the case of a process or method or to operate in the case of a machine or system or that the invention is being worked or that its benefits are available to the public either on reasonable terms or through reasonable licensing arrangements". The same comment could be made with reference to the use of that phrase, i.e., practical application, in Section 304(a)(1) dealing with march-in rights.

We endorse Section 201 which specifically places implementation in the Commerce Department with the corollary hope that the implementation can be handled without creation of a bureaucracy or massive paper work agency which has been the bane of the patent profession.

Again with Section 201(c)(6), we believe that this paragraph should be expanded to include the use of consultants, e.g., "to make or have made market surveys . . ."

With reference to Section 301(a)(2), we believe a policy of the government acquiring title because of the "classified" nature of the work is too broad and unnecessary.

That is not the practice today and we suggest that a more narrow definition should be developed referencing more limited national defense purposes. For example, if the government acquired title because the work was classified, a subsequent removal of the classified status would still find title resting in the government—unnecessarily. We recommend deletion of this Section.

With reference to Section 302(b) we would urge that where the government obtains title to an invention, the license to the contractor should include the right to sublicense (1) the contractor's subsidiaries and affiliates within its corporate structure, and (2) existing licensees the contractor was legally obligated to license or indemnify. Where the contractor has licensed others, any revocation by the government should not include revocation of such license. Also we believe the license to the contractor should be irrevocable if the contractor or its licensee is using the invention.

In Section 304(a)(2) we believe the phrase "reasonably satisfied" should be used throughout for consistency. With reference to Subpart (iii) of that same Section we are somewhat at a loss to understand how such judgments on the effects on competition—which are most complex and technical—can be made in any fashion to accommodate the purposes of this legislation.

In Section 305(a)(1) we suggest adding "trade secrets" to the type of information not subject to disclosure. This would be consistent with the Freedom of Information Act.

Finally, in Section (3) of 305(2) we suggest a requirement of "timely disclosure" rather than "prompt disclosure"—as a more realistic requirement.

We thank you for the opportunity to present the views of the Electronic Industries Association on this legislation. We hope that the constructive comments submitted in terms of specific questions and suggested additions to the legislation do not detract from our overall support of S. 1215. Rather, they should be considered as our attempt to mold the best approach to meeting what we perceive to be the three fundamental needs:

1. Attracting the best firms to participate in Federal R&D programs to assure the best opportunity for achieving innovation.
2. Protecting necessary governmental and public prerogatives.
3. Expanding the commercialization of inventions generated under Federal programs which in turn will entail direct benefits to the public and the economy.

Senator SCHMITT. Mr. Harr.

Mr. HARR. I am Karl Harr, president of the Aerospace Industries Association of America.

I appreciate the opportunity to appear today in support of S. 1215. I will be brief.

Because title IV deals with the allocation of rights to inventions of Federal employees, a matter which we believe is between the Government and its employees, my statememt does not address that part of the bill.

AIA is a national trade association of aircraft, spacecraft, missiles, related components and equipment. Being at the leading edge of high technology, our member companies have long recognized incentives contained in the U.S. patent system, in particular the manner in which such incentives have occurred as the development and advancement of our Nation's technological base and industrial innovations.

For these reasons, our association has supported and continues to support proposed legislation on Government policies which maximize such incentives.

In the past, we have urged Congress and the executive branch to promulgate a single Federal patent policy to replace the multiple policies now in existence, and one in which a contractor would have the option to retain title to inventions.

The principal objective in establishing the single Federal patent policy must be to determine and select that policy which will most benefit the public by providing appropriate incentives to the most

competent firms to compete for Government contracts and to commercialize the new technology and inventions which may result from such efforts.

This raises the question of whether the Government or the contractor is in a better position to assure that new technology and inventions will be brought to public use. The contractor already has gained experience in the technology in which the invention was made. He already is doing business and has both an existing marketing capability and the profit incentive to commercialize the invention.

On the other hand, unless the Government is prepared to assume a new role in commercial markets, the Government has neither the expertise to determine which of the many inventions have commercial potential nor the capability, but perhaps even the incentive to bring such inventions to the marketplace.

Because it recognizes and balances equities of the bars involved for research and development, the Government parties and contractors, we heartily support S. 1215.

Under the bill, the public would benefit in two ways:

First, by significantly increased responsibility of such inventions being patented;

And, second, by their being made available in the marketplace, the Government would have a royalty-free license and the contractor would, with some exceptions, obtain an option to retain title to inventions made under Government contracts.

Should the contractor fail or be unable to patent or commercialize any such invention, assure the retention of title by contractor to prevent the unlawful monopoly, then the bill has much in it to protect the public.

The bill utilizes incentives for encouraging competition for Government research and development, stimulating private expenditures and research and development efforts, and posture industrial innovations.

S. 1215 is particularly timely in this respect. All of us share the deep concerns of both the Congress and the administration about the sharp decline in industrial innovation in the United States in the resulting adverse impact on our economy and national technological base.

We believe the enactment of S. 1215 would tend to reverse that trend.

In closing, it is worth noting that, for the past 30 years or more, Government contracting has operated under multiple patent policy, most of which is title policy. That is to say, the Government takes title to inventions made under Government research and development contracts.

The title policy has failed to achieve maximum utilization to technology resulting from substantial sums of public funds spent on Government R. & D. The report on public policy issued by the Council on Science and Technology indicates that as of 1976 the U.S. Government had 28,021 unexpired U.S. patents available for licensing, of which only 1,252, or about 4½ percent, has been licensed.

Senator, with reference to your questioning of some of the earlier witnesses and to some areas in your opening statement, establish-

ing the broad context in which you were placing this bill and considering its purposes, we, too, have been working that vineyard for quite a long time, particularly with respect to trying to get NASA—advances under NASA contracts out—into the public domain from the point of view of convincing the public of the valuable spinoffs of the space program. We have spent years on working that, and NASA has done an excellent—absolutely excellent—job in its technical transfer program. But, here again, I think that this bill would help not just to get the information out, but to make sure that it got utilized by commercial sponsors.

Thank you.

[The statement follows:]

STATEMENT OF KARL G. HARR, JR., PRESIDENT, AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.

Mr. Chairman and members of the subcommittee: I am Karl G. Harr, Jr., president of the Aerospace Industries Association of America, Inc. (AIA). I appreciate the opportunity to appear today in support of S. 1215, introduced by Senators Schmitt, Cannon and Stevenson. Because Title IV deals with the allocation of rights to inventions of federal employees, a matter which we believe is between the government and its employees, my statement does not address that part of the bill.

AIA is the national trade association representing the manufacturers of aircraft, spacecraft, missiles and related components and equipment. Being at the leading edge of high technology, our member companies have long recognized the incentives contained in the U.S. Patent System and, in particular, the manner in which such incentives have encouraged the development and advancement of our nation's technological base and industrial innovation. It is for these reasons that our Association has supported and continues to support proposed legislation and government policies which maximize such incentives. In the past, we have urged Congress and the Executive Branch to promulgate a single Federal Patent Policy to replace the multiple policies now in existence and one in which a contractor would have the option to retain title to inventions.

The principal objective in establishing a single Federal Patent Policy must be to determine and select that policy which will most benefit the public by providing appropriate incentives to the most competent firms to compete for government-funded research and development contracts and to commercialize the new technology and inventions which may result from such efforts. This raises the question of whether the government or the contractor is in the better position to assure that new technology and inventions will be brought to public use. The contractor already has gained experience in the technology in which the invention was made. He already is doing business and has both an existing marketing capability and the profit incentive to commercialize the invention. On the other hand, unless the government is preparing to assume a new role as a competitor to American business in commercial markets, the government has neither the expertise to determine which of the many inventions have commercial potential nor the capability (or perhaps even the incentive) to bring such inventions to the marketplace.

Because it recognizes and balances the equities of the parties involved in government contracting for research and development—the public, the government and the contractors—we heartily support S. 1215. Under the bill, the public would benefit in two ways: first, by a significantly increased possibility of such inventions being disclosed in patents, and, second, by their being made available to the marketplace. The government would obtain a royalty-free license under such inventions. A contractor would, with some exceptions, obtain an option to retain title to inventions made under government contracts. Should the contractor fail or be unable to patent or commercialize any such invention, or should the retention of title by a contractor tend to create an unlawful monopoly, the bill provides for appropriate march-in rights to protect the public's interest.

The bill also recognizes and utilizes the incentives contained in our Patent System which encourage competition for government research and development contracts, stimulate private expenditures in research and development efforts and foster industrial innovation. These incentives were aptly described by a prominent jurist, Judge Giles Rich, in In re John A. Nelson, 126 USPQ 242 (CCPA 1960), to wit: "(The patent system) is not like a system of military awards in which medals are given out by the people to their heroes as expressions of gratitude for their exceptional

services. While the element of reward is one factor in the patent system, it is probably the least important. The patent system is an incentive system calculated to do two things, principally. First, it stimulates work, research, development, invention and discovery by holding out the prospect of profit. Second, in exchange for and as a condition of patent protection, it secures a full disclosure of the invention. Promotion of the useful arts takes place through the combination of these two factors, the doing of the work and the disclosure of the results thereof."

Moreover, S. 1215 is particularly timely in this respect. All of us share the deep concerns of both the Congress and the Administration about the sharp decline in industrial innovation in the United States and the resulting adverse impact on our economy and national technological base. We believe the enactment of S. 1215 into law would tend to reverse that trend.

In closing, it is worth noting that for the past thirty years or more, government contracting has operated under multiple patent policies, most of which are title policies—that is to say, the government takes title to inventions made under government research and development contracts. The title policy has failed to achieve maximum utilization of the technology resulting from the substantial sums of public funds spent on government R&D. For example, the "Report on Government Policy" issued by the Federal Council for Science and Technology, indicates that as of 1976 the U.S. government had 28,021 unexpired U.S. Patents available for licensing, of which only 1,252 or about 4.5% had been licensed. The time has come to try a policy, such as proposed in S. 1215, under which a contractor would have the option to retain title to inventions made under government R&D contracts.

That concludes my statement. I shall be pleased to answer any questions you might have.

Mr. WITT. I'm with the United Technologies Corp. from Hartford, Conn.

We design, develop, manufacture, and market a variety of technological products for industrial, commercial, and government needs, worldwide.

The corporation employs more than 189,000 people, operates more than 280 plants and maintains marketing and service representation throughout the world.

It serves its markets with diverse products in three principal lines of business:

Power: Aircraft jet engines, industrial gas turbines; and rocket engines, motors and boosters.

Flight systems: Aeronautical and space systems and equipment; and commercial and military helicopters.

Industrial products and services: Elevators and escalators; automotive products and systems; conductors, controls and devices for the transmission and application of electricity; automotive diagnostic and test systems; and air conditioning and related equipment.

Our company funded research and development program is a balanced mix of short-term and long-term projects.

Some of them are aimed at developing new technology; others at creating new products; still others at improving existing products.

Our purpose—really our R. & D. strategy—is to put the corporation in a competitive position with new and improved products long before we have to compete in the marketplace. Our R. & D. commitment is a cornerstone of our future growth. Only a handful of companies—all of them substantially larger than United Technologies—spend more on R. & D.

As a company we have a deep-rooted commitment to industrial innovation. However, the generation of new technology, new products, and their commercialization are each enormous undertakings.

It is always necessary for us to apportion the company commitment in time, talent, and physical resources to insure that we

make the best use of these resources. We do view research and development as an investment in our future.

We would not tell you, nor in fact is it the case, that the "patent situation" is always the crucial factor in our R. & D. decisions, whether company or Government-sponsored, but it is often a factor.

The decisions are frequently impacted by the question whether or not "the path trod by us may soon be trod by others who have saved their energies," as one writer has phrased it.

We can tell you that the likelihood of significant patent rights is viewed as a positive factor in our R. & D. decisions—an incentive. We, as is true of most companies, are in the business of selling products and our R. & D. commitment is directed toward that end. Neither we nor the public benefit from the results of our inventions which never reach the marketplace.

In connection with our company programs, we utilize the patent system and benefit from the rights which that system provides, and we believe the public benefits as well. But the patent incentive exists only when the rights are in the hands of the party seeking to utilize the invention.

The Government does not require the patent incentive, for the Government is seldom, if ever, the commercializing party.

Our experience indicates that commercial ventures are seldom successful on the basis of patent rights alone—I emphasize that "alone."

Most of our licensees, for example, are not interested in bare patent licenses but require other assistance from us as well. Normally this assistance simply cannot be provided by the Government.

It explains, in many cases, why the Government is singularly unsuccessful in its license programs. It is usually the party making the invention that has the expertise necessary to commercialize the innovation by its own further efforts or by licensing. I think Tenney Johnson emphasized that in his testimony.

It is also usually the party making the invention that is best able to recognize the commercial potential.

The process of obtaining a patent itself involves an investment of time, talent, and financial resources—and a not inconsiderable one.

At United Technologies the decision whether or not to seek patent protection is itself a business decision. If the existence of a patent is or may be of assistance in fostering the return on investment, then we would see the pursuit of patent rights as appropriate.

Of course, the reverse is also true. When we see no use of a patent in connection with a given innovation in the marketplace, we typically do not seek patent protection on that invention.

In a case where the patent rights to inventions are vested in the Government, as is the case when the Government acquires title to those inventions, the patent incentive simply cannot enter into our business decision.

In fact, not only is there no patent incentive relevant to the commercialization question, there is no business justification for the filing of a patent application. For this reason, we seldom can

justify the filing of patent applications on inventions where the Government acquires title.

In considering participation in Government R. & D. contracts, a title in the Government policy often has its greatest adverse impact in those areas where we have the greatest private investment. In those cases, not only are we looking at those investments that may be required of us in the future, but we necessarily must consider the impact on those investments that we have made in the past.

Parties coming to the contract table with the greatest expertise should be those able to solve the particular problem at hand in the shortest possible time and at the least cost. It is indeed an anomaly that in many cases agency policy is such as to provide the greatest lack of patent incentive, or even disincentive, in such circumstances.

Federal patent policy, if it is to maximize the R. & D. investment of the Government, simply must be such as to enlist the services of the most qualified parties and to promote commercialization.

And I think, sir, that is the thrust of your proposed legislation.

Title in the Government simply does not do that. We believe that restoration of the patent incentives to the private sector is essential. And because S. 1215 restores those incentives, it is our belief that it will foster "the progress of science and the useful arts," which is the basic thrust of the whole patent concept.

Retention of a license by the Government insures that there would be no impact of patents resulting from Government-sponsored inventions in the products that Government is buying. The patent incentives would be important in the development of those incentives for non-Government products.

We have long been a major participant in Government R. & D. programs and, regardless of the Federal patent policy ultimately adopted, we will continue to participate in and have an interest in such programs.

At the present time we are participating in Government contracts where title to inventions made in the performance thereof will reside in the Government.

As we have mentioned, there are many factors that enter into participation decisions and a "patent situation," as I said earlier, it is only one factor that we consider.

In such cases we have determined that other factors outweigh the lack of patent incentive. However, we do believe that a policy of acquisition of title by the Government is a deterrent to participation and to commercialization in many cases.

We believe that the disposition of patent rights must be clearly established at the time of contracting, as would be the case if this bill is adopted. It is difficult to base R. & D. decisions on uncertain possibilities of later acquisition of rights, as by waiver procedures, after contracting.

It is also our experience that such procedures involve tedious administrative endeavors in which we participate only with great reluctance.

Adoption of this bill will not only provide uniformity and certainty to the Federal R. & D. arena, but will also restore the incentive of the patent system to the process of industrial innovation and

commercialization. The public will simply never receive the benefits of inventions that are never made or commercialized.

For the above reasons, we urge your support of this legislation. Thank you.

Senator SCHMITT. Mr. Lonsdale.

Mr. LONSDALE. First, I would like to thank you for inviting me to these hearings. It is gratifying that someone wants to hear our opinion. I have prepared a formal written statement, but I don't plan to read it at this time. I would rather make my remarks informally if I may.

Senator SCHMITT. Your statement will be included in the record.

Mr. LONSDALE. I represent Bend Research, Inc., located in Bend, Oreg. We have 25 employees, and most of us are chemists. We are inventors, and would-be innovators.

I believe I am the only representative from small business at these hearings, so in a sense I respresent the 4 million small businesses in the United States.

But more to the point, I represent small, high technology companies, of which there are only a few thousand. I feel some responsibility for speaking for those people, because I think they made substantial contributions to the growth and economic success of this country.

Several Government studies have shown that these small high technology companies have been inordinately successful at technological innovations in this century. They have kept us at the economic forefront of the world and made us a world power.

So, with some respect and humility, I feel that I am representing Frank Carlson before the introduction of xerography, or Edwin Land before the introduction of the Polaroid camera. All of these people started as small entrepreneurial inventors. The development of these small, high technology companies is now stifled for a number of reasons.

Changes in SEC regulations and tax laws have made it difficult. And equally important is inflation. That is, people with capital find it more profitable to speculate in land than they do in investing in small high technology companies at the crucial early stage where seed capital is so important.

It is difficult for us now to raise capital, and this is a widely recognized problem. There have been bills introduced into the Congress to try to solve this problem. Senator Bentsen has introduced four bills recently to try to help small high technology companies in this country. For the first two decades after World War II we were doing very well in technological innovation. We still lead the world, but our lead is shrinking. How can we reverse this trend and thereby create jobs and improve our balance of payments?

One way is the way you indicated in your bill, Senator: Give us the exclusive patent rights on our own inventions. We can use these rights to attract the investment needed to get our ideas going.

If the Government retains the rights, as we have seen from other testimony, these patented ideas are essentially lost. That is my own testimony and that of others. I think less than 5 percent of all Government-owned patents have been licensed or used.

I would like to give you an example of our own. We have invented a process that we call "coupled transport". I won't give you a detailed description, but it is a membrane process for recovering metal ions from solution. It is an important new process that has application in hydrometallurgical recovery of metals from low-grade ores and in pollution control.

The invention is ours. We made it about 4 years ago. But to develop the invention, we went to the Bureau of Mines for support. They insisted on vesting all patent rights in the Government.

Senator SCHMITT. You should have talked to me first.

Mr. LONSDALE. I wish we had.

We gave up the domestic patent rights of necessity. We are now 4 years into that development. In that time it has progressed from the concept stage to a very practical thing. We plan to build a pilot plant on a uranium mine in New Mexico this fall. The Government has participated to the extent of about $300,000 to $400,000 in the development up to the present.

We have discussed the process with about 20 American companies, in an attempt to interest them in further development of the process. Several of them are very large firms in the petroleum or mining industries: Gulf Oil, Continental Oil, Kerr-McGee, Westinghouse, Kennecott, Anaconda, and others.

None of them expressed strong interest. As an example, I would like to read two sentences from a letter from the Galagher Corp. of Salt Lake City, a mining company, signed by Hartman Mitchell, vice president for mineral processing.

"The processes which you desribe are very interesting. However, we do not see at this time that there would be enough proprietary equipment for us to be interested."

That is typical of the response we got from all of these people, because we have no exclusive American patent rights to offer any of these American companies.

We do have foreign patent rights, however. We have therefore discussed our process with some foreign companies and we have filed patents on this process in eight countries, the eight most important countries in our opinion. One large Japanese firm has taken a strong interest in the process, and they are in the process of developing it in their country now.

We may well see the process coming back to the United States under a foreign label in due course, which worries me substantially as a citizen.

We favor bills such as S. 1215 which would alter this unfavorable patent situation. Other bills have been introduced, as you know, dealing with this matter. Senator Kennedy has introduced S. 1074. Senators Bayh and Dole introduced S. 414 which also deal with this subject.

There are four key features that I would like to see in such legislation, some of which are in your bill, Senator Schmitt. Some are in the other bills, but none of the currently pending bills combine all of these key features. First, give us exclusive U.S. patent rights. All of the bills I have mentioned will do that, with some exceptions, but I think those exceptions are justified.

Second, I favor giving those rights only to small businesses. I don't have a very defensible position here, but I do think that since

the Government spends only like 3 or 4 percent of its R. & D. money with small businesses, we can accomplish the objective with a minimum of bureaucracy by limiting the granting of those rights to small, high technology companies in the United States. It will also tend to keep the large businesses from increasing the monopoly they already have in this country.

Third, I believe in recoupment. It is not a point brought up in your bill, but I believe strongly in recoupment. Otherwise, the charge of a Federal give-away has a great deal of validity. Let us pay for the rights by returning royalties to the Government on the products we sell covered by those patents. That provision is in neither your bill nor Senator Kennedy's bill.

It does cover the question of what to do if someone comes up with a cure for cancer while doing Government-sponsored work. Let the inventing organization pay the Government a royalty on the sale of any patented product.

Fourth, I favor a Federal procurement policy that will increase small business participation in Government-sponsored R. & D. Senator Kennedy's bill does that, but it is not a feature of the Bayh-Dole bill nor is it in S. 1215.

As you are aware, I am sure, the National Science Foundation has instituted a small business innovation program that we favor strongly. That is a key feature of the bill introduced by Senator Kennedy. We now find ourselves holding back some of our ideas so that we can submit them in future rounds of that particular NSF program.

That is the end of my formal remarks. I would be happy to answer questions.

[The statement follows:]

STATEMENT OF DR. HAROLD K. LONSDALE, PRESIDENT, BEND RESEARCH, INC.

IMPROVING INNOVATION IN THE UNITED STATES: SOME PATENT ASPECTS

There is a justificable concern that the United States is losing its once-enormous world lead in technological innovation. To some extent this decline was inevitable. The United States emerged from World War II in far better condition than the other industrialized countries, and those countries have now fully recovered economically. A good portion of our losses, however, have come as a result of self-strangulation. Excessive Government regulation has decreased our efficiency, and, even more important, we have managed to stifle two of the bastions of the American economic system: incentive, and the small, high technology company.

The innovators in our country are the ones who start or are drawn into these high technology firms. Until recent times, at least, these businesses have been inordinately successful, in part because of the direct relationship between effort and reward. Government-sponsored reports are replete with examples illustrating the fact that independent inventors or small R and D firms have led to a highly disproportionate share of the important innovations of the 20th Century. We can safely conclude that much of our country's economic success derives from the system that has allowed these small, high technology businesses to start and flourish. That system is now in trouble.

Since the Second World War, the genesis and growth of these new companies followed a similar pattern. First, the inventor envisioned some new product, process, or service. Until the early 1970's the inventor could then interest investors in his idea, raise capital by giving up some equity in the new enterprise, and be on his way. However, three factors have completely altered this situation in recent years: changes in tax laws, changes in SEC regulations governing the sale of shares in new issues, and inflation. It is now virtually impossible to find venture capital, and it is frequently necessary for the inventor to relinquish control of his company to acquire the necessary capital, thus reducing his incentive. Increasingly, therefore, these entrepreneurs are turning to the U.S. Government for contract R and D funds

in order to sustain their organizations while they try to develop their ideas internally. At best, this is a much slower path to success. But the probability of success is also diminished, because the Government usually insists on obtaining background as well as future patent rights before a contract award is made. In trading away these patent rights, the high technology company suffers a serious blow to its incentive. Vesting the patent rights in the Government seems to do no one any good. Where does this leave us? Consider our firm, Bend Research, as an example.

Bend Research was started in 1975 as a contract R and D company. We did not start with a single new product/process/service to offer, but rather with a number of ideas in several areas. One of these is a new method for recovering and concentrating metals from solution, a process expected to find application in extractive metallurgy, pollutiion control, and elsewhere. We call this process "coupled transport". A second area in which we are in the early stages of innovation is "controlled release" formulations of biologically-active agents: pesticides, pheromones, pharmaceuticals, and other agents. Despite being highly undercapitalized, we have experienced an annual growth rate of about 50 percent. Our principal client is the U.S. Government, but we are supported by private industry as well, by firms in the United States, Japan, Germany, England and elsewhere.

Consider the "coupled transport" process. This idea was conceived of by us independently, but to obtain Government support for its development we assigned our rights to U.S patents to the Government. We were granted foreign patent rights. Now, after three years and several hundred thousand dollars of R. & D. effort, the process is approaching practical reality. We have explored commercialization with more than ten major U.S. companies, most of them in the mining industry. Not one expressed strong interest, principally because we could not offer them exclusive rights. We have found one interested firm: in Japan. We are in a position to offer them patent rights in their country, and they have taken a favorably aggressive position in their pursuit of commercialization.

If this case can be taken as representative, it would appear that the present U.S. system encourages export of our technology, with its probable ultimate return under a foreign label. There is a straightforward solution to this problem: grant to the inventing firm some form of exclusive U.S. patent rights. As an inducement to investment, the inventors can then offer exclusivity to U.S. firms or, alternately, the inventing firm could pursue the development independently with venture capital. This would keep the innovation here in the United States. And to make the system equitable, we favor a policy of recoupment by the Government of their R. and D. investment.

The present policy of vesting patent rights in the Government is clearly ineffective. Shown in the attached figure is a plot of the number of Government-owned U.S. patents available for licensing, and the number licensed, vs. time. Utilization of this patented technology has been minuscule. Less than 5 percent of the U.S. patents available for licensing have been licensed, and the number of patents licensed did not increase in the twelve year period 1963–75, even though the number available for licensing doubled in that same period.

These facts were no doubt instrumental in the current attempts in the U.S. Congress to drastically alter our patent policy. We refer here to the so-called Bayh-Dole bill, S. 414; a bill recently introduced by Senator Kennety, S. 1074; and the bill being discussed at these hearings, S. 1215, introduced by Senators Schmitt, Cannon, and Stevenson. We applaud all of these efforts. A key provision in each of these bills is the vesting of patent rights in the firms making the inventions, even though the R. & D. is Government funded. This makes eminent good sense. The rights remain in the hands of the inventors and developers, those people who have labored with the idea from the beginning and who will best champion its further development and commercialization. Government ownership means nonexclusivity and we have found that no one is willing to offer very much for a nonexclusive patent. One government agency has already instituted an enlightened patent policy, at least on an experimental basis. That is a provision of the National Science Foundation "Small Business Innovation Program". We favor extending that program throughout all of Federal R. & D.

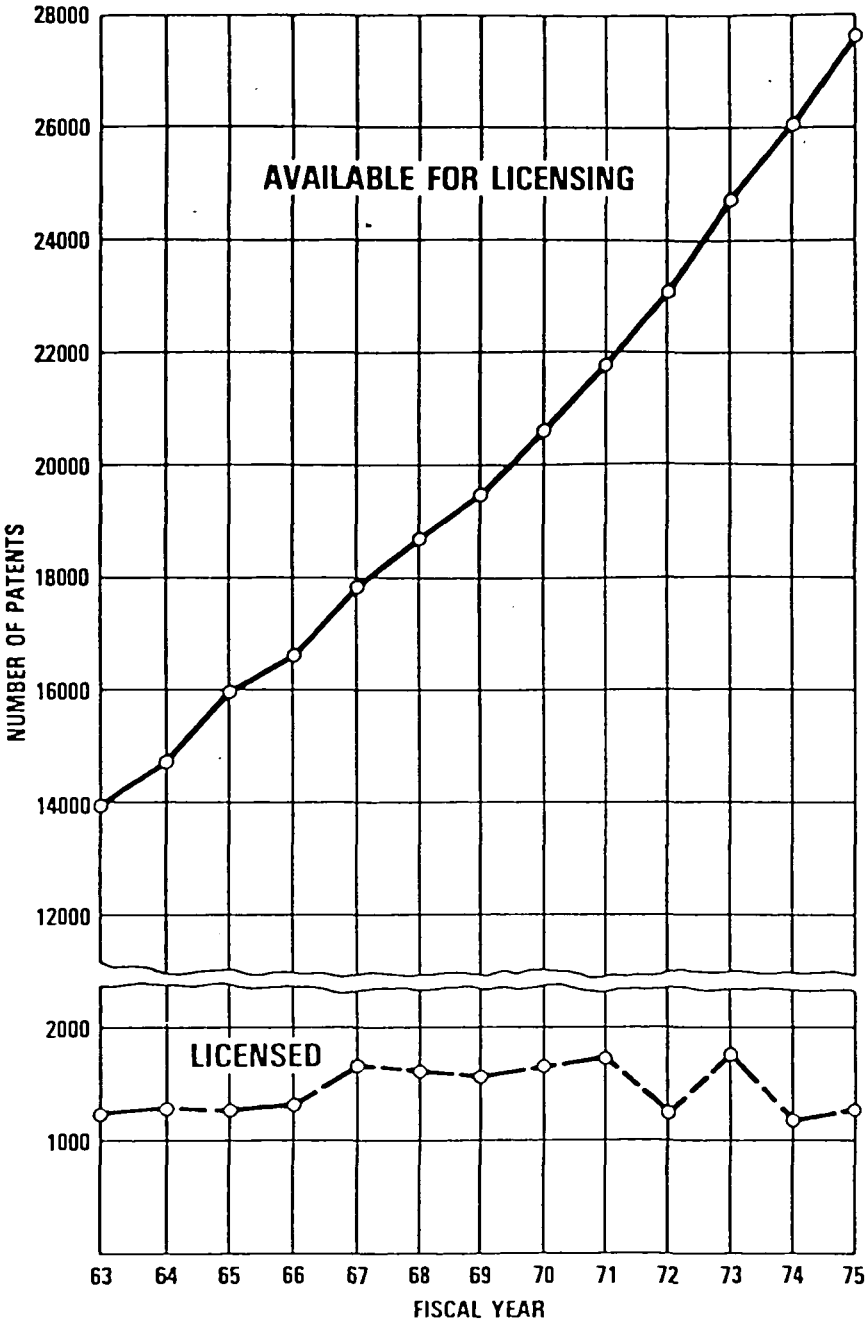
This is admittedly a radical departure from the traditional patent policy on Government-sponsored R. & D. The charge has been levelled that it constitutes a Federal giveaway. Speaking for myself and many other small, high technology firms, I would say that we do not need any gifts. We propose to pay the Government a royalty for these patent rights, just as royalties are paid from one firm to another. While we feel that royalties should be delayed until the new industry is on its feet, we also feel that the royalties should be substantial, i.e., the Government's investment should ultimately be returned, with interest. It may be reasonable to collect

additional royalties so that the winners at least partially offset the losses incurred by the losers.

We also feel strongly that any such new patent policy should be extended only to small, high technology firms and not to all of U.S. industry. Big business already dominates the country economically, and their dominance has increased markedly in the past three decades. Small businesses, on the other hand, create the vast majority of the new jobs in this country, even though they receive only 3.5 percent of Federal R. & D. expenditures. We believe, therefore, that by limiting the new patent policy to small businesses, it could have its full impact on the economy, on the creation of new jobs, and on our balance of payments, with a minimum of bureaucracy and without increasing the dominance of big business.

One might ask: Why does the Government support R. & D. in the first place? Excluding our defense requirements, it does this presumably to strengthen the American economy through the development and introduction of new technology. The principal direct return to the Government traditionally has come from the corporate income taxes paid by the industries it helps to create. Under the patent policy we favor, this return would be supplemented by royalties. The alternative to allowing small innovative businesses greater patent rights, in our opinion, is continued flight of new technology and jobs away from American inventors and the country as a whole and to our foreign economic competitors.

Government-owned unexpired U.S. patents available for licensing, and number licensed, at the end of fiscal years 1963-75. Taken from "Report on Government Patent Policy, Combined December 31, 1973 through December 31, 1976", Federal Council for Science and Technology, U.S. Government Printing Office, Washington, D.C., p. 405.



Senator SCHMITT. Thank you all for those very useful comments. I will ask a few questions and anyone who feels they would like to comment on these questions should feel free to do so.

It has been suggested that any Government-wide patent policy should include a statutory payback or recoupment requirement whereby the Government would get a portion of its investment back when there are inventions in which the contractor received title and then are developed and marketed.

Now before I ask the question, I want to make sure that we agree that there is a distinction between recoupment and royalty. Royalty is something that continues essentially indefinitely unless modified in some way. Recoupment means you are trying to get some portion of your cost, if not all of your costs, back. There are excellent examples of recoupment in various contracts. NASA tends to do that routinely on their recent contracts for aircraft engine technology.

Now, do you believe this would be an appropriate provision in this bill, and can you suggest what form it should take—that is, an incentive for recoupment or for some royalty payments? Mr. Lonsdale, you just mentioned that?

Mr. HARR. Just to kick it off, Senator, it has been addressed several times this morning in fairly uniform agreement up until Mr. Lonsdale's testimony that the payback scheme, as suggested, constitutes a reversal of the philosophy of what is trying to be done by the patent system, namely incentive. You may be pricing a sponsor out of the commercial market. You are, in effect, putting an uncertainty into the contracting procedure between the contractor and the Government.

You are probably up against a situation in which only in the exceptional rare case would there be sound reason for identifying the contribution of a particular patent to the commercial sale. You are adding another burden to the—well, you are putting an excess burden on the investment costs for commercializing and so forth.

But this seems to be a step in the wrong direction, as far as I am concerned.

Mr. MCCLOSKEY. The company that has the most to lose in this situation is the one furthest along in the development process before he gets the Government contract. That is the company that has the best background position, and instead of being rewarded for the amount of investment that he has made to that point in time, he stands the risk, at the very conclusion of some development for which he has sought Government funds to continue or to conclude, of the whole development itself being subject to, in some way, a recoupment theory or royalty theory, depending on which way you go. It would be a cause for concern on their part. And they may say they would prefer not to participate at this point in time, and so the Government would be forced to look to the second or third company that isn't quite as far along.

So I can see some disincentives and some contrary indications, if you will, from the overall thrust of the policy that you have enunciated in S. 1215.

Mr. WITT. I concur, of course, with what these gentlemen stated. There is no question. It is a disincentive. Just looking at the practical side of sitting down at the contracting table, and the man

across the table says, "Now, you understand we have got to get a lot of recoupment consideration built in here." That is enough to turn you off to begin with.

I think there is no question it will be a disincentive to the best people in the technical field that the Government is trying to deal with. It is definitely a disincentive, and it would turn them off. I don't think there is any question about that.

Also, of course, it is a one-way street. If the contractor should not make out later on, is the Government going to donate some money to help cover his losses? Of course not. So it is a one-way street as far as the recoupment is concerned. It is all for the Government.

Senator SCHMITT. Well, to debate that a little bit with you, Pratt & Whitney is part of your organization. I think they are involved in some of the recoupment contracts with NASA and other engine companies that involve recoupment. In this case it appears there is a class of activities where there is a true partnership in which all parties invest and all parties receive a return. Aren't there a few categories where recoupment royalty might be appropriate?

Mr. WITT. They are pretty limited.

Senator SCHMITT. Could you define what those might be?

Mr. WITT. In a case where it is something that the Government very definitely will be interested in and where there is very little commercialization—ideas out in the future, perhaps—and the Government wants to protect itself just in case something does break out in the future, I can imagine that.

Senator SCHMITT. That is not the case in the engine programs. Those technologies were already working their way into commercial use.

Mr. WITT. There is no question, as I said earlier, there is no question that there are cases where if we are going to stay in that sort of business, we will take a contract that we don't like. That happens every day. I assure you, having been on the Government side, we used to strike some very tough bargains. And when I was with the Navy, I saw us put a couple of people out of business by striking too tough a bargain. I imagine Mr. Lonsdale can discuss people like that, too.

Mr. MCCLOSKEY. In part, it may depend on the application that you are trying to get recoupment on, if it is clearly defined, if it is quite capable of definition and there is no controversy associated with it. But the nature of inventions is their serendipity effect. There is a lot going on that was not part of the contract at all, which happens by virtue of the background of the particular inventor.

Senator SCHMITT. Mr. Lonsdale?

Mr. LONSDALE. Let's first recognize that what we are talking about is a gross departure from the long-standing patent policy of the United States. We are talking about giving firms like ours exclusive patent rights on our own inventions even when the Government pays for part of the development. It seems only equitable to return the Government investment, and I favor a royalty as opposed to simple recoupment for the reasons presented with respect to the cancer cure. That is, let the winners pay for some of the losers. Recoupment or royalties may be a small disincentive, but on the other hand, there is also an enormous incentive facing

us, which is Government sponsorship of some of our R. & D. on which we retain domestic patent rights.

I would ask the gentlemen on the panel with me this question: without the recoupment clause, is it likely that such a bill would pass? As a citizen, I consider it a Federal giveaway.

Let me add this. The Small Business Administration held two meetings earlier this year attended by the presidents of small high technology companies and representatives of venture capital companies, and it was virtually unanimous among the 20 representatives of the small, high technology companies that we favor recoupment. We think it is equitable, and we think it will work. If you give us those patent rights, we are happy to repay the Government for its investment.

Senator SCHMITT. My intuition tells me that this issue will be one where great discussion is going to have to be made here in the Congress as to whether, by requiring royalty or recoupment provisions for inventions, we restrict the flow of inventions for the public benefit. Athough you may say it is a giveaway, without the invention the public gets nothing. One of the tasks we have around these tables is to try to find a consensus and a balance as to the most feasible approach. It may be there are some general categories of activities where a recoupment or royalty provision might be appropriate and there may be others where it would be a disincentive.

I hope that you all will think about that as you fly—or walk—back to your respective businesses, and give us some guidance and see if we can, in fact, find an adequate middle ground.

On the issue of background rights, are there circumstances where the failure to acquire background rights would inhibit the public's access to a particular technology?

Mr. WITT. Failure to get hold of the background rights would inhibit the Government?

Senator SCHMITT. Inhibit the public's utilization of the invention—that is, the invention can only be utilized by or made available to the public through a broad base of activity if some of the background rights are available also. Are there circumstances like that?

Mr. HARR. I can't conceive of any, but your bill would take care of it. But I would like to say one thing about background patents, too. The enforced inclusion of them also discourages a very useful incentive motivation to design the existing patents. That has been a great source of technological advance in this country and elsewhere in the world. I will certainly get any further elucidation on the answer to your question.

Senator SCHMITT. Do you feel that the Government has acted reasonably with regard to background rights in the past?

Mr. HARR. We are constantly fighting the fight, but I would not say it is unfair.

Mr. WITT. I would say sometimes yes and sometimes no. There have been instances—and I checked into this—where we have refused to participate in a Government contract, and it was an area in which we had technology, because the Government insisted on having our background rights, and our people got together and

looked at the pros and cons, and they said, "It's not worth it; go somewhere else."

Senator SCHMITT. Do you remember what agency you were dealing with?

Mr. WITT. DOE.

Senator SCHMITT. I would add to that list, the Department of Interior, because NASA decided not to participate to the degree we had originally planned when I was there with Interior. We checked with the industries that we had hoped would bid on the technology transfer contracts. And they said, "No way; if the Department of Interior insists on background rights, we can't get into it."

Mr. MCCLOSKEY. I became aware of one Friday that may or may not be pertinent. I couldn't get enough of the facts, but it had to do with the Department of Defense's program for the very high speed integrated circuit program and whether or not the Intel Corp. would participate in the R. & D. activity. As I understand it second hand, they are reluctant to do so because of the background issue—they feel that they are further along in the development program than anybody else and are not about to give away their competitive advantage by participating in that program.

Senator SCHMITT. I would appreciate any other thoughts you may have on how to find a balance here, because there may be certain circumstances where negotiation of the certain background rights would be appropriate? But your general feeling is that in most cases it is not necessary. Is that correct?

Mr. MCCLOSKEY. Yes.

Mr. LONSDALE. I would like to raise a point of clarification concerning "background patent rights." If the government is going to give us rights on Government funded R. & D., don't we retain those background patent rights as well?

Senator SCHMITT. In some cases the Government has insisted on acquiring rights to background technology developed with your capital. It has been an inhibitor. I think everybody admits it is inhibiting contractors from bidding. The question is, to what degree has it done that?

There are some horror stories that I think everybody can recite. Our biggest problem is how do we deal with this in terms of a patent policy without being overly restrictive on either side.

Mr. LONSDALE. I assume that if we have these rights that we are talking about in your bill, we also retain our background patent rights.

Senator SCHMITT. Not necessarily. All our bill says is nothing shall be construed to deprive the owner of background rights. But it doesn't say that under some other policy or some other authority an agency couldn't deprive you of background rights if you agreed to those conditions in the contract. I don't think either large or small business generally would like to give up rights they have developed under their own auspices to the Government in order to get the rights to inventions that might come under a particular contract.

But again I can see—at least theoretically—circumstances where you might want to do that, or that might be certainly desirable to the public to have that happen. So we have to deal with this one. But if you have any other thoughts, I would appreciate it.

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How important are the patent rights to, particularly, a big company. I am hearing more and more people say that it is not worth it. The rate of exchange is so fast, technological changes so great, that you have to get out there and get a return on your investment and don't worry about the patent. It takes too much time to get it anyway.

Mr. HARR. We probably each want to take a crack at that. We can't generalize, Senator. Probably that philosophy you are talking about is pretty pervasive as a general proposition, but when patents come along that are important, they are terribly important.

Mr. WITT. We looked at a couple of cases that I think really pins it down with specific instances. One I found, for instance, was a new coating that we got into. We feel this could be what we call a next generation high temperature coating which is very important in our business. It could have Government as well as commercial uses. But because we would lose a patent title, we refused to deal with the Government.

So we are going ahead with our own R. & D., but it is at a slightly reduced pace. In another case, we went into an alloy development which we considered very important. Talking with NASA about that, they said they wanted the rights and so forth. We turned them down and said it is not worth it. We were later checked into by the Department of Defense, and they took a different tack, which brings up the difference in policies in the Federal Government.

They essentially said: "We need to get this expertise, and we want you to develop it, but we will not insist on title to it." So we went ahead and dealt with DOD after turning down NASA. I think these are the kinds of problems that you emphasize in your statement to the effect that we ought to have a uniform policy.

Senator SCHMITT. So long as it is a good one.

Mr. WITT. As long as it leans the right way.

Mr. MCCLOSKEY. I think patents are just one factor in the overall weighing of the company's desire to commercialize an invention. It is an important one in the world market where competitive developments are being fostered in other countries, and one has to have the capability of having some protection either in those countries or in his own market.

In addition, there are a number of cross-licenses that exist. That is the trading material that companies use, if you will, the quid pro quo. That is particularly true in the international market.

Mr. HARR. I think their absence would be severely noted in terms of motivation commercially and in investment if you didn't have patent protection.

Senator SCHMITT. There are some companies that because of the delay in obtaining patents just go ahead and market without them. Is that not correct?

Mr. HARR. The evaluation of the timing of the importance against the patent protection.

Mr. MCCLOSKEY. That is true if that company is the potential owner of the patent, or is at least the licensed. They are reluctant to do it when the patent belongs to someone else.

Senator SCHMITT. What about these 28,000 old Government-owned patents, that are sitting around that only a small percent-

age, as we heard this morning, are being utilized. Do you have any guidance to the committee for what we ought to include in the legislation to deal with those? You heard my conversation with Mr. Johnson about working out some mechanism whereby, depending on the interests of some individuals, they could be dealt with on a case-by-case basis under the guidance of the legislation.

Mr. WITT. I certainly agree that there is—the one line descriptions of them leave so much to be desired that we can't tell what they are talking about. I was looking at a list the other day, and it is so cryptic that it is very difficult to even develop the basic idea of what they are driving at—which technology you are approaching.

Mr. MCCLOSKEY. There are two options. One is passing the title to the companies that invented them originally and see what they would do with them. The other alternative——

Senator SCHMITT. Let them have the first crack at it, if they still exist and still want them.

Mr. MCCLOSKEY. The other is to let an entrepreneur go out and sell them, and I guess there are companies that do exist that try to handle the research of the product of the universities. Perhaps they could be salesmen for the patents on some form of an equity participation.

Senator SCHMITT. Mr. Lonsdale, would you search through these, if you had access, and try to find some.

Mr. LONSDALE. Our firm is too small to take advantage of them, but I would agree with Mr. McCloskey.

Senator SCHMITT. For the time being you are too small, but I'm sure your incentive is to get to a point where you aren't too small.

Mr. LONSDALE. I would say let the companies invent them——

Senator SCHMITT. Every small business is a big business way down inside.

Mr. LONSDALE. Probably so. But let the inventors have first crack at them, and I would add with recoupment. I believe in recoupment.

Senator SCHMITT. Gentlemen, I have to move on. We appreciate your testimony, and it is an exciting subject, even though not very many people may get excited about it. It is one which we have to come to some conclusion on. It is at the core of many of the problems that we have today.

Thank you.

STATEMENTS OF HOWARD W. BREMER, PATENT COUNSEL, WISCONSIN ALUMNI RESEARCH FOUNDATION; AND DR. WILLARD MARCY, VICE PRESIDENT, RESEARCH CORP.

Senator SCHMITT. Mr. Bremer, will you proceed first, please.

Mr. BREMER. Yes. Thank you very much.

I appreciate the opportunity to participate in these hearings and present the views of academia. My remarks today are made on behalf of the University of Wisconsin, the American Council on Education which is the largest association of colleges and universities in the Nation, the Committee on Government Relations of the National Association of College and University Business Officers, and the Society of the University Patent Administrators.

I have been engaged in the transfer of technology from the University of Wisconsin for the past 19 years as patent counsel for the Wisconsin Alumni Research Foundation, which foundation functions as the invention and patent administration arm of the University of Wisconsin, and I have drawn upon that experience and the experience of numerous colleagues of mine who have been similarly engaged for these remarks.

I might add at this point that part of that experience also involved an adamant position by the Department of the Interior on an ore processing invention which discouraged commercial participation.

Fundamental to the position of the university community with regard to the disposition of property rights resulting from research and development activities sponsored and funded in whole or in part by the Federal Government are certain strong beliefs which have been amply reinforced by the experience of many years. Among these are the following:

One, that the patent system, imperfect though it may be, is the key to the conversion of scientific knowledge into production benefiting human welfare;

Two, that, as stated by Chief Judge Markey of the CCPA, no institution has done so much for so many with so little public and judicial understanding as has the American patent system;

Three, that the basic consideration in the disposition of intellectual property rights should not be whether the Government or the contractor should take title to such property when it is generated in whole or in part with Government funding, but, in whose hands will the vestiture of primary rights to an invention serve to transfer the inventive technology most quickly to the public for its use and benefit.

Four, that the absence of a uniform Government patent policy has been a serious disincentive to successful technology transfer from the university to the public and has, in fact, often deprived the public of the fruits of basic research;

Five, that the absence of a uniform Government patent policy which reflects and supports our system of free enterprise has helped to put the United States at peril in the world economic scene;

Six, that science has over the years been made increasingly subservient to politics, with decisions being made not on scientific facts but on political opportunity;

Seven, that the talent of invention must be given the maximum encouragement by providing the inventor and the process of technology transfer all necessary stimuli to inventive and innovative activity in a free enterprise environment;

Eight, that the less restrictive a Government patent policy is, the greater is the transfer of technology under the policy; and

Nine, that a uniform Government patent policy under which the contractor has the first option to acquire title to inventions made in whole or in part with Government funds will provide the maximum stimulus to invention and innovation and will be in the public interest.

It appears to us that the goals of S. 1215 and the university community are essentially the same, and, as an instrument toward

achieving such goals, the university community, as represented by the organizations on behalf of which I speak, supports S. 1215.

At the outset it must be presumed that Government research dollars are made available in the expectation of not only developing basic knowledge, but also in the expectation that the funded research will lead to products, processes, and techniques which will be useful and acceptable in all or part of our society to improve the well-being of the society in general.

In the face of this presumption it is apparent that inventions, whether made through the expenditure of private or governmental funds, are of little use to society unless and until they are utilized by society. In order to achieve such utilization it is essential that the invention be placed in a form or condition which will be acceptable and beneficial to the public.

In a free enterprise system, such transfer is normally accomplished as the result of pertinent and appropriate activities of private enterprise. Such activities obviously entail the commitment and expenditure of substantially money—generally estimated at 10 times or more of the amount needed to make the invention. Obviously, adequate and appropriate incentives to such commitment and expenditures must be afforded.

Consequently, and since the patent system provides such incentives and is the most viable vehicle for accomplishing the transfer of technology, full and careful consideration must be given to the making of any patent policy which will affect the transfer of technology that has been generated in whole or in part by Government-funded research.

One can truthfully say that at best the Government patent policy has been nonuniform and at worst has been a nonpolicy with the result that some 20 or more agency policies have developed, and even those have not been necessarily uniformly applied. At the one extreme, some of the agencies advocated the title policy. At the other extreme were those agencies advocating the license policy. There were also many and varied policies between these two extremes.

Governmental agencies operating under the title policy insisted on acquiring title to all contractor generated inventions and patents on them, including inventions which were only incidental to the major purpose of the contract, and then dedicated them to the public through publication, or by offering a license on a nonexclusive, royalty-free basis under any patents obtained to all who requested it. The argument was that all these inventions, including the incidental inventions, should be acquired because they had been paid for by the Government and should therefore be owned by the Government.

Agencies which adopted the license policy permitted the contractor to take and keep title to inventions and patents arising under the contract, while reserving a royalty-free license in the Government to practice the inventions for governmental purposes. The theory which these agencies applied was that inventions and patents are only incidental to the specific research or products contracted for and that equity demands nothing more than a royalty-free right for the Government to use the inventions.

Since within the universities, more often than not, an investigation is carried out with funds acquired under grants and contracts with more than one Government agency, and perhaps also with commingled funds derived from other sources, the uncertainties as to the applicable patent policy militated strongly against the successful transfer of the technology developed. Generally, and most unfortunately, the most restrictive policy was applied and without much attention to the equities of the respective funding parties, again with an adverse effect on possible transfer of the technology to the public. It has been the experience of years within the universities that the more "title" oriented an agency is toward inventions and patents generated under its funding, the less the likelihood exists that the technology will be successfully transferred for the public benefit.

An interesting comparison along these lines was made by Harbridge House in its 1968 study of government-funded patents put into use in 1957 and 1962. It was found that contractor-held inventions were 10.7 times as likely as government-held inventions to be utilized in products or processes employed in the private sector for the benefit of the public. Moreover, based upon experience, particularly under the Institutional Patent Agreements as between universities and nonprofit organizations on the one hand and the Department of Health, Education, and Welfare and the National Science Foundation on the other hand, there is no reason to suspect that a different conclusion would be reached today.

It seems axiomatic that since the patent system was created as an incentive to invent, develop, and exploit new technology—to promote science and useful arts for the public benefit—when the government holds the patent under the aegis that the inventions of the patent should be freely available to all, much the same as if the disclosure of the invention had been merely published, the patent system cannot operate in the manner in which it was intended. The incentives inherent in the right to exclude conferred upon the private owner of a patent, and which are the inducement to development efforts, are simply not available.

Although for some 20 or more years the argument swirling about the ownership of inventions made in whole or in part with Government funds was lodged in rhetoric and not in fact, since 1968, after the first of the new Institutional Patent Agreements were established, a body of evidence has been building which we believe clearly establishes that the universities have been highly successful in transferring technology left with them through licensing under patents while the attempts to license Government-owned inventions has been singularly unsuccessful.

Moreover, and of direct importance to the economic well-being of the United States, is the fact that the Government patent policy has made much of the technology generated with Federal funding available without charge or restriction to foreign countries and companies who have very successfully utilized such technology to capture from their U.S. competitors large segments of various markets. The inevitable result was, of course, an increasing balance of trade deficit.

The university community, in espousing an enlightened uniform government patent policy which will provide an incentive to the

transfer of technology, philosophically believes that such policy should apply to all Government contracts. As a practical matter, however, the greater need for the patent incentive lies primarily with the universities, nonprofit organizations, and small businesses.

Technology transfer by universities and nonprofits depends entirely on the underlying patent position, and for small business the patent right is an important element in its ability to compete. Nor should such a policy differentiate as between research and development results which are intended for the Government's own use and those which are intended for civilian purposes. It must be presumed in both situations, as pointed out earlier, that the goal of research and development is to generate processes, products, and techniques which will become available to and benefit society in general.

In the light of the performance data and information which is available from experience with the Institutional Patent Agreements there is little doubt in the university community that a uniform government patent policy under which the contractor has the first option to acquire title to inventions made in whole or in part with government funds will provide the maximum stimulus to invention and innovation and will also be in the best interest of the public and of the United States.

We also firmly believe that such a bill should contain appropriate provisions which will protect the contractor against arbitrary acts by agency individuals which might deny the rights in the contractor or delay the effort to transfer the technology. To that end it should not provide for the surrender of background patents and should not have compulsory licensing provisions.

Also, from the university viewpoint and given the fact that most university-generated inventions are embryonic in nature and require a great deal of development, and often are ahead of their time in the commercial sense, and also given the absence of evidence of abuses in the administration of inventions generated in whole or in part with government funds, and also the need for exclusivity in order to convey some exclusivity as an incentive, university communities do not favor a limitation on the contractor's exclusive rights in the invention.

The inclusion of a reasonable payback provision in such a bill would be acceptable to the universities, although the return to the public and the country from successful technology transfer in terms of tangible moneys from taxes, such as corporate and individual income taxes, and from foreign sources in licensing and know-how fees, and also in intangible benefits, such as in the successful treatment or prevention of disease or improvements in the quality of life, makes the concern about payback rather insignificant.

Moreover, the cost of development of an invention to the market is many times the cost of making the invention originally and any payback should perhaps reflect the relative risk dollar equities involved and also reflect the fact that inventions are almost always incidental to the federally funded research objective.

We have some specific suggestions for revisions in S. 1215, but suffice it to say that our primary concerns are with the criteria

established for the "qualified technology transfer program," and that under section 301, the presumption to title or appears to lie in favor of the Government. We would like to have that presumption stated more positively in the direction of the contractor taking title, with certain exceptions, and not that the Government takes title under certain stated exceptions.

It is a perhaps philosophical point but we think it is important.

Throughout our considerations, we kept in mind the words of Adam Smith in "The Wealth of Nations" where he says:

> The uniform, constant and uninterrupted effort of every man to better his condition * * * is frequently powerful enough to maintain the natural progress of things toward improvement in spite both of the extravagance of government and the greatest errors of administration.

We look upon S. 1215 as an effort and perhaps a means to curb both the extravagance of governments and its errors of administration in addressing technological innovation.

I would like to include a document in the record, which is a lengthy treatment of the impact of Government patent policy upon competition, innovation, public health, economic growth and jobs and foreign competition.

Senator SCHMITT. I certainly hope you will do that. The record will be open.

Mr. BREMER. Thank you for the opportunity to express these views.

Senator SCHMITT. Before I go to Mr. Marcy, did you comment on the issue of march-in rights?

Mr. BREMER. I did not specifically. We have lived with march-in rights in our institutional patent agreements with HEW now for some 10 years and with the National Science Foundation since 1973, and have not found them onerous.

[The statement and document referred to follows:]

STATEMENT OF HOWARD W. BREMER, PATENT COUNSEL, WISCONSIN ALUMNI RESEARCH FOUNDATION

The invitation and opportunity to participate in the hearings on S. 1215 and present the views of academia is much appreciated.

My remarks today are made on behalf of the University of Wisconsin which is ranked among the top ten universities in the country for academic excellence; the American Council on Education which is the nation's largest association of colleges and universities, numbering among its members approximately 1300 institutions of higher education, 20 national and regional associations, and 80 affiliated institutions and organizations concerned with higher education in the United States; the Committee on Government Relations of the National Association of College and University Business Officers, which Committee is supported by 119 leading universities which, as a group, are the recipients of over 90 percent of the funds made available to higher education through contracts and grants for scientific activities; and the Society of University Patent Administrators, which is a professional society of individuals all of whom has some responsibility for administering inventions and patents in connection with some university and which now counts 111 members connected with 77 separate universities.

I have been engaged in the transfer of technology from the university environment to the public sector for the past 19 years as Patent Counsel for the Wisconsin Alumni Research Foundation, which Foundation functions as the invention and patent administrative arm of the University of Wisconsin, and have drawn upon that experience as well as the experience of numerous colleagues of mine who have been similarly engaged for these remarks.

Fundamental to the position of the university community with regard to the disposition of property rights resulting from research and development activities sponsored and funded in whole or in part by the Federal Government are certain

strong beliefs which have been amply reinforced by the experience of many years. Among these are the following:

1. that the patent system, imperfect though if may be, is the key to the conversion of scientific knowledge into production benefitting human welfare;

2. that, as stated by Chief Judge Markey of the CCPA, no institution has done so much for so many with so little public and judicial understanding as has the American patent system;

3. that the basic consideration in the disposition of intellectual property rights should not be whether the Government or the contractor should take title to such property when it is generated in whole or in part with Government funding but, in whose hands will the vestiture of primary rights to invention serve to transfer the inventive technology most quickly to the public for its use and benefit;

4. that the absence of a uniform government patent policy has been a serious disincentive to successful technology transfer from the university to the public and has, in fact, often deprived the public of the fruits of basic research;

5. that the absence of a uniform government patent policy which reflects and supports our system of free enterprise has helped to put the U.S. at peril in the world economic scene;

6. that science has over the years been made increasingly subservient to politics, with decisions being made not on scientific facts but on political opportunity;

7. that the talent of invention must be given the maximum encouragement by providing the inventor and the process of technology transfer all necessary stimuli to inventive and innovation activity in a free enterprise environment;

8. that the less restrictive a Government patent policy is, the greater is the transfer of technology under the policy; and

9. that a uniform Government patent policy under which the contractor has the first option to acquire title to inventions made in whole or in part with the Government funds will provide the maximum stimulus to invention and innovation and will be in the public interest.

It appears that the goals of S. 1215 and the university community are essentially the same and, as an instrument toward achieving such goals, the university community, as represented by the organization on behalf of which this testimony is given, supports S. 1215.

At the outset it must be presumed that Government research dollars are made available in the expectation of not only developing basic knowledge, but also in the expectation that the funded research will lead to products, processes and techniques which will be useful and acceptable in all or part of our society to improve the well-being of the society in general.

In the face of this presumption it is apparent that inventions, whether made through the expenditure of private or governmental funds, are of little value to society unless and until they are utilized by society. In order to achieve such utilization it is essential that the invention be placed in a form or condition which will be acceptable and beneficial to the public. In other words, the technology must somehow be transferred to the public sector.

In a free enterprise system such transfer is normally accomplished as the result of pertinent and appropriate activities of private enterprise. Since such activities obviously entail the commitment and expenditure of substantial monies—it has been estimated at 10 times or more of the amount needed to make the invention—adequate and appropriate incentives to such commitment and expenditures must be afforded. Consequently, and since the patent system provides such incentives and is the most viable vehicle for accomplishing the transfer of technology, full and careful consideration must be given to the making of any patent policy which will affect the transfer of technology that has been generated in whole or in part by Government funded research.

One can truthfully say that at best the Government patent policy has been non-uniform and at worst has been a non-policy with the result that some 20 or more policies have developed, generally on an Agency-by-Agency basis and which have not been even necessarily uniformly applied. At the one extreme, some of the Agencies advocated the "title" policy. At the other extreme was those Agencies advocating the "license" policy. There were also many and varied policies between those two extremes.

Governmental agencies operating under the "title" policy insisted on acquiring title to all contract-generated inventions and patents on them, including inventions which were only incidental to the major purpose of the contract, and then dedicated them to the public through publication, or by offering a license on a nonexclusive, royalty-free basis under any patents obtained to all who requested it. The argument was that all these inventions, including the incidental inventions, should be ac-

quired because they had been "paid for" by the Government and should therefore be owned by the Government.[1]

Agencies which adopted the "license policy" permitted the contractor to take and keep title to inventions and patents arising under the contract, while reserving a royalty-free license in the Government to practice the invention for Governmental purposes. The theory which these Agencies applied was that inventions and patents are only incidental to the specific research or products contracted for and that equity demands nothing more than a royalty-free right for the Government to use the inventions.

Since within the universities, more often than not, an investigation is carried out with funds acquired under grants or contracts with more than one Government Agency, and perhaps also with co-mingled funds derived from other sources, the uncertainties as to the applicable patent policy militated strongly against the successful transfer of the technology developed. Generally, and most unfortunately, the most restrictive policy was applied and without much attention to the equities of the respective funding parties, again with an adverse effect on possible transfer of technology to the public. It has been the experience of years within the universities that the more "title" oriented an Agency is toward inventions and patents generated under its funding the less the likelihood exists that the technology will be successfully transferred for the public benefit.

An interesting comparison along these lines was made by Harbridge House in its 1968 study[2] of Government-funded patents put into use in 1957 and 1962. It was found that contractor-held inventions were 10.7 times as likely as Government-held inventions to be utilized in products or processes employed in the private sector for the benefit of the public. Moreover, based upon experience, particularly under the Institutional Patent Agreements as between universities and non-profit organizations on the one hand and the Department of Health, Education, and Welfare and the National Science Foundation on the other hand, there is no reason to suspect that a different conclusion would be reached today.

It seems axiomatic that since the patent system was created as an incentive to invent, develop and exploit new technology—to promote science and useful arts for the public benefit—when the Government holds the patent under the aegis that the inventions of the patent should be freely available to all, much the same as if the disclosure of the invention had been merely published, the patent system cannot operate in the manner in which it was intended. The incentives inherent in the right to exclude conferred upon the private owner of a patent, and which are the inducement to development efforts, are simply not available.

Although for some 20 or more years the argument swirling about the ownership of inventions made in whole or in part with Government funds was lodged in rhetoric and not in fact, since 1968, after the first of the new Institutional Patent Agreements was made with the Department of Health, Education, and Welfare, a body of evidence has been building which we believe clearly establishes that the universities have been highly successful in transferring technology left with them through licensing under patents while the attempts to license Government-owned inventions has been singularly unsuccessful. Moreover, and of direct importance to the economic well-being of the United States, is the fact that the Government patent policy has made much of the technology generated with Federal funding available without charge or restriction to foreign countries and companies who have very successfully utilized such technology to capture from their U.S. competitors large segments of various markets. The inevitable result was, of course, an increasing balance of trade deficit.

The university community, in espousing an enlightened uniform Government patent policy which will provide an incentive to the transfer of technology, philosophically believes that such policy should apply to all Government contracts. As a practical matter, however, the greater need for the patent incentive lies primarily with the universities, nonprofit organizations and small business. Technology transfer by universities and nonprofits depends entirely on the underlying patent position, and for small business the patent right is an important element in its ability to compete. Nor should such a policy differentiate as between research and develop-

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[1] See, Public Citizen v. Sampson, 379F Supp. 662 (D.D.C. 1924) aff'd, 515 F. 2d 1018 (D.C. Cir. 1975); Press release by Senator Gaylord Nelson (Wis.) of the Senate Monopoly Subcommittee of the Senate Small Business Committee on Dec. 9, 1977 re the Government giving rights to inventions to contractors; Also, hearings held by Senator Nelson on GSA proposed changes in the FPR issued March 18, 1978; Hearings before the Subcommittee on Monopoly and anticompetitive Activities of the Select Committee on Small Business United States Senate, 95th Congress, 2nd Session on Government Patent Policies, May 22, 23, June 20, 21, and 26, 1978.

[2] Harbridge House Inc., Government Patent Policy Study for the FCST Committee on Government Patent Policy, May 15, 1968.

ment results which are intended for the Government's own use and those which are intended for civilian purposes. It must be presumed in both situations, as pointed out earlier, that the goal of research and development is to generate processes, products and techniques which will become available to and benefit society in general.

In the light of the performance data and information available from experience with the Institutional Patent Agreements there is little doubt in the university community that a uniform Government patent policy under which the contractor has the first option to acquire title to inventions made in whole or in part with Government funds will provide the maximum stimulus to invention and innovation and be in the best interest of the public and of the United States.

We also firmly believe that such a bill should contain appropriate provisions which will protect the contractor against arbitrary acts by Agency individuals which might deny the rights in the contractor or delay the effort to transfer the technology. To that end it should not provide for the surrender of background patents and should not have compulsory licensing provisions. Also, from the university viewpoint, given the facts that most university-generated inventions are embryonic in nature and require a great deal of development and further, that they are often ahead of their time in a commercial sense, and given the absence of evidence of abuses in the administration of inventions generated in whole or in part with Government funds, and the need for exclusivity in order to convey some exclusivity as an incentive to development, the university community does not favor a limitation on the contractor's exclusive rights in an invention.

The inclusion of a reasonable payback provision in such a bill would be acceptable to the universities, although the return to the public and the country from a successful technology transfer in terms of tangible monies from taxes, such as corporate and individual income taxes, and from foreign sources in licensing and know-how fees, and in intangible benefits, such as in the successful treatment or prevention of disease or improvements in the quality of life, makes the concern about payback rather insignificant. Moreover, and as was mentioned before, the cost of development of an invention to the market is many times the cost of making the invention originally and any payback should reflect the relative risk dollar equities involved and also reflect the fact that inventions are almost always incidental to the Federally funded research objective.

Turning now to the specific provisions of S. 1215, the university community has some recommendations which, based upon many years of experience with the technology transfer process and the interrelationship with the Government, will improve the bill. These are set out below.

Section 103 definitions

The definition of a "qualified technology transfer program" in Section 103(13) is drafted so that it is intended to include the five separate requirements listed. If the technology transfer program responds to the five criteria listed (with the revisions suggested below), the program should be considered to be qualified. The word "includes" leaves the requirement for a qualified program open-ended and susceptible to inclusion of a number of other qualifications, perhaps even an agency-by-agency determination of such qualifications. This could easily frustrate the desire for uniformity.

We recommend changing the word "procedures" in Section 103(13)(iii) and (iv) to "provisions" and in (v) delete the words "an active and effective promotional" and insert "a viable."

Section 201 implementation and section 202 agency technology utilization program

Reservation were expressed about the provisions of Section 201 with all the indicated functions to be performed by the Secretary of Commerce. This along with the provisions of Section 202, relating to development and implementation of Technology Utilization Programs within each agency would likely result in building an unnecessary bureaucracy with all of its attendant paperwork and administrative problems. Notwithstanding the provisions of Section 301(b), the provisions of Sections 201 and 202 may promote a greater tendency by an agency to except inventions under the provisions of Section 201(3) at the time of contracting, with a view of later utilizing Section 303 after an invention has been identified. It is our opinion that this could be construed to permit a case-by-case determination of patent title in each agency that establishes a technology transfer program. We know from the experience that case-by-case determination procedures are unworkable.

These sections should be either deleted or carefully circumscribed to prevent use not anticipated by the bill.

Section 301 right of the government

We recommend that Section 301 state a positive presumption of title to the contractor and then list the exemptions.

Throughout our consideration of the provisions of S. 1215 we have had in mind the words of Adam Smith: "The uniform, constant, and uninterrupted effort of every man to better his condition * * * is frequently powerful enough to maintain the natural progress of things toward improvement, in spite both of the extravagance of government and of the greatest errors of administration."—Wealth of Nations, 1776.

We look upon S. 1215 as an effort and perhaps means to curb both the extravagance of Government and its errors of administration in addressing technological innovation.

Thank you for the opportunity to express these views.

Mr. Chairman, with your permission I would like to submit an additional document for inclusion in the record. This is a paper entitled: "Public Patents—Public Benefit Synonyms or Antonyms?" which I prepared for a meeting of the State Bar of Wisconsin and which discusses the impact of Government patent policy on competition, innovation, public health, economic growth and jobs, and foreign competition.

PUBLIC PATENTS—PUBLIC BENEFIT SYNONYMS OR ANONYMS?

Since the term "Public Patents" used in the title of this paper can mean different things to different people, it is to be understood that for purposes of this paper it means those patents to which title resides in the United States Government and under which a royalty-free nonexclusive license is generally available.

Introduction

To enable us to consider the question posed by the title to this paper we must look at the constitutional basis for patents and the development and impact of Government patent policy with regard to the allocation and disposition of property rights resulting from research and development activities sponsored and funded in whole or in part by the Government operating through various of its Agencies.

Of all the controversial subjects which have been addressed by members of Congress and discussed by newspaper editors and columnists over the years, none appears to be less understood than the policy governing the allocation and disposition of rights to inventions arising out of Government-financed research and development.

The basic issue is whether the Government should always take the commerical rights to patentable inventions generated under a Government sponsored contract or from Government-funded research or whether such rights would better be left with the contractor or fund recipient to permit him to utilize the patent system in transferring the technology developed to the public sector for its benefit.

The talent of invention—an expression of intellectual originality—must be given the maximum encouragement by providing the inventor with all necessary stimuli to inventive activity. The patent laws provide the major stimulus to such activity for they are intended to afford the inventor protection for his intellectual property.

Technological advance is essential to this country maintaining its international leadership and there can be little such advance without adequate reward for the inventive mind. Therefore, a viable and sound system of patent laws is essential to the economic well-being of this country. As Abraham Lincoln said "The patent system added the fuel of interest to the fire of genius."

Constitutional basis

As we all know, the Constitution was drafted in the context of a struggle with a Government which had abused its obligations to defend the rights of its citizens. It was no accident, therefore, that the salient portion of the Constitution drafted for the purpose of protecting your liberties, the fifth amendment, made the Government the servant and protector and not the master of your individual rights.

The fifth amendment of the Bill of Rights provides that: "No person shall —— be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use without just compensation."

Thus, the fifth amendment provides generic protection for all individual property. Since there is little doubt than the term "property"; as used in the fifth amendment includes intellectual property, it would seem that the protection afforded the individual by that amendment would be adequate. Yet the framers of the Constitution felt compelled to be even more explicit about intellectual property and provided the

following language in Article 1, Section 8: "The Congress shall have Power —— To promote the Progress of Science and useful arts, by securing for limited Times to Authors and Inventor the exclusive Right to their respective Writings and Discoveries."

Why this special handling of intellectual property?

There was no recorded debate in the Constitutional Convention on September 5, 1787, when Article I, Section 8, was presented and it was approved unanimously. That the products of the mind should prospectively receive legal protection, even from a centralized Government to be formed, was a principle upon which no one disagreed.

As evidenced by subsequent statement by Madison, the chief architect of the Constitution, his interest in intellectual property did not end with the Constitutional Convention. For example, in the Federalist on January 23, 1788: "The utility of this power will scarcely be questioned. The copyright of authors has been solemnly adjudged, in Great Britain, to be a right of common law. The right to useful inventions seems with equal reason to belong to the inventors. The public good fully coincides in both cases with the claims of individuals. The States cannot separately make effectual provision for either of the cases, and most of them have anticipated the decision of this point by laws passed at the instance of Congress."

Then later, in a letter to Thomas Jefferson on October 17, 1788, he made a more important insight: "With regard to monopolies, they are justly classed among the greatest nusiances in Government, but is it clear that as encouragements to literary works and ingenious discoveries they are not too valuable to wholly renounced?[1] Would it not suffice to reserve in all cases a right to the public to abolish the privilege at a price to be specified in the grant of it? Monopolies are sacrifices of the many to the few. Where the power is in the few, it is natural for them to sacrifice the many to their own partialities and corruptions. Where the power, as with us is in the many, not in the few, the danger cannot be very great that the few will be thus favored. *It is much more to be dreaded that the few will be unnecessarily sacrificed to the many.*" (Italics added.)

In the above statement, and particularly in the last sentence, the answer to the need for specific protection of intellectual property, notwithstanding its inclusion in the generic term "property" in the fifth amendment, seems apparent. By use of the word "monopolies" Madison conveys that he was aware that the nature of an individual piece of intellectual property is such that it could be useful to all people and yet could be owned by one person, while diversity of ownership of all other categories of property precluded the possibility of monopoly. The strong possible argument against an indefinite monopolization of valuable intellectual property and its end product under only the fifth amendment and his recognition that "The States cannot —— make effectual provision", suggests that Madison was aware that the rights of the creative few would be in danger without clarification in Constitution. Thus, a compromise was struck under which intellectual property was to be owned for only a limited term during which the creator had the right to exclude others.

The power given under this clause is not general. Hence, it expressly appears that Congress is not empowered by the Constitution to pass laws for the benefit of protection of authors and inventors except as a means to "promote the Progress of Science and useful arts."

Under this specific power the present patent statute, Title 35 of the United States Code, was enacted. It is significant that the face of the patent document contains the following statement: "—these Letters Patent are to grant unto the said claimant(s)—the right to exclude others from making, using, or selling the said invention throughout the United States."

and that 35 USC 261 characterizes this right to exclude as a property right.

There is little if anything in the foregoing remarks that would appear subject to question and certainly not among those of you who deal with intellectual property on a day-to-day basis. Even those who have difficulty with the intellectual property clause do not advocate its repeal. Their argument has not been directed against the Government's responsibility for protection of private property and the special reward promised by the intellectual property clause. Rather their thrust has been to erode the concept through efforts to convince that there is an immediate need to limit the reward "in the public interest" or because of some public involvement, e.g. through partial funding by Government, in the difficult and generally imperfectly understood delivery process through which intellectual property must move before reaching the public in usable form. These arguments, used in inappropriate situa-

[1] In this sentence Madison appears to distinguish between past monopolies on commodities granted as personal favors and the suggested monopoly for intellectual property.

tions are likely what Madison considered "to be dreaded" since then indeed "the few will be unnecessarily sacrificed to the many."

The issue

The issue presented by the title to this paper has become much more sharply focused because of the apparent loss of technological leadership by the United States[2] with its attendant negative effect upon the balance of payments and has been emphasized by the recent attack upon the dollar. How did that issue arise?

Historical

During the early history of our country very little technical development work was done by the Government and therefore, as a practical matter, the question of the Government owning a patent never arose. Gradually Federal agencies begun to undertake the practical kind of development work which led to inventions. Since prior to World War II almost all Government-financed research and development work was conducted in Federal laboratories by full-time Government employees, there was a small but recurring problem of what to do with inventions resulting from such work—inventions which, if made by private parties, would have become the subject of patent applications.

This situation changed rapidly during and after World War II when the technological requirements imposed by more and more sophisticated military requirements as well as the increasing complexity of support services made it quickly evident that there were not sufficient resources within the Government to undertake all the scientific projects necessary to a winning war effort. The absolute necessity to utilize the best technical ability available, regardless of its locus, spawn a rapid proliferation of Government-sponsored and -funded research and development contracts.

The proper disposition of rights to patents resulting from this work was theoretically as important then as now but was never seriously addressed as a major problem because of the exigencies of wartime needs.

Post World War II the technological strides made under the impetus of a wartime footing and the obvious necessity for continued technological superiority, at least in defense-oriented efforts, made it imperative to continue to provide public support for science. Nor was this support limited to the military. For example, in 1950 Congress finally provided an annual budget limit of $15 million for the National Science Foundation to conduct basic scientific research at universities.

During this same period, hundreds of millions of dollars were appropriated by the Government in the area of medical research in the beginnings of an all-out attack on disease.

With the rapid expansion of scientific projects being undertaken and supported by the Government, the same shortage of technical ability and facilities continued to prevail as it had done under the pressures of World War II. Because the Government could not do all the necessary work in its own facilities, qualified private companies, universities and non-profit organizations were sought out to perform many of the programs via contractual arrangements. And the same old problem of ownership of patent rights existed in every one of the contracts.

Since there was no single or overriding patent policy which the Government had to rely upon, each governmental Agency which supported a research and/or development effort, through either or both of contractual or grant arrangements, developed its own policy. The obvious result was that many policies evolved. At the one extreme, some of the Agencies advocated the "title" policy. At the other extreme was those Agencies advocating the "license" policy. There were also many and varied policies between those two extremes.

Governmental agencies operating under the "title" policy insisted on acquiring title to all contract-generated inventions and patents on them, including inventions which were only incidental to the major purpose of the contract, and then dedicated them to the public through publication, or by offering a license on a nonexclusive, royalty-free basis under any patents obtained to all who requested it. The argument was that all these inventions, including the incidental inventions, should be ac-

[2] See Physics Today, Apr. 1978, p. 96—An Editorial by Betsy Ancker-Johnson, former Assistant Secretary of Commerce for Science and Industry; "The Innovation Recession", Time, Oct. 2, 1978; "Something's Happened to Yankee Ingenuity", The Washington Post, Sept. 3, 1978; "Vanishing Innovation", Business Week, July 3, 1978; "U.S. Losing Ideas Race—Other Nations Chip Away at America's Technology Empire", The Atlanta Journal, The Atlanta Constitution, May 21, 1978.

quired because they had been "paid for" by the Government and should therefore be owned by the Government.[3]

Agencies which adopted the "license policy" permitted the contractor to take and keep title to inventions and patents arising under the contract, while reserving a royalty-free license in the Government to practice the invention for Governmental purposes. The theory which these Agencies applied was that inventions and patents are only incidental to the specific research or products contracted for and that equity demands nothing more than a royalty-free right for the Government to use the inventions.

Other theories and contentions made by the advocates of the two policies, each in support of its own position, tended to finally so polarize the two groups that compromise seemed impossible.

Memorandum and statement of government patent policy

In 1963, Jerome Wiesner, President Kennedy's Science Adviser, recognizd a need for some guidelines to effect a more uniform Government policy toward inventions and patents on a Government-wide basis. The results of Dr. Wiesner's study culminated in the Policy Statement issued on October 10, 1963 by President Kennedy [4] to establish Government-wide objectives and criteria, subject to existing statutory requirements, for the allocation of rights to inventions as between the Government and its contractors which would best serve the overall public interest while encouraging development and utilization of the inventions.

Since the policy, as promulgated, would most likely have to be revised after experience had been gained in operating under it, a Patent Advisory Panel was established under the Federal Council for Science and Technology to assist the Agencies in implementing the Policy, acquiring data on the Agencies' operations under the Policy, and making recommendations regarding the utilization of Government-owned patents. In December 1965, the Federal Council established the Committee on Government Patent Policy to assess how the Policy was working.

The studies and experience of the Committee and the Panel culminated in the issuance of a revised Statement of Government Patent Policy by President Nixon on August 23, 1971.[5] The changes effected in the Nixon Policy Statement were made as a result of analysis of the effects of the Policy on the public interest over the seven years from the Kennedy Policy Statement. It was stated that the studies and experience over the seven years indicated that:

(a) A single presumption of ownership of patent rights to Government-sponsored inventions either in the Government or its contractors is not a satisfactory basis for Government patent policy, and that a flexible, Government-wide policy best serves the public interest;

(b) The commercial utilization of Government-sponsored inventions, the participation of industry in Government research and development programs, and commercial competition can be influenced by the following factors: the mission of the contracting agency; the purpose and nature of the contract; the commercial applicability and market potential of the invention; the extent to which the invention is developed by the contracting agency; the commercial orientation of the contractor and the extent of his privately financed research in the related technology; and the size, nature and research orientation of the pertinent industry.

(c) In general, the above factors are reflected in the basic principles of the 1963 Presidential Policy Statement.

The considerations basic to the Statement of Government Patent Policy are the following:

(a) The Government expends large sums for the conduct of research and development which results in a considerable number of inventions and discoveries.

(b) The inventions in scientific and technological fields resulting from work performed under Government contracts constitute a valuable national resource.

(c) The use and practice of these inventions and discoveries should stimulate inventors, meet the needs of the Government, recognize the equities of the contractor, and serve the public interest.

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[3] See, Public Citizen v. Sampson, 379 F Supp. 662 (D.D.C. 1924) aff'd, 515 F. 2d 1018 (D.C. Cir. 1975); Press release by Senator Gaylord Nelson (Wis.) of the Senate Monopoly Subcommittee of the Senate Small Business Committee on Dec. 9, 1977 re the Government giving rights to inventions to contractors; Also, hearings held by Senator Nelson on GSA proposed changes in the FPR issued Mar. 18, 1978; Hearings before the Subcommittee on Monopoly and Anticompetitive Activities of the Select Committee on Small Business United States Senate, 95th Congress, 2nd Session on Government Patent Policies, May 22, 23, June 20, 21, and 26, 1978.

[4] Presidential Memorandum and Statement of Government Patent Policy (FR Vol. 28, No. 200, Oct. 12, 1963).

[5] Presidental Memorandum and Statement of Government Patent Policy (FR Vol. 66, No. 166, Aug. 26, 1971).

(d) The public interest in a dynamic and efficient economy requires that efforts be made to encourage the expeditious development and civilian use of these inventions. Both the need for incentives to draw forth private initiatives to this end, and the need to promote healthy competition in industry must be weighed in the disposition of patent rights under Government contracts. Where exclusive rights are acquired by the contractor, he remains subject to the provisions of the antitrust laws.

(e) The public interest is also served by sharing of benefits of Government-financed research and development with foreign countries to a degree consistent with our international programs and with the objectives of U.S. foreign policy.

(f) There is growing importance attaching to the acquisition of foreign patent rights in furtherance of the interest of U.S. industry and the Government.

(g) The prudent administration of Government research and development calls for a Government-wide policy on the disposition of inventions made under Government contracts reflecting common principles and objectives, to the extent consistent with the missions of the respective agencies. The policy must recognize the need for flexibility to accommodate special situations.

Although there is evidence that the guidelines did bring the patent practices of the Agencies into greater harmony, divergent policies still exist and there is a strong presumption, if not evidence in terms of the transfer of technology to the public sector, that the more restrictive the policy of the Agency, i.e. the more "title" oriented the Agency is toward inventions and patents generated under its funding, the less the likelihood exists that the technology will be transferred for the public benefit.

Notwithstanding the President's Statement of Patent Policy one must remember that such Policy establishes guidelines only and that today there are as many as 19 variant patent policies among the various Government Agencies, all presumed to exist within those guidelines.

Current agency practices

A. General

Executive Agencies have traditionally interpreted the provisions of the President's Statement on Government Patent Policy, or applicable statutes, to require the use of patent rights clauses in contracts (and in grants where universities and other non-profit organizations are involved—grants are not available to commercial or profit-making organizations) to provide either title in the Govenment in inventions generated in the performance of such contracts (or under such grants) or a deferred allocation of patent rights, the allocation of the rights taking place after the invention has been identified.

Even when the title clause is used by the Agency, and even where the disposition of patents rights is statutorily controlled as, for example, with the National Aeronautics and Space Administration and with the Energy Research and Development Administration, the clause many times may permit the contractor or grantee to request and obtain the principal rights in the invention with the Agency's agreement after the invention has been indentified.

Thus, there are three clauses which can and are used by the various agencies: (1) The license policy clause; (2) The deferred patent rights clause; (3) The title policy clause with waiver privileges.

Exemplary of patent policies of Government Agencies [6] which provide the bulk of research and development monies are the following:

Department of Health, Education, and Welfare—deferred determination, but permits Institutional Patent Agreements under which certain grantees and contractors are afforded first option on title to inventions made during the course of a grant or contract.[7]

National Science Foundation—deferred determination, but permits the use of Institutional Patent Agreements with certain contractors and grantees.

National Aeronautics and Space Administration (NASA)—statutorily controlled; has title policy with waiver possibility.

Energy Research and Development Administration (ERDA)—statutorily controlled; has title policy with waiver possibility.

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[6] For listing of current statutes, regulations, orders, manuals, memorandums and materials governing allocation of rights to inventions arising from Government-sponsored research on agency-by-agency basis see Report on Government Patent Policy by Federal Council for Science and Technology, U.S. Gov't. Printing Office 1978—281-067-289 available from the Superintendent of Documents.

[7] For historical interest re Institutional Patent Agreements and early DHEW practice see Report to the Congress on "Problem Areas Affecting Usefulness of Results of Government-Sponsored Research in Medicinal Chemistry" by the Comptroller General of the United States, Aug. 12, 1968.

Department of Transportation (DOT)—title policy.
Environmental Protection Agency (EPA)—title policy.
Department of Defense (DOD)—deferred determination (for health-oriented inventions).
Agency for International Development (AID)—title policy with waiver possibility.
Department of Agriculture—title policy (statute interpretation by Department as permitting only the taking of title).
Veteran's Administration (VA)—title policy with waiver possibility (generally a VA employee is involved and waiver therefore difficult).

The expression of patent policy for each of the foregoing Agencies is stated not necessarily in terms of its written policy, but in terms of its practical operation under that policy and the President's Statement.

There is no real consistency among the Agencies, or even within an Agency, or even necessarily from one contract to the next within an Agency, as to what the disposition of patent rights will be. It has become apparent that decisions regarding the disposition of patent rights are often made on an attitudinal or philosophical basis, for the decisions are not a function of law but of men.

Operating under these policies, which in the main has been a royalty-free nonexclusive licensing policy, the Government has accumulated in its patent portfolio about 28,000 patents of which only about 5 percent have been licensed [8] and of this 5 percent only a small portion have resulted in commerical products. Thus, the economic benefits intended to be stimulated by the patent system have not been derived by the Government or the public through such licensing of Government owned patents.

An interesting comparison along these lines was made by Harbridge House in its 1968 study [9] of Government-funded patents put into use in 1957 and 1962. It was found that contractor-held inventions were 10.7 times as likely as Government-held inventions to be utilized in products or processes employed in the private sector for the benefit of the public.

Government-owned patent—An anomaly

What is the situation that pertains when the Government takes ownership of a patent? It is in a sense an anomaly. The patent system was created as an incentive to invent, develop and exploit new technology—to promote science and useful arts for the public benefit. When the Government holds the patent under the aegis that the inventions of the patent should be freely available to all, much the same as if the disclosure of the invention had been merely published, the patent system cannot operate in the manner in which it was intended. The incentives inherent in the right to exclude conferred upon the private owner of a patent, and which are the inducement to development efforts, are simply not available.

With regard to Government ownership of patents an interesting bit of history is presented by Marcus B. Finnegan[10] in which he calls attention to the famous case of United States v. Dubilier Condenser Corporation. The court issued its original opinion on April 10, 1933.[11] Then on May 8, 1933, the court, on motion of the Solicitor General, struck from its opinion [12] a paragraph which questioned the authority of the Government to hold ownership to a patent thereby giving, by negative implication, judicial sanction to the Government's practice of taking title to patents. Of importance to the issue presented in the title to this paper is the following language from the stricken paragraph with respect to the question of whether title to the patented invention in dispute should be awarded to the Government: "In these circumstances no public policy requires us to deprive the inventor of his exclusive rights as respects the general public and to lodge them in a dead hand incapable of turning the patent to account for the benefit of the public."

The experience with licensing of Government-owned patents,[13] with the Government in the main espousing a nonexclusive licensing policy, has irrefutably been one of non-use. Indeed, when title to patents are vested in the Government under

[8] See Résumé of U.S. Technology Polices—Dr. Betsy Ancker-Johnson Les Nouvelles (Journel of the Licensing Executives Society) Dec. 1976, Vol. XI, No. 4, p. 186; Statement before the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, Dec. 11, 1976. (This latter document also contrasts the experience of universities in licensing patents owned by them some or most of which may have resulted from research supported in whole or part by Federal monies.)

[9] Harbridge House Inc., Government Patent Policy Study for the FCST Committee on Government Patent Policy, May 15, 1968.

[10] "The Folly of Compulsory Licensing" Les Nouvelles (Journal of the Licensing Executives Society) Vol. XII, No. 2, June 1977.

[11] 289 U.S. 178 (1933).

[12] 289 U.S. 706 (1933).

[13] Ibid—Resumé of U.S. Technology Policies (Note 8).

such a licensing policy one can conclude that they are lodged "in a dead hand incapable of turning the patent to account for the benefit of the public."

Optimum patent policy presumption

At the outset it must be presumed that Government research dollars are made available in the expectation of not only developing basic knowledge, but also in the expectation that the funded research will lead to products, processes and techniques which will be useful and acceptable in all or part of our society to improve the well-being of the society in general.

In the face of this presumption it is apparent that inventions, whether made through the expenditure of private or governmental funds, are of little value to society unless and until they are utilized by society. In order to achieve such utilization it is essential that the invention be placed in a form or condition which will be acceptable and beneficial to the public. In other words, the technology must somehow be transferred to the public sector.

In a free enterprise system such transfer is normally accomplished as the result of pertinent and appropriate activities of private enterprise. Since such activities obviously entail the commitment and expenditure of substantial monies —— many times the amount needed to make the invention [14]—adequate and appropriate incentives to such commitment and expenditures must be afforded. Consequently, and since the patent system provides such incentives and is the most viable vehicle for accomplishing the transfer of technology, full and careful consideration must be given to the making of any policy which will affect the transfer of technology that has been generated in whole or in part by Government-funded research.

Objectives of government patent policy

There is general agreement that the primary objectives of Government patent policy should be to (1) promote further private development and utilization of Government-supported inventions, (2) ensure that the Government's interest in practicing inventions resulting from its support is protected, (3) ensure that patent rights in Government-owned inventions are not used for unfair, anticompetitive or suppressive purposes, (4) minimize the cost of administering patent policies through uniform principles, and (5) attract the best qualified contractors.

However, of all of the considerations attendant upon the establishment of a Governmental patent policy only one consideration should be paramount: "In whose hands will the vestiture of primary rights to inventions serve to transfer the inventive technology most quickly to the public for its use and benefit?"

Recognition of this paramount consideration was plainly evident from the provisions of the National Science and Technology Policy, Organization and Priorities Action of 1976 [15] which directs OSTP to review current legislation and agency practices with the view of recommending and developing, "Federal patent policies * * * based on uniform principles, which have as their objective the preservation of incentives for technological innovation and the application of procedures which will continue to assure the full use of beneficial technology to serve the public."

Alternatives

Three major approaches to Government patent policy are available and all three are currently in use by various of the Agencies of the Government as pointed out above. These are:

1. Strict title in the Government [16]

Under this approach, as a condition of receiving a Government research grant or contract, the contractor would have to agree to transfer rights in all inventions made under the contract to the Government. The Government, in turn, would either dedicate the inventions to the public or license them itself.

2. A case-by-case approach

Under this approach individual agencies would select the patent clause to be used in each grant or contract on a case-by-case basis, and agencies would also in many cases delay the determination of whether contractors would retain rights until after inventions have been identified. Depending on the exact manner in which the policy

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[14] Ibid—Harbridge House Inc. Report, May 15, 1968. (Note 9).

[15] Title I, Section 101(c)(4) of P.L. 94-282.

[16] Assistant Attorney General John Shenefield, in advocating a title-in-the-Government approach in his appearance of December 20, 1977, before the Select Committee on Small Business, U.S. Senate, stated, "The competitive risk to the public in transferring title to the contractor may be especially high where transfer carries a danger of further entrenching the already strong market positions of many Government contractors."

is framed there may or may not be presumptions in favor of or against the taking of title by the Government.[17]

3. Title or first option to title in the contractor

Under this approach as a normal rule contractors or grantees would be allowed to retain title to inventions made under the award subject to a Government license and "march-in" rights.

The impact which these alternative policies would have on (1) competition, (2) innovation, (3) public health, (4) economic growth and jobs, (5) foreign competition, (6) contractor participation, and (7) and administrative costs entailed by the policy are important to their assessment. Several of what are considered to be the most important of these factors will now be considered.

Impact of patent policy on competition

Since those who favor a title-in-the-Government patent policy appear to advocated their position primarily on the basis of a belief that allowing contractors to retain title will be anticompetitive, and since the Antitrust Division of the Department of Justice also espouses this view,[18] it is believed to be one of the two most important considerations for discussion here.

The supposition that seems to underlie this argument is that most Government contractors are large, dominant firms and that if they are allowed to retain rights to inventions their dominance will be enhanced. Retention of "march-in" rights are apparently not deemed sufficient to prevent this. Following this approach, of course, necessitates also taking rights from smaller firms and universities that deal with the Government. However, it is argued that since these firms do a relatively small proportion of Government contracting, it is not worth worrying about the few inventions they make as compared to the great number coming out of the large firms.[19]

As an initial observation, it is to be noted that a substantial portion of Government R&D is conducted by universities and other high-technology comercial firms that are not dominant in any commercial markets. Even when Government prime contracts for major systems development are awarded to major corporations, some of the work is subcontracted with the result that some of the new and innovative ideas stem from lower-tier subcontractors. It is extremely unlikely that dominant firms receive even half of the total Federal extramural R&D budget.[20]

It is also believed likely that a substantial portion of Government R&D that goes to firms that are dominant in commercial markets would be found to be with major air frame and engine manufacturers that dominate both the Government and civilian markets in this area. It appears, however, to be fairly obvious that whether

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[17] The Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 590) is an example of such approach. It places the presumption in favor of the Government's taking title, but given ERDA (now DOE) considerable flexibility to decide otherwise depending on ERDA's evaluation of a variety of factors. In reality, this type of approach, which some claim represents a middle-ground, is not a uniform policy at all since agency practices will vary considerably depending on the predilections of agency officials involved in the process.

[18] Ibid. Remarks by Assistant Attorney General John Shenefield before Select Committee on Small Business. (Note 16)

[19] For example, Admiral Rickover, a leading proponent of the title-in-the-Government approach, in his statement of Dec. 19, 1977, before the Select Committee on Small Business, U.S. Senate in questioning the wisdom of allowing contractors to retain rights stated, "Since large corporations get the major share of Government contracts, they would be the ones to benefit the most from such a practice." Later, he claims, "Small business, for its own advantage, should be against a giveaway patent policy. The vast proportion of Government business goes to large contractors. . . If the rights to Government financed inventions are given away to contractors, the Government itself will be promoting the concentration of economic power in the hands of a few large conglomerates."

[20] The "NSF Surveys of Science Resources Series," NSF 77-301, Vol. XXV, "Federal Funds for Research, Development, and other Scientific Activities," estimates that out of a total Federal budget for basic, applied, and developmental extramural research in fiscal year 1977 of $17.428 billion, 30 percent was performed by universities and other nonindustrial performers. And in the sub areas of basic and applied research the industrial share was only around one-third. These statistics do not, however, provide any breakdown between the types of industrial performers, i.e. what percentage were small businesses. A recent draft study by the Office of Federal Procurement Policy finds that in fiscal year 1975, 7.8 percent of Federal R&D awards to industry from major agencies went to small business. However, this study covers only prime contracts and does not indicate the percentage of prime contracts to large firms that were subcontracted to small firms. It would also seem unlikely that all of the nonsmall business industrial firms dominate or control a substantial share of their commercial markets. Hence, at a minimum around 35 percent of Federal extramural R&D is performed by small business and nonindustrial institutions. Thus, it would be most unlikely that dominant firms actually receive even half of the total R&D extramural budget.

or not the Government takes title to the inventions of these companies the effects on competition in these capital intensive industries will be negligible. Indeed we would note that until the Justice Department recently took action to end this, there was a policy of cross-licensing within that industry which made inventions generally available.[21]

Whatever may be the exact distribution of the source of inventions made under Government contracts and grants, in the case of those inventions made by dominant firms one would find that in the vast majority of cases those firms' positions would not be affected vis-a-vis other U.S. firms by the disposition of rights in their inventions. Patents would probably be found to be of minor consequence in the maintenance of dominance in their industries (although in some cases they may have been an important factor in the early growth of the firms.)

In most cases superior financial resources, economies of scale, access to resources, and well-developed marketing and distribution systems will be found of much more consequence to the maintenance of dominant firms' market position. These are the factors that prevent new firms from entering the market and which prevent smaller firms from effectively competing and increasing their share of the market. Even if the Government took title to inventions of dominant firms, we believe that in most cases the factors listed above would prevent smaller firms from making any effective use of the inventions, the great bulk of which, in any case, are merely minor improvements on existing technology controlled by the inventing firms.

Conversely, smaller firms do not enjoy the advantages described above. For such firms, patent protection is a much more significant tool. When a smaller firm makes a new invention that has the potential of being developed into a new product which might increase that firm's share of the market, patent protection may be the only defense that that firm has to prevent larger firms from undercutting its market. Without patent protection, larger firms could, because of the advantages noted above, undercut any market developed by the smaller firms.

Thus it appears that a title-in-the-Government policy will have, at most, a marginal effect on the market position of already dominant firms, but that it will almost surely destroy the competition that might result from smaller firms developing inventions coming out of Government work.

There is another major shortcoming with the proposition that taking title from dominant firms will allow other firms to use the inventions so as to increase competition. First, it seems likely that the number of inventions reported to the Government would decrease if contractors saw no advantage to reporting them. Second, it is unclear just how other firms would learn of those inventions that were reported. Typically, invention reports come in as separate items or addendums to progress reports. Nor does there appear to be any systematic publication of reported inventions, per se, by the Government, and even if there were it is doubtful that this would be an effective means of achieving technology transfer of specific inventions. The closest approach currently available is the NTIS publication of Government-owned inventions available for licensing. However, publication, unless it is combined with other techniques, is not really a particularly effective way of alerting and interesting commercial firms in inventions (even if one assumes such firms would be willing to invest without exclusive rights). Then too, such publication serves to make foreign firms and countries aware of the technology and because of the relationship and cooperation between certain governments in foreign countries and firms within that country, competition from such foreign source based on the technology published could further adversely affect the balance of trade.

Notwithstanding the use of catch-words such as "patent give-away", "windfall" and, that most appealing to the uninformed, "what the Government pays for it should own" by the proponents of title-in-the-Government, there is no hard evidence to show that the "title" policy results in the transfer of any appreciable amount of technology for the public benefit. Quite to the contrary, there is strong evidence of the poor utilization of the technology of Government owned patents.[22]

The title-in-the-Government policy rejects out-of-hand the need for the patent incentive in the contractor in all situations and also rejects continuing participation by the investigator-inventor-an imperative consideration with university-generated inventions which tend to be embryonic in nature and which almost always require additional extensive development.

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[21] See the well-known "smog" case (U.S. v. Automobile Manufacturers Association, Civil No. 69-75 JWC (C.D. Cal. 1969)) and the complaint against the 40-year pooling arrangement in the aircraft industry (U.S. v. Manufacturer's Aircraft Association, 5 Trad. Reg. Rep. para. 45,072 (S.N.N.Y. 1972). It would appear that required nonexclusive licensing of undeveloped technology results in a "governmental patent pool" with the same negative effect upon innovation.

[22] Ibid. Resumé of U.S. Technology Policies (Note 8).

The economic health of the nation, long-term economic growth, and the maintenance of competition is much more dependent on stimulating the introduction of new products and technologies than it is on ensuring maximum competition in the manufacture and sale of a given product.

On balance, it must be concluded that a title-in-the-Government patent policy would prove anti-competitive as compared to the title or first option in the contractor policy.

The impact of patent policy on innovation

At the outset it is to be understood that innovation means the conversion of inventions made with Government support to commercial products and processes. The following remarks are to be considered in isolation from the competition objective discussed before and are intended to address only whether the chances of inventions being developed by anyone will be enhanced or diminished by one policy or the other.

It should also be clearly understood that many inventions that are reported under Government grants and contracts are by-products of the research being supported. This is certainly true of almost all university inventions. Similarly, very rarely does the Government support research and development to the point where a given product intended for the commercial market has been proven both technically and economically feasible so that private firms would view investment in the manufacture and marketing of the product as virtually risk-free. And even where a Government contract does have this objective, many of the inventions reported under that contract may still be by-products of the research or may have potential uses in areas not being tested by the Government. In those few cases where the Government is supporting full development, the supporting agency should have the discretion to use a deferred determination or other more restrictive patent clause.

Given the fact that the vast majority of Government-supported inventions have not been developed beyond the laboratory stage and will not be through Government support, it should be obvious that substantial private investment will be needed to bring the invention to the market.[23] This is particularly true with regard to inventions made at universities under Government funding and it is relatively rare for a firm to be willing to invest in the development of a university invention without being afforded some exclusivity.[24]

Similarly, in the case of inventions made directly by smaller firms under Government contracts or subcontracts, it is difficult to believe that such firms would normally be willing to invest in the further development of the invention without some exclusive rights.

In the case of larger firms the impact of the Government's obtaining patent rights to their inventions is less clear. It is certainly indisputable that many firms, especially in certain industries, would not invest without exclusive rights, and neither would any other firms with the possible exception of certain foreign firms that enjoy state-supported monopolies (having nothing to do with patents) in their home markets. On the other hand, there would undoubtedly be some cases when larger firms would work their inventions even without exclusive rights. Minor improvements might be integrated into on-going product lines, or new products might be developed by larger firms where the market potential was clear.

The conclusion that leaving title in contractors is much more likely to result in commercialization than is the Government's taking title is supported by the data developed by Harbridge House, Inc. in its 1968 study.[25] For example, Harbridge House examined all Government-supported inventions patented in 1957 and 1962. Of all the inventions utilized in this group, they found that the contractor held title to 203 and the Government to 7. In the total sample the Government held title to around 27 percent of the inventions.

The Harbridge House analysis indicates that all other things equal a firm with title is about twice as likely as a firm without title to commercialize an invention. It can also be documented that in the over-whelming number of instances in which universities have obtained licenses for their inventions an agreement could only be consumated on an exclusive basis.

It thus seems clear that the result of the Government keeping title will be to deter investment (innovation) in some cases, and to have a neutral effect in others. The only question that remains is whether this might be counterbalanced by some larger firms using their patent rights to suppress or defer the development of

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[23] U.S. Panel on Inventions and Innovations, "Technological Innovation: Environment and Management," pp. 8–9 (GPO, Jan. 1967).

[24] See Report of the University Patent Policy ad hoc Subcommittee, Appendix H, Report on Government Patent Policy referred to above.

[25] Ibid. (Note 9)

inventions that others might have been willing go develop had the Government held title. Experience indicates that such fears are largely unfounded and that, in any case, even if the Government held title, the likelihood of other firms developing most inventions would be small without some exclusive rights. It would seem that the Government would have to do more than merely take title. It would, in turn, in most cases have to grant someone else an exclusive license. But it could be asked what advantage there is to going through the cost and effort of such an exclusive licensing effort as opposed to allowing the inventing contractor, who is intimately familiar with the invention to retain rights with appropriate march-in provisions if no work is done on the invention to commercialize it?

For a variety of practical reasons, it would be a mistake to believe that a title-in-the-Government licensing approach could be as effective in promoting utilization as leaving title-in-contractors. First, as mentioned previously, a title-in-the-Government approach might eliminate the incentive for many grantees and contractors to report inventions. In the case of the university community it is the principal investigator who normally starts the process moving by identifying inventions. Since publication, and not patents, are critical to the careers of university investigators many are not motivated to report inventions.[26] However, this can be overcome by aggressive programs at the university to induce reporting, especially by an active licensing program that offers some possibility of financial reward for the inventor. Such incentives to the inventor are completely lost when the Government automatically takes title. Within the business sector, a similar decrease in reporting might result, although probably for different reasons.

Secondly, the government would be faced with an enormous increase in workload. For example, under a title-in-the-Government approach DOD would be faced with some 1500–2500 inventions a year on which a decision would have to be made concerning the filing of patents. If DOD continued to base that decision solely on potential military applications, it ought to be obvious that patent applications will not be filed on a number of inventions that have commercial potential but not military potential. Therefore, if one is to honestly argue that a title-in-the-Government approach will not have negative impacts on innovation, one must be prepared to say that DOD and other agencies must screen invention disclosures for commercial application, a task which is now done by DOD contractors who have the opportunity to elect rights (i.e., a first option on rights to inventions). However, that would require a substantial increase in DOD staff and resources devoted to such task.

To duplicate the efforts now undertaken by many contractors and a number of universities, the Government agencies would have to be prepared to discuss the inventions with various industrial experts, to run patent searches, and to undertake a substantial amount of sophisticated market and technology analysis that is beyond their normal missions and capabilites.

Thirdly, Government licensing efforts will be hampered by the fact that the Government will not have available to it the expertise and know-how of the inventor and the technical team that conceived the invention. Successful patent licensing often requires transfer of more than a bare right in patent. Agreements to provide technical assistance may be required which the Government could not offer. Moreover, in the case of many inventions coming from the larger firms, the invention may simply be an improvement on existing technology controlled by the inventing firm. Because of the existence of dominant background patents, the invention will be of no use to anyone but the inventing corporation.

Fourthly, it is not always obvious at the time an invention is made that it will ultimately have commercial importance. In many cases, it is the perserverence of the inventor or other technical personnel with the firm who foresee an invention's possibilities that persuades a company to go ahead with development.

For example, Battelle Columbus Laboratories did a study to identify the factors which influenced the movement of ten current technologies from their original conception state into actual use. They concluded: "The technical entrepreneur, whose importance was highlighted in the study of the "factors", is also a "characteristic" important in nine of the ten innovations. This is the strongest conclusion that emerges from the study. In fact, in three innovations, the technical entrepreneur persisted in the face of the inhibiting effect of an unfavorable market analysis. If

[26] In this regard it should be kept in mind that about two-thirds of the basic and applied extramural research supported by the Government is performed by universities and other nonprofit institutions.

any suggestion were to be made as to what should be done to promote innovation, it would be to find—if one can, technical entrepreneurs."[27]

We believe "technical entrepreneurship" will largely be lost under a title-in-the-Government approach. Accordingly, it is unreasonable to believe that Government licensing would be as effective in promoting the development of contractor inventions as leaving title-in-the-contractor.

Impact of patent policy on public health

The following discussion provides a clear case study of the impact of patent policy since one can compare the results of the Department of Health, Education, and Welfare's (DHEW) pre-1968 title-in-the-Government oriented policy with its experience since that time when a more title-in-the-contractor oriented approach was adopted.

A significant portion of Government R&D is devoted to medical research.[28] DHEW, NSF, the Department of Agriculture and to a lesser extent other agencies such as DOD and the Veterans Administration support extramural research in the medical life sciences. Out of such research new compounds are often synthesized which may have pharmaceutical potential. Experience at NIH and studies by the General Accounting Office [29] and Harbridge House [30] clearly support the conclusion that a title-in-the-Government patent policy that did not make an exception for medical research would endanger the public health. However, proponents of a title-in-the-Government approach have never suggested that medical research be excepted from the policy. Indeed, even the President's Statement on Government Patent Policy unfortunately specifically singles out health as an area in which the Government should take title.

The GAO and Harbridge House reports noted above, which were based on extensive interviews with National Institutes of Health grantees and staff, concluded that the pharmaceutical industry would not utilize its risk capital to pursue further development of potential pharmaceutical agents generated with DHEW support without a guarantee of some patent exclusivity. (With the passage of the Medical Devices Act of 1976, which requires premarket clearance of many medical devices, it is becoming increasingly apparent that the same need for patent protection applies to the medical device area.) In some situations, the GAO discovered investigators with hundreds of compounds with potential therapeutic value on their shelves with no source to test their market potential. The GAO criticized DHEW for its failure to use its discretion to enter into Institutional Patent Agreements (which it had not done since 1958) or to make timely determinations of rights after identification of inventions.

Since 1969, when DHEW began using its discretion as suggested by the GAO, until the fall of 1974, DHEW estimates that the intellectual property rights to 329 inventions made in performance of DHEW-funded research were being managed by institutions with Institutional Patent Agreements (IPA) or by successful nonprofit petitioners for the purpose of soliciting further industrial support. During this period, these organizations have negotiated 44 nonexclusive and 78 exclusive licenses under patent applications filed on the 329 inventions. Since 1974, to the end of fiscal year 1976, the number of inventions held by such organizations has increased to 517. DHEW estimates that the risk capital generated under the licenses on these 517 inventions has been approximately $150,000,000.[31]

An example of the stake which an innovating company has in the development of a new drug may be seen from the following. Prior to the 1962 amendments to the Food and Drug Laws the average cost of developing a new drug was estimated to be $534,000.[32] The development cost of a new drug in 1973 was estimated to be $11,500,000, a figure which escalates to $24,400,000 when the cost of research on projects which do not result in marketed drugs in included. With these figures in

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[27] Battelle Columbus Laboratories, "Science, Technology and Innovation, Summary Report", Feb. 1973, p. 8.

[28] Over one-third of the Federal R&D budget for basic research in FY 1977 went for the life sciences which include medical and related research.

[29] GAO Report B-164031. Ibid (Note 7)

[30] Harbridge House Report. Ibid (Note 9)

[31] Science Policy Implications of DNA Recombinant Molecule Research. Hearings before the Subcommittee on Science, Research and Technology of the Committee on Science and Technology, U.S. House of Representatives, 95th Cong., 1st Sess. (No. 24), p. 965. It should also be noted that over 60 percent of the inventions retained by IPA holders or petitioners have not yet been licensed and many will never be licensed or brought to ultimate use. Accordingly, the mere retention of patent rights is clearly no guarantee that commercialization will occur.

[32] Scherer, "The Economic Effect of Mandatory Patent Licensing," p. 59, U.S. Energy Research and Development Administration, Public Meeting 11277.

mind it is little wonder that the return on R&D investment in the drug industry has dropped sharply since 1960 (it is currently calculated to be 3.3 percent).[33]

The May 26, 1977 testimony of the Patent Counsel of DHEW, given before the Subcommittee on Science, Research and Technology of the House Committee on Science of Technology includes examples of inventions which have been licensed by universities and nonprofit organizations that have reached or are near reaching the market place. As noted in that testimony most of the examples are pharmaceutical products and medical devices. No comparable examples were known at the time the GAO and Harbridge House ran their studies.

This experience strongly supports the general proposition that the less restrictive the patent policy the greater is the transfer of technology.

Why does such a first-option-in-the-contractor policy promote the transfer of technology:

1. It reduces the uncertainties as to the status of invention rights and thereby permits:

(a) the prompt filing of appropriate patent applications by the contractor-grantee;

(b) an early effort by experienced technology transfer groups and patent management organizations to locate and engage private enterprise in further development of inventions;

(c) an early decision by the industrial developer that the intellectual property rights in the innovation being offered are sufficient to protect its risk investment.

2. It is a recognition by the agency that the nature of the research being supported through funding under a grant or contract is fundamental or basic and that inventions and the making of them are by-products of and not a specific object of the grant or contract.

3. It is a recognition that any invention evolved will require further development to bring it to the marketplace—development which should involve private enterprise since under our free enterprise system private parties and not the Government should engage in such activity.

4. It provides motivation for a contribution by a commercial organization, in cash or in kind, to Government-funded research projects—the certainty of the grantee (contractor) having the first option to any invention arising from such project providing the basis for this now recognized attitudinal change by industry.

5. It provides a climate which encourages the investigator-inventor's continuing participation in the transfer of his inventive technology to the public—a particularly important consideration where university-generated inventions are involved since such inventions tend to be embryonic in nature.

6. It more fairly recognizes the equities and contributions of all of the parties to the inventive technology.

7. It provides the opportunity for the university-contractor to generate income as consideration for the technological innovation being offered, which income is earmarked to support further research at the university—the public thus benefits a second time.

8. It permits timely consideration to be given to foreign patent protection and thereby enhances the possibility of generating payments from foreign sources for the transfer of the patented technology under license with an attendant favorable impact upon the balance of trade.

Impact of patent policy on economic growth and jobs

It should be obvious that without the introduction of new products into the economy, economic growth and job expansion would come to an eventual halt. While people can disagree whether particular technological innovations are good or bad, we doubt that anyone would seriously argue that a slow-down in technological innovation would not result in slower economic growth. Yet, the fraction of R&D performed in this country that is Government supported has now reached around two-thirds. Hence, it is inescapable that a Government patent policy that discouraged investment in the development of the inventions made during that research would have a negative effect on economic growth.

Although the relationship between innovation and long-term economic growth and job expansion are intuitively and historically obvious, several studies serve to highlight this.

A 1967 Department of Commerce study [34] and a more recent update of that study by John Flender and Richard Morse of the MIT Development Foundation, Inc. [35]

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[33] Schwartzmann, "Innovation in the Pharmaceutical Industry," p. 70.

[34] "Technological Innovation: Its Environment and Management", U.S. Panel on Invention and Innovation. (Washington, D.C. GPO, 1967).

[35] John O. Flender and Richard S. Morse, "The Role of New Technical Enterprises in the U.S. Economy", M.I.T. Development Foundation, Inc., Oct. 1, 1975.

lend strong support to the proposition that sales growth and job creation occurs more rapidly in innovative companies than in mature (dominant) companies. And even more significant for purposes of this analysis is the fact that job expansion at young (i.e. small) high technology companies was even more spectacular. For example, the authors found that during a five year period six mature companies with combined annual sales of $36 billion in 1974 experienced a net gain of only 25,000 jobs during the five years, whereas five young, high technology companies with combined sales of only $857 million had a net increase in employment of 35,000 jobs (five "innovative" companies with $21 billion sales total had a net increase in employment of 106,000 jobs). These findings indicate that a patent policy that would deemphasize the needs of smaller firms and emphasize concerns with larger and more dominant firms could have a negative impact on job expansion.

The potential harm that could accrue from discounting the need to be concerned with inventions from nondominant firms is further emphasized by a study done by Gelman Research Associates. An international panel of experts selected the 500 major innovations that were introduced into the market during 1953–73 in the U.S., U.K., Japan, W. Germany, France, or Canada. Of the 319 innovations produced by U.S. industries, 24 percent were produced by companies with less than 100 employees. Another 24 percent were introduced by companies with 100 to 999 employees.

Inasmuch as it seems apparent from the foregoing discussion that a first option to title to inventions in the contractor is much more likely to bring about innovation, it is indisputable that it is also much more likely to encourage economic growth and job expansion.

Impact of patent policy on foreign competition

American industry is in increasing competition with foreign corporations in high-technology areas and a title-in-the-Government patent policy must inevitably work to the advantage of foreign firms at the expense of American industry and labor.

The taking of title by the Government will effectively prevent the American inventing corporation from obtaining foreign patent protection. Without Government foreign filings no American firm could gain any exclusive rights in foreign markets. Moreover, historically, the Government agencies have had neither the incentive, the staff, the budget, nor sufficient knowledge of market conditions to file for foreign patents in anything more than a small number of cases.[36]

If the Government takes title to U.S. rights in inventions and dedicates them, these inventions are equally available to foreign based firms that would export commercial embodiments of these inventions into the U.S.

If one combines these facts with the difference in the relationship between business and Government in certain foreign countries as compared to relations in the U.S., certain disturbing implications arise. In some foreign countries industry is highly socialistic and state controlled. In others, major companies may enjoy state subsidies and support. The result of all this is that the same invention that U.S. firms may not develop without the exclusivity afforded by patent rights may be developed by Japanese, German, or other foreign firms that enjoy monopoly advantages in their home markets through means quite apart from patents. In turn these products are exported into the United States and displace American products and American jobs.

In short, given the difference in industry-Government relations in many of the technologically advanced foreign countries as compared to the United States, a title-in-the-Government policy is most likely to favor foreign companies. The mere speculative concern that there might be a few isolated cases where leaving title in a contractor might result in activities by that contractor which are in violation of the antitrust laws should not control the whole of Government patent policy when other remedies are available through those laws. The U.S. economy does not operate in a vacuum and to formulate a policy of title-in-the-Government primarily upon hypothetical and mistaken concerns about the impact that policy will have on competition within the United States ignores the many adverse effects such policy would have.

The case-by-case approach

Where the disposition of patent rights in inventions made in whole or in part with Federal funds is deferred until there has been an identification of the inven-

[36] Statistics by the Committee on Government Patent Policy show that during the period of Fiscal year 1970–75 the Government filed for foreign patents on an average of 77 contractor inventions, and the preponderance of these were by only two agencies, DOE and NASA. This is approximately one-tenth the number of contractor inventions upon which the Government filed U.S. patent applications.

tion the certainties associated with title-in-the-contractor are lost. As pointed out before such certainty is a strong incentive to the transfer of technology.

Thus, any attempt to transfer the inventive technology would have to await the decision by the Government that title will be left with the contractor. As a consequence, valuable time will be lost in transferring the technology because it is seldom that a bureaucratic decision is made expeditiously. Moreover, the administrative and associated paperwork burden in the deferred determination approach militate heavily against the viability of this approach as a realistic alternative to the title-in-the-contractor approach. For example, a preponderance of DOD contracts now include clauses allowing the contractor to retain patent rights. As was mentioned before, it is unlikely that DOD could expeditiously process each contractor request for patent rights under a deferred determination procedure with present staffing.

Deferred determination advocates would claim that the Government can make a better judgment after the invention is identified, and that exclusivity will not always be needed. Implicit in this claim is the assumption that Government personnel will either be in a position: (i) to determine if the existence of exclusive patent rights is needed as an incentive to further development; or (ii) to find a better qualified firm to commercialize the invention through a Government licensing effort after taking title to the invention.

In regard to the question of whether exclusivity is needed for private investment to be made in an identified invention, it should be recognized that if the Government determines that exclusivity is not needed but is wrong, no further development may take place.

Moreover, for the Government to be right more often than not when making a deferred determination would require extensive technical, marketing, and economic studies of the firms, technology, industries and market involved. The cost to taxpayers of such programs could be more than any savings they would produce for consumers. This appears to be true, since in most deferred determination cases exclusivity has been deemed necessary, and the costly determination process has been engaged in simply to confirm this fact. This has been substantiated in practice by NASA, DHEW and NSF (the three agencies who have historically made the largest number of deferred determinations) by the grant of over 90 percent of the requests for "greater rights" over a period spanning ten years.

Similarly, the ability of Government personnel to decide after an invention is identified that utilization will best be promoted by the Government's taking title and offering the invention for licensing, assumes that commercial developers, other than the inventing contractor, can be found (presumably but not necessarily on a nonexclusive basis). There is really no effective means for Government personnel to ensure that other firms, whether licensed exclusively or nonexclusively, would do a better job of developing the invention than a willing contractor or a licensee of the contractor. As noted previously, other firms often lack some of the "know-how" of the contractor and will not have the inventor or co-inventors working for them. One can be sure that in most cases the inventing organization will have little interest or incentive to transfer its know-how to another firm, possibly a competitor. Moreover, the very process of attempting to find alternative developers will simply serve to delay private investment and cool the interest of the inventing contractor. It will also force the Government into the expense of filing patent applications in order to assure that a patent is available if exclusive licensing is ultimately deemed necessary.

It is important also to emphasize that a deferred determination that is truly geared to resolve the questions that trouble opponents of the title-in-the-contractor approach would be so costly, complex, and time consuming as to discourage many contractors from requesting rights in the first instance, especially small busnesses and universities. They may even neglect to report the invention under such circumstances. In all likelihood, without a request for rights to trigger the deferred determination process, most agencies will have no incentive to do anything with the disclosure, and the invention will fall into the public domain to be available to all and, in most cases, practiced by no one, as seems to be the case with a very substantial portion of the 28,000 patents now in the Government's patent portfolio. Indeed, under a deferred determination approach the agencies would probably be devoting so many resources to those cases where rights were requested that they would have insufficient personnel or interest to study inventions and encourage development and marketing where rights were not requested.

Summary and commentary

It is believed apparent from careful examination of the impact of alternative patent policies on the various objectives of Government patent policy that the title

or first option to title in the contractor approach is superior to any other approach on every count. Thus, public patents-public benefits are antonymous.

In reaching this conclusion it should be kept firmly in mind that we are not dealing in abstractions.

The number of patents granted to citizens of the United States has fallen off. In 1961 only 17 percent of the patents issued in the country were issued to non-Americans; currently the ratio is up to about 35 percent. The statistics also indicate fewer "big" inventions—the rate of new drug introductions today is about one-fourth the rate of 15 or 20 years ago—and it takes longer to put them in the market. In the chemical field it averages about seven years from the laboratory to the market; 15 years ago it took an average of two years.

We as a nation spending less on research, using fewer people, and producing fewer inventions; and fewer of the inventions we do produce reach the marketplace, and it takes them longer to reach it.

Under the accepted definition of an underdeveloped country which is "one that exports raw materials to maintain its balance of payments, while it imports finished goods to maintain its standard of living" we are now an underdeveloped nation. We are exporting our cotton, timber, grain, coal and other raw materials in order to pay for cameras, TV sets, radios, tools, steel, clothing and a host of other finished products.

Today science is being made subservient to politics with decisions being made not on scientific facts but on political opportunity. And efforts go forward to discredit and weaken our patent system which, over the history of our country, has provided the incentive for innovation. It is indeed a noble motive to give to the people the benefits of publicly supported research and we can agree that tax dollars should not be used as a means of enriching private parties. We must, however, be vigilant, for the views on the issues involved lend themselves to emotional molding. Outspoken claims to the guardianship of the public interest or public welfare is a rich field for cultivating political power. A deadening result of political emphasis on such guardianship is the proliferation and growth of the bureaucratic maze where accountability becomes the fear. Under such conditions the atmosphere generated tends to be one of self-protective caution with the danger that operation of the system will become a disproportionate part of the objective.

Effort is fundamental to the transfer of technology to the marketplace and wherever effort is needed incentive is required. In this country the patent system has provided that incentive through its exclusion privileges and can be considered to figure prominently in the economic equation.

$$E(x) = Px\ f(x)$$

where E(x) is the expected return, Px is the probability of success and f(x) is the total value of return.

The probability of success is most certainly enhanced by the existence of an intellectual property right—a patent. In today's technologically intensive atmosphere some protection for the heavy investment required in development is more than ever necessary. The lead time given by exclusive knowledge or patents is shorter than ever before. If that lead time disappears, through further weakening of the patent system, or weakening of the ability to extend exclusive rights to intellectual property, it may become economically sound to be second in the field. There is some evidence of that second-place philosophy in the medically-oriented and other fields today. Further erosion of the exclusive rights to intellectual property afforded under the Constitution could lead to a second-position attitude in U.S. industry. The next step is willingness to be a second-place nation.

Senator SCHMITT. Mr. Marcy, would you proceed, please—Dr. Marcy?

Dr. MARCY. I'm not a real doctor; I'm only a Ph. D.

Senator SCHMITT. Somebody stuck another title in front of my name and I lost track of the other ones.

Go ahead.

Dr. MARCY. My name is Willard Marcy. I am vice president of invention administration program, Research Corp..

Research Corp. is a private foundation. It is a nonprofit organization founded in 1912 and chartered by the State of New York. It is dedicated to the support of science and technology. In its present embodiment, it provides educational and scientific research institu-

tions with invention evaluation, patenting and licensing services in accordance with the terms of prearranged invention administration agreements, and it devotes all of its income after expenses to support further research in college and university laboratories.

I am honored to be asked to testify today regarding the provisions of S. 1215 and the need for a uniform policy directed toward the encouragement of participation by private industry in Federal research and development programs and commercial use of their results. In so doing, I should make it clear that the views I present here are mine as a private citizen, but I believe they reflect, in general, the feelings of my employing organization.

The basis for my thoughts and observations is grounded in over 15 years experience in the constructive use of the patent system for the transfer of technology primarily from nonprofit educational and scientific research institutions to industrial corporations. During this time I have worked intimately with universities, Government agencies and industry in attempting to translate the differing policies of Government contracting agencies into positive action to develop innovative concepts for public use.

Recently, in hearings on S. 1250, Chemical & Engineering News reported that Senator Brown identified 12 problem areas connected with innovation which warranted further congressional attention. I venture to say that there are at least another dozen and probably another dozen on top of that. I mean to imply that innovation, how to foster it and how to use it to the best advantage of the country, is exceedingly complex.

This is borne out by contemplation of the hundreds of thousands of man-hours spent on studying innovation, and the tons of reports analyzing the results of these studies. One recent report commissioned by the Office of Federal Procurement Policy, for example, contains a bibliography of no less than 206 references to various publications relating to the narrow area of the activity, or lack thereof, of small firms relating to Federal research and development.

I think the citizens of this country have now come to realize that past innovative activity has played a key role in making this country great, and that continued innovation is a necessity for keeping it great and for increasing its citizens' standards of living. In today's highly specialized society, it is no longer possible to take a laissez-faire attitude toward innovation, as was done at the beginning of this country's history; we must consciously and assiduously promote innovation. Not control it in an absolute sense, but promote it, for to control it unduly is to stifle it.

In my opinion therein lies the basic problem. Ever since the Federal Government began to finance research and development in a massive way, during and since World War II, greater and greater control of scientific and technological research, its development and the use of its results have been exercised by Government bureaucrats until innovation itself has become stultified and suppressed.

What seems necessary to me is to loosen these controls, and in addition, to provide incentives and encouragement to the large pools of scientists, engineers, entrepreneurs, managers and workers available in this country to innovate.

What I am suggesting is that the philosophy of Government input to the innovation process be rather drastically changed. At present this philosophy is, generally, a defensive one leading to a proliferation of rules, regulations, and controls which, in toto, defeat innovative minds and greatly hinder, if not prevent, development of new ideas.

In the present circumstances there are simply too many people advocating and enforcing too many control methods. This results in great confusion at the working level. Instead of spending time, effort and enthusiasm on innovating, innovators must try to find the right person in Government to approach, prepare proposals in depth with ironclad justification for funding—based on speculation, I might add—and then stand in line just to obtain funds for doing research and development.

They must then perform the research and report back frequently in tedious and unnecessary detail what they have accomplished, justifying each expenditure in order to satisfy rigid Government auditing regulations. And finally, they must go through extensive report writing and prepare quasi-legal arguments with contracting agency officials to be allowed to proceed to develop, manufacture and market new products or processes resulting from the research.

Even when authorization is finally obtained, all sorts of restrictions are placed on how developing and marketing is to be handled, with a constant threat of the Government standing ready to take over at the first sign of difficulty. It is small wonder that innovation based on Government support has declined. The barriers are formidable.

In contrast, if all Government departments were united in the desire to help the innovator, to reduce barriers to his success, and to provide a positive atmosphere to his undertakings, innovative activity would greatly increase, the time between conception of an idea and its public use would be reduced and many more new ideas would surface.

What I propose, then, is that a highly positive approach be taken at the topmost levels of the Federal Government and that this attitude be actively promoted down through all the lower governmental levels.

In my view, a start in this new direction must be made in Congress through legislation. However, as noted previously, encouragement of innovation is a many-faceted and extremely complex endeavor. For this reason, I believe several pieces of legislation, each addressing one issue at a time, is preferable to a single omnibus bill which tries to resolve the whole problem in general terms.

Ideally, the several legislative proposals should dovetail and complement each other. When one issue at a time is addressed, later changes or modifications can be made more easily and promptly without disturbing companion legislation.

Consequently, it is heartening to me to see introduced into this session of Congress S. 414, which addresses the Government patent policy issue; S. 1215, which addresses the issue of the most suitable policy to follow in encouraging private industry to participate in developing federally funded innovative concepts; and S. 1250, which

addresses the issue of developing and fostering a climate conducive to the enhancement and improvement of the innovative process.

These three bills complement each other and seek to improve the Government attitude toward innovation. If passed, they will be steps in the right direction, but will not provide the final answer. Additional bills along similar lines and addressing additional issues will need to be introduced and passed in the future to further improve the climate for innovation before measurable overall improvement can be perceived.

It is also gratifying to note that the constructive and forward-looking institutional patent agreement approach, formulated and first used by Department of Health, Education, and Welfare patent staff personnel, and adopted later by the National Science Foundation, has served as a basis for some of the provisions in both S. 414 and S. 1215.

While the IPA is a small step, it is in the direction I advocate, that is, the removal of unnecessary recordkeeping, a major disincentive, and, through loosened, but not thoroughly relaxed, controls, the provision of a very real incentive to private organizations to undertake further development of innovative concepts stemming from federally funded research and development.

The provision in S. 1215 of a central authority to provide various services, such as evaluation, patenting and licensing, to the Federal contracting agencies is also gratifying. However, I would suggest setting up such an organization on a rather different basis than is proposed in the bill. I would not center it in an existing administrative agency, such as the Department of Commerce, but would recommend an entirely new quasi-governmental and semiautonomous organization independent of existing agencies along organizational lines similar to the National Research Development Corp. in England.

My reasoning is that many problems are bound to develop which could lead into serious conflict of interest situations, the solution of which would exceed the authority and administrative scope of an existing agency. This new organization should not only provide administrative oversight but would be responsible for the active development of innovative concepts all the way to the marketplace.

Such an organization should function with as small an internal staff as possible and contract with private organizations outside of the Federal Government to undertake the bulk of the work to be done, including the licensing of patents to industrial concerns. This type of arrangement would benefit the Government, private industry and the public by bringing to bear more knowledgeable managerial, financial, manufacturing and marketing expertise than is available from solely governmental sources.

I believe that a better job could be done at less overall expense to the taxpayer with this type of operation. A successful model for such an organization already exists on a modest scale within the Federal Government. It is the Office of Energy Related Inventions, established by Congress in the Nonnuclear Energy Research and Development Act of 1974, and administratively attached to the National Bureau of Standards.

I have other comments to make on S. 1215 and on the general issue of providing incentives to encourage private industry partici-

pation in federally funded research and development, but these will be included in a longer written statement for publication in the hearing record. Some of these comments may well be discussed, and have been this morning during the question and answer period following the opening statements.

I would like to interpolate a few comments about an article that I have in front of me that bears on this issue which I think is very important and which we haven't heard mentioned so far this morning.

Senator SCHMITT. Dr. Marcy, I will allow you to do that, certainly. I would say that your additional comments would be appreciated, even if they might be a little bit duplicative, and they will be included in our record.

It is always good to have the same thing said by different people.

Dr. MARCY. Thank you. I will only spend a couple of minutes on this.

This is an article that appeared in the magazine Science in the issue dated May 25, 1979, by Peter F. Drucker, who is a well-known economist and student of social issues and a management expert. This is a talk that he gave before the American Association for the Advancement of Science in Houston, Tex., on January 7, 1979. The title of the article is, "Science and Industry: Challenges of Antagonistic Interdependence":

> Science and industry in the United States used to enjoy a relationship of mutual respect based on an unspoken conviction that they depended on each other. That relationship, while distant, was uniquely productive for both science and industry.

That is his opening paragraph. He goes on to say:

> There has been a major change in this, not in the measurable realities of the relationship as between science and decisionmakers in industry and Government, but in the moods, the values and meaning of the relationship. There is today distress, disenchantment, mutual dislike, even, at worst, lack of interest in each other on both sides.

And he goes on to speak about the relationship between Government and scientists:

> As to Government, there is now a strong tendency to judge science by what is politically expedient or fashionable, that is, to attempt to subordinate science, either pure or applied, to the value judgments that are incompatible with any criteria one could possibly call scientific. The values of industry, but equally of the Government decisionmaker concerned with effective policy, are in danger of becoming hostile to the needs, the values, views and perceptions of science.
>
> One reason for this is the increased pressure, especially in inflationary periods, to produce results fast.

He goes on to say, in his view, that this is a period in which either industry or policymakers do not feel that they can take risks. He thinks this should be changed. He goes on to say—in referring to the effects of Government actions—that taxation is one of the more, as he puts it, "insidiously deleterious over a long period of time to the use of scientific results."

He also says, regarding regulations, that they not only add costs but they create uncertainties. And then he says this:

> Regulation makes investment in research irrational, not only increasing the odds against research of producing useable results, but also making research into a crooked game.

He is very strong.

He says, then, further:

The atmosphere is aggravated by the antitrust laws, which probably are responsible, more than any single factor, for turning American industry away from building on a technological science-oriented basis and toward the financially-based conglomerate.

I won't go on. The article goes on and talks further about this from different points of view. And he feels that industry and science, scientific research and Government people should try to get together to change this atmosphere of hostility that has been arising. His final paragraph says:

The traditional relationship between science and its customers in the economic and governmental systems is based on mutual respect and understanding and a keen awareness of interdependence. American science must effect a return to these values, however old-fashioned they now appear to be.

I feel that this article in a way reflects what I said in my statement. And I have to confess that I wrote my statement before I read the article.

That, Senator Schmitt, concludes my formal statement. I would be glad to answer any questions you might have.

Senator SCHMITT. Thank you, Dr. Marcy. We will include that article by Drucker in the record. I would add, as a comment, that I appreciate the references that both of you have made to S. 414, the so-called Bayh-Dole bill. I am co-sponsor of that bill and it is, we believe, consistent with the direction we are trying to take in a somewhat broader sense in S. 1215.

Are you gentlemen familiar with the patent policies of other countries, particularly the major industrial countries, and if so, could you comment on how they compare with our patent policy or lack of same?

Mr. BREMER. As far as policies are concerned, we have all heard of Japan, Inc. I think that is an attitudinal approach in the sense that in Japan the Government tends to cooperate with certain companies to corner a share of the world market. This is certainly in contrast to the antitrust approach in the United States.

Where the foreign government is cooperating to take technology from outside, although the country itself has almost no resources, and to develop that technology and import it into our own market provides a formidable competitor.

I don't know that in the various other countries the governments support the R. & D. function to the extent that they do here, looking toward the cooperation under a free enterprise system between the private sector and the Government sector to transfer the technology to the public. As you are well aware, in Russia it is quite a different situation. In England—Dr. Marcy's reference to NRDC—it's an effort to pull together any inventions made at various universities, particularly where Government funding has been effected, and to use that agency, NRDC, to license those inventions and to ultimately earn money on them.

Senator SCHMITT. Have you any other comments about the NRDC, Mr. Bremer? Are you supportive of that concept?

Mr. BREMER. No; I do not support the NRDC concept. I support Mr. Tenney Johnson's view that there should be someone other than another Government agency or an already established agency

that oversees these things, perhaps a panel that is free from any agency intervention or control.

It is my understanding that currently the NRDC is under attack in Britain from various sources and is considered not to have been as successful as it may appear.

Senator SCHMITT. Dr. Marcy?

Dr. MARCY. Senator, I have to disagree with Mr. Bremer. The NRDC has been under attack, not only once, but about three times, and each time it has weathered the attack and has come back stronger than ever. At present, it was being supported very vigorously by the former British Government. I have not heard anything about the new Government that has come in, as to what they are planning to do.

Senator SCHMITT. Is there a summary or analysis of the NRDC, its history?

Dr. MARCY. Yes; there are many summaries and there are also Government reports that came out of these investigations that are available. I do not have them with me. They are easily available. I would be pleased to get them for you.

Senator SCHMITT. The staff may get in touch with you to ask for those.

Dr. MARCY. Very good. Not only in England and Japan, but also in many of the other European countries and in Canada, some South American countries, Australia and New Zealand also, also India and some of the Third World countries, there are government policies relating to patents and relating to science and research and development.

In this country we have no such overall policy and we are anomalous in that regard. The countries that have these science and technology policies most highly developed, are, of course, the industrialized countries. West Germany does not have such a general Government policy. They function more or less like we do, but with a great deal of Government money input to the R. & D. area, and also into the area of transferring of technology.

The countries that have the NRDC concept, in Mr. Bremer's testimony, he says they deal only with the universities. This is not true. They deal primarily with Government agencies. The agencies of the French Government and the British Government are constrained by law to send any inventions that they might come up with as a result of research supported by them to the NRDC, and in France it is the ANVAR organization. And these two organizations are then charged with trying to get these particular inventions into the marketplace.

The reason I feel it is important to have a centralized organization like that to do this kind of thing is that, as has been mentioned before this morning on several occasions, the Federal Government is just not capable of doing this on a piecemeal basis. One thing that was mentioned, for example, is that the Government does not defend its patents, and it would be kind of a horrendous thing to do this. But this is very important. There is no point in getting a patent if you are not going to defend it. It would be better to publish the results and let them be free for everybody and save the expense of patenting.

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But for an organization like the NRDC, defense of patents is possible, and it is a very important part of it.

Mr. Bremer mentioned that they are finally in the black. This is true, because one of their inventions happens to be supported primarily by sales of particular products in the United States; the licensee, the Eli Lilly Co., is practically solely responsible for putting NRDC in the black with the inventions that they have. So this kind of thing is something that I think ought to be seriously considered in developing legislation that is directed toward the next step down the road—what do you do with the patents after you get them.

Senator SCHMITT. I presume you would use this as a means of clearing the decks of the 28,000 patents that now exist in the Government?

Dr. MARCY. This would be one task that I would think could be assigned to such an organization. On the other hand, I think that task could be assigned to existing organizations within the United States at present through contracting operations similar to what the Office of Energy Related Inventions is doing and also similar to what the National Technical Information Service is currently doing on a very limited basis.

Senator SCHMITT. You are probably correct in part, at least, that agencies have so many other fish to fry that this issue does tend to get subordinated in contract discussions.

Mr. BREMER. May I add something else to that? When I said the universities were involved, I meant that the support of the Government goes to the universities for research projects and functions, much as it does in this country and they, of course, are required to bring any inventions made back to NRDC. That is the university involvement. I believe you will find an NRDC kind of organization in most of the Commonwealth countries or former British Commonwealth countries.

One of the main objections I have to an NRDC type of organization is that you are in essence, putting all of your eggs in one basket, under which a tremendous bureaucracy can be established. One of the repeatedly voiced criticisms of that kind of an organization, and which is now coming up again, is that the people at the universities conducting the research function do not feel that their inventions are getting adequate attention in each case because of the size of the organization and the manner in which invention evaluation is carried out.

I know Dr. Marcy with his organization, Research Corp., has encountered that same problem because of the very large number of universities for whom they work. I have, in fact, heard criticisms of Research Corp. for those very reasons.

Senator SCHMITT. Do you agree with Mr. Mossinghoff, who earlier said that the person who is most likely to see that something is made of an invention is the inventor?

Mr. BREMER. You need two people when you are in an invention licensing situation. At the universities, where most inventions tend to be embryonic in nature, the ones that have the know-how are the inventor and his immediate colleagues. We think it is imperative therefore, that he participate in any transfer of technology from the university.

The second person needed in a licensing situation is a champion for the invention within the company which is being licensed. In the absence of such a champion, one who really espouses the invention as a product line for the company, or espouses use of the invention by the company in another way, the invention will generally go nowhere.

We speak from and have had considerable experience along those lines and conclude that two people, the inventor and the invention champion are necessary for its successful transfer to the public.

Senator SCHMITT. Is this different from a Dr. Jeckyl-Mr. Hyde personality split within the inventor himself or herself that could be embodied in two people or one person?

Mr. BREMER. Speaking for the universities in general on that point is rather difficult, since there are various kinds of arrangements that are available. In some schools, for example, there is an employment agreement with the professors conducting the research. They then have a direct obligation to the university itself. Other places, as at the University of Wisconsin, they do not. At Wisconsin, absent an obligation to the Government because of Federal funding, the inventor is free to do with his inventions whatever he wishes. In that situation, he can go directly to the industry, participate in the invention development, and also receive some stipend back from any successful transfer of that technology; or he may even sell the invention outright. In other universities he cannot do that.

Also where he is essentially a free agent he is very often employed by the licensed company as a consultant. That is, however, on his own volition and a voluntary act.

Senator SCHMITT. Do you favor that kind of an arrangement?

Mr. BREMER. It has been very successful, in our view, at the University of Wisconsin, and I must state that my experience has been primarily limited to that approach. That arrangement has generally been credited as part of the reason that that university has been so successful in technology transfer efforts.

Senator SCHMITT. Section 201(a) of S. 1215 creates a central review authority with power to determine with administrative finality any dispute between a Federal agency and a contractor as to the allocation of rights for an invention made under a Federal contract. Do you believe, Mr. Bremer, that this review authority could meaningfully address the concerns that you raised in this regard?

Mr. BREMER. I think it certainly can. In any situation you have an equity proposition that attaches, and we have found very often, that the old saw about what the Government pays for it should get is not, in equity, applicable. The university often provides physical space, the proper environment, and the principal investigator, who is generally salaried by the State, as well as other ancillary contributions. We have very often found that the equity position of the university vis-a-vis the Government is about 50–50.

As a consequence, a review authority could consider all of those factors in addressing a problem such as this.

Senator SCHMITT. In your statement—and Dr. Marcy may want to comment on this, also—you say the present Government patent policy has, in a way, insured that technology generated with Feder-

al funding is available without charge or restriction to foreign competitors, and they have more successfully utilized such technology than we have. Do you think that S. 1215 would treat that problem?

Mr. BREMER. In my view, if we can give the contractor first option to title—he will make a selection to the best of his ability as to the invention disclosures which appear to have the best commercial potential and file patent application on them. We, for example, at the University of Wisconsin, may get 60 disclosures a year. We may file patent applications on about one-third of those. The remaining technology may not lend itself to patentability or is so narrow in scope that it doesn't lend itself to a patent licensing arising at a university however, it a generally disclosed through publication. It must be kept in mind that for a university or a nonprofit, a patent is the fundamental basis upon which a transfer of technology occurs.

The NTIS, of course, publishes—they even have an outlet in Japan, I understand, so they can transfer the technology more quickly to the Japanese, who can't seem to get it fast enough. I think S. 1215, with its basic thrust, would be favorable toward controlling at least some of that free dissemination of technology.

Senator SCHMITT. Dr. Marcy?

Dr. MARCY. Well, I think one has to realize that the major funding of scientific research at universities comes from the HEW and from NSF. Therefore, generally speaking, the inventions that come out of this type of research are biological, chemical, pharmaceutical, biomedical devices, diagnostic testing procedures and so on rather than the so-called high technology inventions in electronics.

Now, the situation regarding that type of invention is quite different from the situation in the electronics and mechanical device area. Chemically-oriented inventions are much stronger and much more important to the industrial company that finally manufactures and sells these things.

Our practice at Research Corp., for the past 10 years at least, has been to try to develop patent packages overseas on this type of invention in foreign countries, and to license these things in foreign countries, certainly on terms no more favorable than in the United States, and in many cases even less favorable to the terms in the United States.

So that, in our view, the situation overseas for this type of invention, contrary to the way people say it has been, is that technology does not necessarily get used overseas freely, since we have seen to it that it doesn't get used freely overseas first. Sometimes our licensees overseas get on the market there first before the U.S. companies do here, and then these products finally end up in the States. The point I am trying to make is that, with the university type inventions, using our services, and I think with WARF's services, too, this does not happen in this manner.

Now, in the electronics and the mechanical devices area, where massive support for this type of investigation in the institutional area is centered in just a few institutions, like MIT, Princeton, Brookhaven and so forth, that is a different story. This type of research doesn't make very good patentable inventions. Frequently

the technology gets published and the information gets transferred overseas in a normal way, and science just diffuses around the world. In those cases, what is said is true about the foreign countries getting this technology and bringing it back later to the United States.

I think you have to take that into consideration and keep in mind the type of technology we are talking about.

Senator SCHMITT. Gentlemen, I am sorry to say we've run out of time.

Again, thank you very much for your testimony.

Our next hearing is Friday at 9:30 in this room. We will continue our examination of S. 1215 and related issues. I hope that in the not too distant future we can take into account all of the good suggestions we have had and ignore the bad.

Thank you very much.

Mr. BREMER. Thank you.

Dr. MARCY. Thank you.

[The article referred to follows:]

SCIENCE AND INDUSTRY, CHALLENGES OF ANTAGONISTIC INTERDEPENDENCE

(By Peter F. Drucker [1])

Science and industry in the United States used to enjoy a relationship of mutual respect based on an unspoken conviction that they depended on one another. That relationship, while distant, was uniquely productive for both science and industry.[2]

The first change in the traditional American relationship occurred after World War II. Research became fashionable in industry and government alike. These were the years when the stock market valued a company according to the amount of money it spent on research, and which a lavish campuslike research center was considered proof of a management's competence. Similarly in those years—culminating in the space program of the 1960's—science and research increasingly came to be seen as the mark of the effective well-planned and properly progressive government program.

During the years after the war, the ability of America to convert science into industrial application was considered the outstanding strength of both American science and American industry. Treatise after treatise pointed out that the British, for instance, were America's equals in science. But the British failed to convert their own scientific achievements—in electronics, in polymer chemistry, in the computer, in radar, or in aviation—into technology, products, and economics advancement, whereas America did.

Equally, especially during the Truman and the Kennedy years, the willingness, indeed eagerness, of the American politician and government executive to apply science—"hard" as well as "soft"—to both the study of social and political problems and to the design of social and political programs was seen both inside this country and outside as a distinct and great American achievement. The innovating ability of American society was widely explained throughout the world, including the Communist countries, as the result of the sensitivity of the American scientist to political and social needs and opportunities, and to the values and dynamics of the political process.

In quantitative terms, the relationship seems to be as close as ever—and perhaps even closer in computer sciences, solid-state and nuclear physics, the earth sciences, and biochemistry. It might be argued that nothing has really changed despite all the talk of irrelevance of science or of the wickedness of "American Imperialism" by the vocal critics on the New Left, despite Vietnam, despite inflation, and so on. One might indeed assert that the highly publicized and highly visible developments and media events—the headline- and demonstration-makers—are little more than whitecaps on the surface of the ocean.

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[1] The author is Clarke, professor of Social Science and Management at the Claremont Graduate School, Claremont Colleges, Claremont, California 91711. This article is adapted from the text of a letter delivered at the meeting of the AAAS in Houston, Texas, 7 January 1979.

[2] I know of no comparative study of different models of integration of science and society. The few Marxists analysts, such as George Lukacs or Lancelot Hogben, wore nationalistic blinkers; Lukacs, for instance, assumed the German model to be universal.

Yet there has been a major change, not in the measurable realities of the relationship between science and the decision-makers in industry and government, but in the moods, the values, and the meaning of the relationship. There is today distrust, disenchantment, mutual dislike even, and worse, lack of interest in each other on both sides. American scientists today, in large number, tend to suspect the traditional relationship as being tainted or impure. Industry still professes to honor the relationship and to respect research. But industry's actions no longer fully live up to industry's professions. As to government, there is now a strong tendency to judge science by what is politically expedient or politically fashionable; that is, to attempt to subordinate science, whether pure or applied, to value-judgments that are the reverse of, and largely incompatible with, any criteria one could possibly call scientific.

In both industry and government, there is even increasing doubt whether science and research do indeed lead to results. It is often argued that this reflects lengthening lead times resulting from the increasing complexity and specialization of today's advanced scientific research. But there is no evidence that the lead times have lengthened; the time span between new theoretical knowledge and the first application is the same 30 to 40 years that it has been all along (for example, between Maxwell's theory and Westinghouse, between x-ray diffraction and Carruther's development of nylon and polymerization, or between quantum mechanics and semiconductors). What is changing are not facts but faith. On both sides the mood is becoming one of alienation and perhaps even of recrimination. It is a dangerous mood, above all for American science and American scientists. Both sides stand to lose, but science stands to lose far more.

Ways of industry

The mind-set values of industry—but equally of the government decision-maker concerned with effective policy—are in danger of becoming hostile to the needs, the values, the goals, and the perception of science. One reason for this is the increasing pressure, especially in an inflationary period, to produce results fast. An inflationary period, by definition, is one that erodes and destroys both industrial and political capital. In an inflationary period the existing value of future results is subject to the exceedingly high discount rate of inflation which, in effect, means that no results more than a year or two ahead have any present value whatever, whether value is defined in economic or in political terms. It is, therefore, not a period in which either industry or the policy-maker can take risks.

Thus both industry and the governmental policy-maker in an inflationary period concentrate on small, but sure and immediate, payoffs; that is, on what can be calculated with high probability. The application of true scientific knowledge is by definition a big gamble in which payoffs are far in the future and thus exceedingly uncertain although very great in the event of success. In an inflationary period, the industrialist or the policy-maker is almost forced into the small but quick payoff of a lot of small and, by themselves, unimportant projects that require very little science altogether and can only be damaged if exposed to too much science.

Tax effects and investments

More important perhaps—or at least more insidiously deleterious over a longer period of time—is taxation. The tax system adopted by the United States in the last 20 years or so penalizes basic research and the adaptation of basic research to technology. Worse, through the combined working of corporation income tax and capital gains tax, the system greatly favors short-term, immediate gains and makes long-term investments in an uncertain future unattractive and unrewarding.

Equally inimical to investment in research and innovation is the increasing burden of regulation. It is not primarily that regulation adds cost, but that it creates uncertainty. Whether in respect to the environment, to safety, or to new drugs, regulation makes investment in research irrational, not only increasing the odds against research producing usable results but also making research into a crooked game.

Tax laws and regulations also push industry away from technology focus and toward financial conglomeration. Under the tax laws of the United States—laws which in this form do not exist in many countries—the proceeds of liquidating yesterday are considered profit and are taxed as such both to the company and to the investor. Hence, businesses, instead of liquidating the obsolete, have to find new investments in new businesses for whatever cash is being released by the shrinkage of an old technology, an old product line, or an old market. And this, in effect, imposes conglomeration on them. This policy makes it increasingly difficult to shift resources from low and diminishing areas of productivity to areas of high and increasing productivity and this impedes innovation. It also shifts businesses from a

technological to a financial focus. It makes management increasingly a matter of finding the right financial investment.

This constant pressure of the tax laws, which results in a swerve from the scientific and technological toward the financial and from the long term toward the short term, is then aggravated by the antitrust laws, which probably are responsible more than any single factor for turning American industry away from building on a technological, science-oriented base and toward the financially based conglomerate.

In the world economy, even businesses that are very large on the national scene are becoming marginal, if not too small. The "big business" of 1938 or even 1958 is a small, if not a marginal, business in the 1979 world economy. Yet our antitrust laws frown on the scalingup of businesses except through the formation of conglomerates, which, however, lack the fundamental core of technological unity. This conglomerate is focused on financial rather than on technological results. Hence, investment in long-range research and in the application of scientific knowledge to economic production becomes difficult in the conglomerate. People who are good at building and running conglomerates are financially oriented people. Yesterday's business, with its unified technology, organized around a process, such as making glass, was basically technologically oriented and therefore looked to science for its future. The conglomerate, which comprises everything from tin cans and electronics to fast-food restaurants and dress shops, from airlines to banks and toys, is, of necessity, financially oriented. Research becomes a cost center rather than a producer of tomorrow's wealth.

Similar forces operate in government in respect to the interest and the investment in science. Even the most short-sighted businessman still has to focus on both the short term and long term. But a governmental budget is always myopic. It knows no time span other than the fiscal year. It has to justify allocation of resources on the basis of short-term and mostly political expediencies. This was one reason why some older and wiser heads in American science warned against dependence on government 25 years ago. Their fears proved well founded. As soon as science ceases to be an article of the faith and popular, and becomes one application of governmental funds rather than the application of governmental funds, the pressures of the budget process make science a low-priority choice for politician and bureaucrat alike.

There is also disenchantment with the results. Whether science oversold itself or whether industry and government expected miracles, is beside the point; the results that business and government anticipated when they rushed into lavish expenditures on scientific research have rarely been attained. Surely, the relation between scientific work and results, whether in terms of goods, services, or such benefits as better schools or better health care, is far more difficult and complex than either scientist or policy-maker thought.

As a result of these pressures and developments, industry and government are drifting toward what might be called a scholasticism of the budget in which the budget is a closed system, with its own absolute logic.

Both the business executive and the governmental executive proclaim their faith in research, but neither can practice it today. The mind-set of executives, whether in business or in government, and their values thus inexorably shift from what Thorstein Veblen, about 60 years ago, called "the instinct of workmanship to what he called "the spirit of business"—the right term today would be "the spirit of the budget." It is a shift from a concern with the creation of wealth-producing resources toward immediately payoffs. It is a shift in cost-effectiveness from emphasis on cost. And this trend is perhaps a good deal more pronounced in government today than it is in business.

Estrangement

Let us now look at what has happened to change the mood, the mind-set, the value of American science. Those changes, or at least their underlying causes, go back to an earlier period during which the relation between science and its non-scientific patrons and customers both in industry and in government seemed to be closest, most harmonious, and most productive.

American science first began to feel uncomfortable in the traditional relationship of mutually advantageous coexistence. Or perhaps science was uncomfortable all along, but did not see any alternative until after World War II, when government emerged as its rich and more generous patron. Whereas industry had at best spent hundreds of thousands and hired a dozen scientists, the government spent billions and seemed to have an insatiable appetite for well-paid science professionals in an ever increasing number of government agencies.

Even more appealing: Government increasingly offered scientists, including a great many junior ones still at the beginning of their scientific careers, the best of

both worlds—to live in academia on a Washington income. No wonder that grantsmanship rapidly became the most prized and the most accomplished of the liberal arts. And where industry, whenever it offered support, had the insulting habit of expecting results, government, or so it seemed, was willing to support the scientist for science's sake. Indeed anyone who in the palmy days of the early 1960's raised such nasty questions as the accountability of grants-receiving scientists for performance and results, risked being branded on anti-intellectual. And anyone who then doubted that government support would continue to grow, let alone whether government's intentions were truly honorable, was likely to be dismissed as an old fogy.

As a consequence, science became accustomed to large sums of public money, in return for which it then had to accept political rather than economic yardsticks for success and performance, the main yardstick being whether a program for the support of this or that major scientific enterprise could be sold to the governmental policy-makers; and—a logical consequence—whether this or that search for knowledge fitted the political ideologies and popular fads of this or that clique or faction. Thus American science, quite understandably, came to consider the question of economic application and economic benefits to be irrelevant and irksome, of not somewhat demeaning. Few raised the question whether political favor and acclaim might not be equally irrelevant and perhaps even more demeaning as yardsticks of scientific achievement.

But I would consider even more crucial in the estrangement from industry on the part of science the fact that, for the last quarter-century, work in graduate school has come to focus on the production of Ph.D.'s, certified for teaching in institutions of higher learning. Prior to World War II, science teaching in the university focused on undergraduates, on students who were unlikely to make science their career. In graduate school the focus was largely on the preparation of research scientists for outside laboratories, that is, in industry and, to a lesser extent, in government. The best graduates were the ones who then got the good jobs in industry; other jobs for graduate scientists were exceedingly scarce.

The "educational explosion" of the mid-1950's, of necessity, meant a shift in focus to basic theory, which is what an undergraduate teacher teaches. It meant, of necessity, a loss of close contact with industry. For one's brightest graduates no longer went into industry—and it is largely through his graduates that the university scientist stays in contact with the world outside of science. Indeed the distinguished scientist's best students did not even go into undergraduate teaching, but stayed on in graduate teaching and graduate research. The educational explosion made the scholar into an industrialist who produced graduates. Graduate school became a growth industry, and the university largely became a closed system, preparing people for its own continuation and perpetuation.

This also changed the meaning of research. Research now became something for which one gets entitlement to a specific type of job, to promotion, or to tenure. It became a ticket of admission. Whenever a piece of work becomes a ticket of admission, it becomes increasingly formalized. It increasingly focuses on satisfying requirements rather than on producing results.

Again, 15 years ago only an "old fogy" would have dared to suggest that graduate school enrollment and, especially, enrollment in graduate programs preparing for teaching in graduate school would not and could not expand indefinitely. Long after the "baby bust" of 1960–1961 has occurred—indeed long after it had clearly become irreversible—graduate schools, and especially those in science, continued to intensify their efforts to produce larger numbers of graduates trained and mentally prepared for rapid careers in the academic "growth industry," of the ever expanding university. When the university stopped expanding, these graduates then understandably felt let down. The did not blame the university which has led them on and had overpromised. They did not accept the facts of baby boom and baby bust. they tended to blame the outside would, namely, industry and government.

These developments may account for what, to the outside viewer, seems to be the most fundamental shift of all. This is the shift toward a definition of knowledge as "whatever has no utility and is unlikely to be applied." This is not a form of Marxism, let alone social responsibility. It is incompatible with any philosophy of society or economy. And it is far more elitist, and in the worst possible way, then the so-called elitism of the traditional scholar. It is a view of science as existing primarily for the sake of academia.

The American scientist, by and large, still invokes Francis Bacon as his patron saint. But to an outside observer, and especially an outside observer located in the employing institutions other than the university itself—that is, in government or industry—it sometimes seems that American science is rapidly shifting to its own neo-scholasticism, its own closed system. Like any scholasticism, it suspects experi-

ence, despite its emphasis on experiments. It tends to reject utility, application, technology, and any kind of payoff altogether. To the outside observer it looks as if the mind-set and the values of American science are becoming incompatible with, or at least alien to, application, utility, and results.

The dangers

The drift of science and industry from mutual respect and advantageous interdependence to the antagonism and alienation which characterize the last 10 or 15 years, is dangerous first to American industry. The great danger is that what I have called the "spirit of the budget" will paralyze the ability to innovate and to change.

We know very little about the actual relation between scientific knowledge and technology, but we do know that science creates both vision and performance-capacity. It would be a very poor trade-off to exchange the increased analytical capacity of the policy-maker in government and business for lack of vision, lack of will to innovate, and paralysis of the capacity to change. We face a period in which ability to change will be crucial—with the impacts of 20th-century science on our vision, as well as on our technology and our way of life, just beginning to be significant.

The danger of the drift into antagonism and alienation is, however, even greater for science than it is for industry. It is possible, and even fairly easy, to buy the application of science. By its very nature, science is public. Technology, the application of science, is usually available in prepackaged and applicable form and for a reasonable fee. This has been proved by such totally different countries as the Soviet Union and Japan. In both, investment in science has been kept low—in the Soviet Union it has essentially been focused on a few selected areas considered of prime importance for defense; and in Japan it has been reserved for areas that were considered intellectually prestigious. In both countries, the technological fruits of science were readily available by purchase from the outside world.

It is not true, in other words, that a modern developed country needs a science base. It can purchase it or import it. If American science loses the support of industry and of government policy-maker because it spurns both in the name of scientific "purity," it may find that for long years to come the country can get along without it. Ultimately there may be a very high price to pay—but this may well be far into the future.

In purely opportunistic terms, American science can therefore ill afford to be estranged from industry. Clearly the expectation that government would turn out to be a more reliable, let alone a less demanding, patron than industry can no longer be maintained. Government may turn out to be a far less dependable and a far more restrictive patron than the economic sector would ever be. Certainly, government is likely to impose political values on science, far more than pluralistic and atomized industry would ever do, whether this is in respect to biomedical research with its politically popular fads and crash programs, in respect to the demand that scientific research be focused on projects rather than on knowledge, or in demand that what is science is what elects politicians or what pleases an intellectual mob.

Equally, it is no longer able to anchor American science in the graduate training of Ph.D.'s for college or university teaching. Colleges and universities will for long years to come be amply staffed, especially in traditional scientific disciplines. At the same time, government employment for scientifically trained people has reached a plateau, and may indeed go down rather than up—both because the pipelines are full and because spending cuts are likely to fall on areas of long-term promise—that is, on areas that employ scientists in large numbers—rather than on areas of immediate performance.

For the next 25 years or so, American science will therefore have to look to industry to find employment for its graduates. It will again, as it was 40 or 50 years ago, become the rule to expect one's ablest graduates to find employment and livelihood in industry. The alternative is a sharp curtailment of the academic establishment in science, and especially of graduate work in science, and almost certainly a drop in standards and quality.

The philosophical issue

Modern free society rests on three foundations: autonomous local government as opposed to the centralized bureaucracy of enlightened absolutism; the autonomy of science as independent value and self-directed intellectual inquiry; and pluralism in the economic sphere, in which autonomous self-governing institutions in the pursuit of their own mission promote economic well-being. The three are interdependent.

Of the three, industry has shown itself capable of survival even if free society is snuffed out. In the most totalitarian society, the economic unit—that is the management of industry—is still autonomous. Whenever a modern tyrant tried to subordi-

nate the economic institutions to the all-powerful Party, he failed, and very soon. Stalin's successors learned this lesson and so today do the successors of Mao in China.

Science, by contrast, has proved to be fragile, easily subordinated to tyranny, subject to dogmatic thought control and easily swallowed up in the bureaucratic apparatus of a totalitarian system. Science, in other words, has a greater stake in the survival of an autonomous and self-governing industry than industry has in the survival of an autonomous and self-governing science.

The deterioration in the science/industry relationship may be only a symptom of far more profound changes in world view way below the surface. But the change is in itself a dangerous, a disturbing, a painful symptom that deserves being treated.

Most needed perhaps is an attitude of responsibility on the part of science. It is no longer permissible for scientists to dismiss the difficult question of the results the laity might expect from scientific endeavor and research. To say, as scientists are wont to do, that scientific knowledge is its own result beyond appraisal or measurement, could be justified when science was a marginal activity. For this is an argument with which one justifies a small luxury, or a harmless self-indulgence. We may never be able to measure scientific results, let alone to plan them. But science may—and should—be able to tell us what to expect, what to anticipate, and how to judge. Science is unlikely to be measurable. But it might hold itself accountable.

Such a change in attitude may not cure anything. But it would enable science, industry, and government to function better and more productively. And the initiative clearly rests with science. We may never be able to work out the complex relationship between science, technology, and innovation—whether in the economy, in education, or in health care. But that the scientist has a stake in the relationship and in its productivity needs to be emphasized—and most by the scientist.

But industry and the decision-makers in government also need to change their attitudes and correct their vision. They know that slighting research and long-term work is dangerous and may even be suicidal. The means to convert this knowledge into action is systematic abandonment of the obsolete, the outworn, the no longer productive. In a few businesses this is understood. There every product, every technology, every process is considered as becoming obsolete, the only question being "how fast?" And then an attempt is made to assess the amount of the new, and expecially of the new science and technology that is needed to fill the gap, accepting that of every three major innovative thrusts, one at the most is likely to live up to its promise. For most businesses, however, this is still something only talked about—if not something stoutly resisted as a threat. Most businessses—and practically all governments—seem to believe that yesterday should last forever.

The traditional relation between science and its customers in the economic and governmental system was based on mutual respect and understanding and a keen awareness of interdependence. American science must effect a return to these values however old-fashioned they now appear to be.

Senator SCHMITT. The hearing is in recess.

[Whereupon, at 1:05 p.m., the hearing was adjourned.]

PATENT POLICY

FRIDAY, JULY 27, 1979

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
SUBCOMMITTEE ON SCIENCE, TECHNOLOGY, AND SPACE,
Washington, D.C.

The subcommittee met, at 9:40 a.m., in room 5110, Dirksen Senate Office Building, Hon. Adlai E. Stevenson (chairman of the subcommittee) presiding.

Senator STEVENSON. The subcommittee will come to order.

OPENING STATEMENT BY SENATOR STEVENSON

Senator STEVENSON. This morning we continue hearings on S. 1215, a bill introduced by Senator Schmitt to establish a uniform policy for determining the rights of the Government, its contractors and employees to exploit publicly financed inventions.

For energy development, health care, and transportation improvements, civilian applications of military and space advances, and a variety of other public purposes, the Government depends largely on private industry to commercialize the technology it develops. Federal support of research and development does not eliminate the risks to investors of turning its results into marketable products and processes. Indeed, the risks are high if competitors can legally copy an invention because the Government refuses to allow a producer exclusive rights for the period necessary to recoup his investment. The principle of granting temporary rights in return for public disclosure is the foundation of the patent system. It should be recognized in most Government R. & D. grants and contracts.

But the Federal research budget is only half of the Nation's total investment in R. & D. The returns on private expenditures are no less dependent on the security of commercial rights. We therefore want to examine the state of the Nation's patent system. What is the value of patents to inventors, entrepreneurs, investors, and firms of various sizes? In what circumstances is patent protection essential or not to the commercialization of innovative technologies? What, if any, trends in the patenting process and patent litigation have diminished the utility of patents? Is the alleged weakness of American patents a deterrent to domestic innovation or an incentive to the transfer of technology abroad? Finally, what should Congress do to strengthen the patent system?

To help us answer these questions we have invited a group of distinguished inventors, investors, and representatives of the private and corporate patent bars. Our first witnesses are Tom

Arnold, president of the American Patent Law Association and Harry Manbeck, Jr., patent counsel, of the General Electric Co.

I will invite these gentlemen to come forward at the same time. We will hear from both of them and then return to both with questions.

Mr. Arnold is a senior partner in the Houston law firm of Arnold, White & Durkee. He was a member of the industry advisory group on patent and information policy to the administration's Domestic Policy Review on Innovation. In addition to serving as general patent counsel for GE, Mr. Manbeck chairs a Committee on Economic Development task force on patents, part of a larger CED innovation study that parallels the administration's effort.

Gentlemen, we welcome you. We are grateful for your help. If you would like to summarize your statements, I would be happy to include the full statements in the record.

Let's proceed with you, Mr. Arnold.

STATEMENT OF TOM ARNOLD, PRESIDENT, AMERICAN PATENT LAW ASSOCIATION, ARNOLD, WHITE & DURKEE

Mr. ARNOLD. Thank you, sir. It is certainly my pleasure to have an opportunity to represent the American Patent Law Association before the committee, and perhaps also to share with you the personal views of one of those who went through the study of the Advisory Committee on Domestic Policy Review on Industrial Innovation, because some of the views that some of us developed out of that study were, of course, not includable within the ultimate report.

First, as to S. 1215, I might say that the American Patent Law Association is for it. We have suggested a few amendments which will appear in my written statement. But we feel basically that the idea of that bill is very excellent and we support it in every way that we know how.

I have been prompted by the invitation that you have sent me to spend the bulk of my time today, however, addressing the role of the patent system in industrial innovation.

I lead off with the observation that industrial innovation is clearly on the decline. The decline of industrial innovation in our Nation is very serious in quite a number of ways, not the least of which is the international balance of payments deficit as to which the decline in our industrial innovation is very fundamental.

This decline is the result, not just of deficiencies in the patent system, but also of many non-patent-system factors that are involved.

This morning, however, I will address only the role of the patent system in the decline of industrial innovation.

What is the role of the patent system in industrial innovation?

Well, the Constitution concept of the patent system was not to make inventors rich at the expense of the public, but rather, by holding out the carrot of a property right in any inventions to induce investors of sweat, investors of intellect, and investors or capital to invest in research and development whereby the public would enjoy a wealth of new and better things. This is a high-risk investment with cost overruns as certain as death and taxes and

success as unpredictable as the weather, so strong incentives are needed to induce major investments in R. & D.

The constitutional clause, if you will recall, is that, "the Congress shall have the power * * * to promote the progress of science and useful arts by securing for limited times to authors and inventers the exclusive rights to their respective writings and discoveries."

That, of course, is the focus that we are addressing this morning, the promotion of the progress of the useful arts.

The system announced in our Constitution and enacted in our statutes has certainly worked well for us over most of our history. Every responsible study has concluded that the patent system does, in fact, promote the progress of the useful arts. It does, in fact, induce the commitments of sweat, intellect, and capital into research and development.

If the patent system works so well, and there are so many of these non-patent-oriented factors that I referred to, that have contributed to industrial decline, that might imply that the patent system is not at fault. But that is not correct. I regard the shortcomings of the patent system as being a serious contributor to the decline in innovation.

The Constitution and the patent statute promised to the inventor and his financial backer the exclusive right to their invention, title to their invention, as it were, as a piece of property.

No one can use your property without your permission and you can ask anything you want to for the privilege of somebody using your property.

But the modern egalitarian sophistry of our divided power system of government now makes the promise of the Constitution and the statute into a deception upon anybody who would rely upon their promise of an exclusive right because the system simply does not deliver that exclusive right, at least in the vast majority of instances.

For the most part, the system offers half a loaf, the right to license, as distinguished from the exclusive right that the statute and the Constitution purport to promise.

The system is fairly well riddled with deficiencies. I will approach it in four general categories:

First, the cost of using the patent system, which is hideously excessive.

Second, the time delay in using the patent system, which is hideously excessive.

Third, the uncertainty of result of using the patent system, which is hideously excessive.

And fourth, an unrealistic standard of what inventions are patentable, as applied at least in many of our courts.

Let's start in the Patent and Trademark Office as an example. I often use its old name, simply Patent Office or its nickname "PTO." Owing directly to chronic underfunding of the Patent Office by the Congress, and I might add, to some extent owing to inefficiencies in Patent Office management—my office is not perfectly managed, the Senate is not perfectly managed, and neither is the Patent Office—we find that the Patent Office has no computerized search facility for either patents or trademarks.

In this day and time, that is just a crime.

Further, there are in the PTO search shoes, which contain the prior art references that engineers search to find out whether they're being asked to reinvent the wheel that has already been invented, and that lawyers and patent examiners search in order to find out whether the alleged invention is, in fact, new or whether it is old.

Those search shoes in the Patent Office are incomplete. In many of them 8 or 10 percent of the references are missing. Perhaps that's the average of the references that are missing from those search shoes. People borrow references and fail to return them. Some few of the search shoes, in the most interesting and active arts of the day, have been found to be missing 28 percent of the references that are supposed to be there.

So the lawyer spends perhaps $300 performing a patentability search for his client and does not find the best references.

The lawyer then spends $3,000, perhaps, to draft an application for a patent and prosecute that patent to issue for his client. And the patent examiner performs a search, and he, too, does not find the best references. And he has less time now to study the references that he does find than he did a number of years ago.

And so the patent examiner is bound by circumstances that deter him from doing a good job and he issues a patent that perhaps he shouldn't issue.

When the patent is issued and the accused infringer comes along, he's got a lot at stake. So he spends perhaps $100,000 in a search, searching in poor search facilities and elsewhere. He finds new references that were not found by the inventor's attorney, nor by the patent examiner.

Now if those new references should invalidate the patent, then all of this effort has been for naught. But it is much worse than that.

If bankers or if investors committed capital based upon the protection of the invention which was soberly promised in the patent issued by the Patent Office under the great seal of the United States, then those bankers and investors have effectively been swindled by the great seal of the United States on the patent that was issued when it should not have been issued.

So you see: Poor search facilities and poor PTO examination deters investors from investing in patents that so frequently are poor patents because the Patent Office was not given funds for management by which to do its job well.

Further, the law is also acutely uncertain on a number of substantive points. Even when two courts have the same references before them, some courts apply one standard of patentability and other courts apply other standards of patentability. And our systems of judicial process by which the Supreme Court does not reconcile all of those conflicts has left us with the situation where we've got different standards of patentability in different courts.

Some judges have sat for 20 years and never found a single patent valid.

One result of all of this is that lawyers advising their clients tend in this area perhaps more than any other to render inconsistent opinions and that beget litigation.

It also begets the cost of litigation, which in patent cases may be typified at a half million dollars to try a patent infringement suit to conclusion including appeal.

That is not an unlikely figure to pay these days. A million dollars is not rare. It also means delay, like 8 or 10 years.

I hazard a guess that in the last 10 years, there has never been a single exclusive right actually granted by the entry of an injunction within 10 years of the time that the invention was reduced to practice.

And, of course, those first 10 years are at least not uncommonly the important years of market development, technical development, potential licensing.

Those are the years when the exclusive would have been important, but we don't get any exclusive in those years because we have several years of delay in getting through the Patent Office and several years of delay in getting through the court.

So we end up with a long period of time, 8 to 10 years before we can ever have any hope of getting the exclusive, and then we find the uncertainty that half of the patents are held invalid, as a result of some of the things that I have already alluded to.

Then there is the point of what inventions should be patentable—only the once-in-a-generation breakthrough invention or all inventions which give to the public an enjoyment they did not before have access to? If we protect only the once-in-a-generation invention, the system provides no economic incentive to R. & D., provides no return on investment in the research lab month in and month out, where it costs over $100,000 per year to keep a researcher working. Only if the courts follow the statutory scheme by which all inventions which an R. & D. buck will buy, that are new to pubic enjoyment and not truly within the prior reach of the public to enjoy, can we expect to provide enough return on investment on R. & D. investment for the system to be an incentive to innovation. In perhaps half of our country today, the present statutory scheme is simply not what the courts enforce; in perhaps half of our country, only the once-in-a-generation invention is offered any hope of protection.

Well, these things will move an investor away from investing in R. & D. and encourage him to invest rather in real estate or some other more certain investment where he can be sure of his title to his property and be sure of it now instead of having to wait 8 or 10 years to find out whether he has title to the property he wants to do business with.

Then there's the confusion of the law as to a bunch of areas, and I will mention only one—the law of license.

The Department of Justice man in charge of this subject matter a year or so ago said, "There are no per se legalities" for the licensor. "There are no safe harbors" for the licensor.

A law with that degree of uncertainty is obviously a discouragement to the transfer of technology and to the licensing of technology and we need some address to it.

So then, in summary, about the subject matter, I would say it this way. Innovation, by its nature, is a very high risk investment with cost overruns as certain as death and taxes, and with techni-

cal success and market success at least as uncertain as the weather.

If in that discouraging context the investor in innovation cannot be confident of the protection that his R. & D. buck will buy, if the investor in innovation likely must spend hundreds of thousands of dollars in litigation costs just to find out whether he's got title to the invention, if the investor cannot know for years and years whether anyone has title to the invention—that is, if the patent system functions as, in fact, it does now function to a very substantial degree, then there is no wonder that the investor is off spending his money somewhere else rather than in R. & D. and no wonder that we suffer a decline in innovation in our country.

Most commonly, therefore, the patent owner compromises against these pressures of cost, time, delay, and uncertainty, and he grants licenses rather than asking for the exclusive that the Constitution and the statute and the patent all guaranteed him. And he gets those licenses typically at royalties that are low enough to reflect the compromise of the circumstance that he cannot afford the costs in time and money of litigation.

So this uncertainty and this cost is a tool of extortion to bring the owner of the intellectual property of the patent of the technology to license at a low royalty fee. The promise of the system is in large part modified from the grant of the exclusive right that the Constitution and the statute speak of, to the right to solicit the license. This is the dominant function of the patent system today.

The system still functions and functions effectively to induce a substantial amount of progress of the useful arts. But it functions oh so inelegantly. The system plan is guaranteed exclusive property right in an invention not previously obvious to those of ordinary skill in art. That is, the system plan is a guaranteed property right as to inventions not currently within the reach of public enjoyment. That plan specs out as a powerful V-8 engine, a powerful powerplant for innovation.

Unfortunately, we are coughing along on only five cylinders. What a tremendous important blessing it is that we have the patent system; what a pity that we do not service it into full function.

So I say to you the increasing deficiencies in the patent system is one of the substantial contributors to the decline in innovation.

What are the performance specifications for a properly functioning patent system?

They may be expressed as seven in number. I won't take time for all of those seven. They are in the written paper. But let me mention a few.

First, a standard of patentability which will protect the regular new and nonobvious product that is not currently in public use and that an R. & D. invested buck normally will buy. In some courts, the patent law as they interpret it will protect only the once-in-a-generation invention.

Well, if we protect only the electric light and the laser and one other invention between the two, we will not be providing return on investment, on R. & D. investment, for the thousands of companies that we want to be spending research and development money day by day and week by week, month in and month out.

We must provide a protection for the kind of research and development that can ordinarily be produced by the ordinary research buck, or otherwise, we do not provide an inducement to invest in R. & D.

If we are only protecting that once-in-a-lifetime invention, we are giving a valuable award to the once-in-a-lifetime inventor. But we are not encouraging all of our industry to spend money in R. & D. by that kind of a standard of patentability which is applied by some of our courts.

The second of our performance specifications, the availability of a search of the prior art by, let us say, the attorney for the investor in innovation, wherein the innovation investor can 80 percent rely upon the attorney having found the best references.

Now an 80-percent reliability does not sound like too much, perhaps, but we don't get anything close to that now. The effort to have an 80-percent reliable search of the prior art that the attorney needs to have access to means that he needs to have access not just to a technology search facility but to an excellent technology search facility, one the likes of which you would have expected Vince Lombardi to produce if the patent system had been his game instead of football. And we don't have anything close to that.

And the personnel in the Patent Office have in significant degree learned to live with the bureaucratic system that is forced upon them and with the funding that has been forced upon them and they don't recognize, really they don't feel in terms of their stomach ulcers, the degree by which the present search facility is deficient.

Next, I will skip over to the fifth of my performance specifications.

The availability of a final determination of the right to an exclusive in the invention—that is, the final determination of title, a judicial quieting of title, this invention I own. The availability of a final determination of title to the invention that can absolutely be relied upon, this means a substantially in rem judgment of a property right against all the world, just as my title to my car I can reasonably rely upon as against all the world.

Under the present system, the patent owner gets his patent and then litigates against the first infringer. And often, the second infringer. And often, the third infringer.

I, myself, have taken a patent back to the same court the third time. A patent owner is drained several hundred thousand dollars a crack at this repetitive litigation.

He needs to be able to say at some time, "I've got title, I really do." So he can commit his investor's $30 million to a plant or whatever it may be.

He needs to be able to quiet that title for some reasonable sum of money like $100,000 and in a time period like 2 years. Isn't $100,000 enough to pay for an examination of title to your invention? A patent owner can't get that now, at least only rarely. He only rarely can. He needs to be able to get an examination of title that industry will honor for $100,000.

This is essentially not available to him now.

Isn't 2 years long enough to decide title to a property. No way to quiet title in 2 years now.

The performance specification that will enable us to get a final examination of title for $100,000 in 2 years will require, among other things, a special set of rules for trial and for appeal of patent cases and the judiciary will howl over the idea of special treatment of patent cases. And lawyers including me will howl over the 2 years along with the courts because such rules will bind them greatly.

But it certainly is going to take some radical surgery in order for us to stop this sequence of half-million-dollar litigations and cut it down to one litigation at $100,000 cost in 2 years, or something on that order of magnitude.

From the point of view of the intelligent investor in innovation, each of the seven performance specifications, some of which I mentioned to you, is a very reasonable thing to ask for. But as of now, the system does not come close to providing him final title in 2 years' time for $100,000.

Now if you're going to invest in a piece of property, is it not reasonable for the investor to say, "I want to know within 2 years' time whether I have title and I don't want to pay more than $100,000 just to find out whether I've got title."

But we don't have that kind of possibility now. We don't have close to that now. And I say to you, therefore, that it is little wonder that investors are moving their money from research and development into more safe investments.

In conclusion, I might say that I have read Mr. Manbeck's presentation and have reviewed the specific recommendations that he will be presenting to you and I will not try to preempt them by saying what I would recommend that preempts his remarks.

I would say that with one exception, which I regard as minor, I and the American Patent Law Association agree 100 percent with everything that he is going to recommend to you.

Perhaps it may be that some of his list of items which he recommends being made out of context of the inner workings of the judicial system which is one of the seats of shortcomings of our functioning system, may be working more or less on the tentacles of the problem—important work, but nevertheless, working on the tentacles and not getting fully at the jugular vein.

But in all events, I suggest to you that we are in critical need of a revision of the standard of patentability of section 103 to establish as a standard of patentability in all of the courts that which the Congress intended when it wrote the present section 103. But that is not being followed by many courts.

In order to get a uniform structure for the standard of patentability, the uniform practice where we can have reasonable reliability, we probably also need a change in court structure, which has been proposed, as you know, by bills currently pending—S. 677 and S. 678—to have a single court of patent appeals so that appeals from all patent cases from all over the Nation can go into one court. Thereby, perhaps we could have a uniform patent law rather than have different patent laws in different sections of the country, as we now have.

We also need an address to the patent statute's section 101: What subject matters are patentable. Are micro-organisms patentable? They are certainly useful arts. We benefit from them.

Isn't it clear that new technology should be as patentable as old ones?

The whole idea of the patent system was to afford us protection for new technology. But the Supreme Court says, "Well, if it is a new technology, we're not sure the Congress wanted to reach that far. So we will not permit the patentability of the new technology because we're not sure the Congress wanted to reach the new technology."

Well, the whole idea of the patent system was to sponsor the new technology. So we need an address to section 101 of the patent statute, the definition of the scope of new technology that should be patentable.

Senator SCHMITT. You're saying that the Constitution reaches that far.

Mr. ARNOLD. The Constitution certainly reaches that far and the sociological functioning of the system reaches that far.

If we are to get the benefit of the system to function to induce the new technology, then we have to let the patent system reach that far. At least we will get an increased value if we let the patent system reach to all new technology.

Then we need correction of some miscellaneous substantive rules of law such as the one that I perceive to be in error, announced by the Supreme Court in *Lear* v. *Atkins*, which I won't take time to address.

We also need something in the nature of a speedy trial act for patent cases. The patent bar will howl, and for just cause, for good reason, to have a speedy trial act for patent cases. At the same time, it is necessary because we are not getting good justice for our clients under the present system and we're going to have to make some sacrifices in order to reach the goal of a quieted title to inventions in 2 years time.

We need the in rem judgments as to patent validity, which I've indicated to you, and there will be some howling over that, but I think we've got to have it.

We need—well, I guess I'd better stop there because I'm starting to encroach on Mr. Manbeck's statement. But I suggest to you that the patent system is in need of improvement and it would be my pleasure and the pleasure of the American Patent Law Association to help in any way we can to address the issue of improvements in the patent system.

Thank you.

[The statement follows:]

STATEMENT OF TOM ARNOLD, PRESIDENT, AMERICAN PATENT LAW ASSOCIATION

Mr. Chairman, Senator Schmitt, and Members of the Subcommittee, I understand that the Subcommittee has dual concerns today. Firstly the merit of the bill S. 1215, the "Science and Technology Research and Development Utilization Policy Act". And secondly, a broader interest in the effectiveness of the patent law and patent system as each now exists, and how this relates to the current state of industrial innovation in America.

As to S. 1215, the American Patent Law Association supports the bill and urges that it be enacted. S. 1215 will cause greater and faster commercialization of inventions resulting from research, development and experimentation funded with Federal monies, so that such advances can be of direct benefit to and be enjoyed by the American public.

Furthermore, S. 1215 will eliminate the highly negative impact on innovation we are now enduring because of the current lack of a uniform, clear and certain, and effective government wide approach to patent policy. The purpose and thrust of S. 1215 were specifically supported by both the Advisory Subcommittee on Federal Procurement Policy and the Advisory Subcommittee on Patents to the Domestic Policy Review on Industrial Innovation on this ground.

As you know, Mr. Chairman, the APLA has offered comment in the past to the staff of this Subcommittee, and to Senator Schmitt's staff to make S. 1215 a practical and workable piece of legislation. As an appendix to this statement, we have included several further amendments to S. 1215 which we believe will strengthen the bill. I know you will give our recommendations careful consideration.

Earlier I mentioned the Domestic Policy Review on Industrial Innovation which is still in progress. I know this Subcommittee has the Advisory Committee Reports to the Review, including the Report on Patent Policy. I was a member of that Advisory Subcommittee, and commend to you the specific recommendations contained therein. You will recognize in the discussion that I present to you this morning a reflection of some of the studies made in my service upon that Advisory Committee, for this morning I will discuss the decline in industrial innovation and the role of the inefficiencies of the patent system in that decline.

There is no longer any room for argument on this point: Industrial innovation in the United States is and for some time has been in a state of significant decline.

That fact gives rise to many questions. Today I will touch lightly only, these few of those many questions:

(1) What is the effect of the decline in innovation?

(2) Why the decline?

(3) Is the patent system, or the Patent and Trademark Office, a part of that why?

(1) What is the effect of that decline?

There are many effects of the decline in innovation.

I note here that last year the United States suffered a balance of payments deficit of something like 15 billion dollars in manufactured goods, arms excluded. That, inherently, is in technology goods—the very goods which used to generate such a balance of payments credit as to pay for our imported chromium from Rhodesia, our copper from Chile, our diamonds from South Africa, our oil from OPEC. Just as Japanese exports of technology goods still more than fully support Japan's importation of much more of its raw materials including oil, than we have ever imported.

For 100 years the United States exported more electric power systems, cameras, computers, automobiles, television sets—more technology goods—than we imported, and by a large margin. Now we are a net importer of the very goods that have been our source of foreign exchange. That bothers me.

Our reputation for technology goods is now so high among our own peoples, that Chrysler Corporation and General Motors are advertising as an important fact that certain of their cars are made in Japan or Germany. That RCA has its television sets made in Hong Kong or Taiwan or elsewhere. That IBM has many of its computer parts made in similar places. From the point of view of the job market in the United States does that bother you?

Of course it is true that in the innovative design of computers and television sets, the United States is still at least generally competitive with innovation elsewhere. But in manufacturing techniques for such equipment, our former leadership has yielded sufficient that our production costs and quality are commonly in second place.

The trade deficit in manufactured goods as well as oil, has devalued our dollar as against all foreign currencies. So when we buy foreign goods and raw materials, we now pay much more than three years ago. To pay more is to suffer inflation. That bothers me.

To suffer inflation is to suffer high interest rates. That bothers me. Etc., Etc. and Etc.

Any degree of loss of innovation leadership of the world is serious business to all of us. Of course, loss of technology leadership is not the whole cause of all our nation's troubles. But I perceive it to be as important as any other single factor. As important as OPEC oil prices, for example, because our importation of manufactured goods, at least up through 1979 has been greater than our importation of OPEC oil.

(2) Why the decline in innovation?

The reasons are many, both patent-related and non-patent related.

While our government is attending to energy problems by creating a new Department of Energy to address energy problems, and while our government may be now deciding to limit oil imports and ration gasoline, our government is cutting the budget of our Patent and Trademark Office—the already underfunded agency which is a major power source for *all* our innovation in electronics, chemistry and all other technologies as well as energy.

It is important that we all understand the role of the Patent and Trademark Office as the motive force for innovation, so I will return to that topic in a moment.

But to put the role of the patent system and the Patent Office in context we must first observe that much of our nation's decline in innovation is properly attributable to factors which have nothing to do with the patent system or office.

When I first commenced to practice patent and trademark law thirty years ago, the bulk of the patent practice in my home state of Texas descended from a myriad of oil tool and oil field service companies.

These companies were largely privately owned, commonly dominated by the founder—a founder who had been some sort of innovator and/or inventor as well as entrepreneur.

A few of these owner-chief-executive-officers we now call CEOs, had a Bachelor's degree in engineering or the like. Many did not. Not one anywhere had a Master's degree in anything.

They were pragmatic men, not scholars. They were entrepreneurs with a major gambler's spirit at a time when the national philosophy was not so much on security as on opportunity.

These men commonly rendered their "go" or "no-go" decisions on innovation projects while standing on the floor in the shop without consultation with either scholars or accountants—nor computer mathematical models of projected ROI.

They invented radioactivity, well logging, jet perforating, rotary drilling, and all the other tools that enabled our oil industry to set a barrel of crude oil down in Houston for less money than it cost me for a yard of good loam garden dirt set in the backyard of my new house back in 1970. Whatever they may have done wrong, there was at least something these men were doing right, if until 1970 they could make oil price competitive with dirt.

Almost all of those oil field service companies have now merged with others or grown themselves. Almost every profit unit is now presided over by a man with a Master's degree in Business from Harvard, Wharton, or Stanford with access to computer models of future markets.

Is this not an improvement?

Well, perhaps more no than yes, if your target is innovation.

By the peculiar nature of the inputs to computer mathematical models of future markets not yet in existence, no computer model could ever have projected before Xerography that the market for plain paper copiers would ever be as big as one percent of what now exists. That failure to appreciate the market is the key reason that companies like IBM declined to take on the Xerox invention when its inventor, Chester Carlson, tried to interest them in his baby.

This is but one example of the fact that computer models of ROI on inventions not yet made, are subject to horrifying errors, most commonly errors on the negative or no-go side. So if innovation is your target, computer projections of ROI may generate as much mischief as merit.

But surely these new whizzes with Master's degrees, knowing that, can more than off-set that problem?

Not hardly, if innovation is your target.

The business schools teach management of established businesses efficiently; but most of them are totally incompetent in the entrepreneurship of new technology and teach little or nothing of that or of venturesome new departures for business.

Personalities of the scholar type commonly get through the Master degree level in college. Entrepreneurial types—if indeed there are many new men of that type coming along in our present security-conscious society—rarely have the patience to stay in school for a Master's degree. The scholarly types who get Master's degrees have a relatively low sense of adventure, discovery, opportunity.

Not only has society generally moved more security-conscious in the last 30 years, we now filter out the adventurous from having much chance to head up a technology profit unit—this by the schooling processes we insist upon for men to be eligible for such jobs.

Adventuresome courage is neither on the grade sheet of the job applicant nor on his résumé, critically important though it is.

Innovation being a high risk adventure into the unknown, the new managers of business are by our selection process not as likely either to explore the length and

breadth of the Grand Canyon on a raft, or to innovate, as were their predecessors. It's just too adventuresome for at least many of them.

What is the remedy for these personality, education, and tools-of-the-analysis problems which I have been discussing? The only ones I can suggest are: (a) better training in entrepreneurship and the free enterprise system in our schools and colleges, and (b) a better, more efficiently functioning patent system to provide security in R&D investments by which to induce more money there.

I will skip all the other non-patent-system oriented factors causing decline in innovation, except one: Money markets.

In 1969, 1,298 new stock issues sold to 31,000,000 U.S. stock-buyers to raise 3.5 billion dollars of fresh venture capital.[1] In 1978 only 58 new issues were offered vs. 1,298 nine years earlier.[1] In 1978 only $214 million was raised, vs. 3.5 billion nine years earlier.[1] In the last five years together only 100 firms were able to sell a stock offering to the public for their first time.[1]

Do those figures bother you? They bother me.

In 1969 and before, innovators generally found venture capital readily available for investment in instant snap shot inventions, plain paper office copiers, and even Weed Eaters. In the last five years, innovators have generally found the venture capital for them was simply not obtainable.

Thus they have not entrepreneured their own innovation. Often they did not make the invention at all, seeing no place to go with it. When they did innovate, they have commonly been forced just to try to sell their innovations to established corporations with surplus money.

The capital for innovation venture is unavailable for many reasons, including in part, deficiencies in the patent system.

(3) Is the patent system or the Patent and Trademark Office a part of the problem?

Where does the patent system fit into all of this?

Well, the Constitutional concept of the patent system, was not to make inventors wealthy at the expense of the public, but by holding out the carrot of a property right in any inventions, to induce investors of either sweat, intellect or capital to invest in R&D, whereby *public* would enjoy a wealth of new and better things. As the Constitution phrased it:

"Congress shall have the power . . . *To promote the progress of science and the useful arts,* by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

That system has worked well for us, over most of our history. In anticipation of a property right in any inventions produced, Americans have invested heavily their sweat, their intellect and their capital in innovation. And the *nation* has prospered—through technology. If innovators also prospered, what a happy coincidence, and who could criticize their profiting by their service to the nation.

If the patent system has worked so well, and if there are many important non-patent-related factors that have contributed to decline in innvocation, then it must be that none of the fault that produced the decline is attributable to the patent system. Right? Well, no. Wrong!

President Johnson's 1966 Commission on the Patent System, and the 1978 Patent Advisory Committee to the Domestic Policy Review on Industrial Innovation, like every other responsible study of the system and its concepts, have judged the patent system to be in fact operating as an important net plus. I concur. But loyalty to the value and power to be derived from a valuable V8 engine, should not be permitted to blind us to its great deficiencies which I perceive to be growing, and therefor in special need of attention.

The Constitution and patent statue promise to the inventor and his financial backer, the exclusive right to their invention. You make an invention, it's your property just like your car. And no one can use it without your permission. And you can ask anything you want, as the price for giving your permission.

But the modern egalitarian sophistry of our dividend-power system of government, now makes the promise of the Constitution and the statute, into a deception upon anybody who relies upon their promise of an exclusive right.

Because the system does not but rarely function to fulfill that promise. At best, the system offers a right to license—only half a loaf of what was promised.

The patent system is now fairly well riddled with deficiencies of which I can here identify only a very few.

The defiencies include:

(a) poor Patent and Trademark Office search facilities, a direct result of chronic underfunding of the Office for years;

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[1] Washington Post, May 24, 1979.

(b) long delays and acute uncertainties in the quality of work of that agency resulting from two principal factors:

(i) chronic underfunding by Congress;

(ii) a confused state of the applicable law which varies from court to court making it impossible for the Patent Office to comply with all the variant law;

(c) and finally some glaring examples of judicial over-kill of imagined horrors that have made rules of law which are counter-productive of innovation.

Let's start with a Patent Office example. Owing directly to chronic underfunding of the Patent and Trademark Office by Congress, aided in this error by OMB, the Patent and Trademark Office has no computerized search facility.

Further, the manual search shoes which contain the prior art references that lawyers and patent examiners search through when trying to find out whether an invention is new, are incomplete. People borrow references from them, and fail to return them properly. The search shoes, on average, are probably missing 8% or so of the references that are supposed to be there. In some of the technologies of high current interest, 28% of the references have been found to be missing.

So the lawyer spends $300 of his client's money on a prior art search—and fails to find an invalidating prior art reference—and spends $3,000 to file an application for patent for his client. The Patent Office examiner also searches, fails to find prior art references. He has inadequate time to evaluate those references he does find. And he allows the aplication to issue into a patent, in error, typically more than two years after the application was filed. On some few occasions 20 years after.

And suit is filed against an infringer. The infringer spends $100,000 on a search and finds references not known to the applicant, his lawyer, or the examiner who allowed his patent.

If those only-now-found references invalidate the patent by proving it to be addressed to a not-new invention, all that effort and cost was wasted by the deficiency of the Patent Office search facility.

Worse yet: If bankers or investors committed capital based on the protection of the invention which was soberly promised in the patent issued by the Patent and Trademark Office under the great seal of the United States, they have been effectively swindled by that great seal of the United States.

Further, the substantive law of what is patenable is also acutely uncertain. Even when two courts have the same prior art references in front of them, some courts follow one standard of patentability while other courts follow a sharply different standard of patentability.

One result is that the Patent Office simply cannot comply with the variant standards.

Another result is that the lawyers who advise clients tend more in this area than perhaps any other to render inconsistent opinions to their clients. This produces litigation, also cost, delay and uncertainty which moves inventors from R&D and into real estate or other more stable investments.

Purely apart from different standards in different courts, the standards of patentability require extensive search for evidence, long and protracted pre-trial procedures, lengthy trials, protracted appeal procedures, high cost, heavy burdens, long delay, during which uncertainty prevails over business activity that must go on while the lawyers play their expensive games at the court house.

Typically it costs several hundred thousand dollars to litigate a patent infringement case to conclusion.

Typically, the time required to actually get an injunction-against-infringement issued and damages litigated and collected, is much more than eight years—in one recently decided case, over 20 years—after the patent issues with its sober promise under the great seal of the United States of an exclusive right in the invention.

Very often, particularly at the appeal level, after all that money, time and effort, the court holds the patent to have been improperly issued by the Patent Office in the first place.

Then there is the mischief of bad law, by judicial overkill of an unhappy situation. One example: For 100 years an accused infringer could at his option and as part of a compromise of the uncertainties of a patent's valid scope, settle his law suit by an agreement to pay a low royalty, and in exchange for the lowness of the royalty level, agree also not to contest in court the validity of the patent for the remainder of its normal term. After all, the Patent Office had examined the application to be sure it did not cover anything in the public domain, did not take anything away from the public, and did in fact disclose to the public something new and theretofore not obvious. And we could rely on that Patent Office determination at least for purposes of permitting parties to settle their law suits by license.

Indeed for 100 years the Supreme Court law on the point of licensee-estoppel implied at law an obligation that all licensees are estopped to contest in court the validity of the issued patents under which they are licensed, whether or not the license was in compromise settlement of a law suit. Among other values of this rule: it is an important inducement of the parties to settle their controversies.

But the Supreme Court not long ago changed that in *Lear Inc. v. Adkins*, 395 U.S. 653 (1969). The underlying theory of *Lear Inc. v. Adkins* was that so many bad patents are now issuing from the Patent and Trademark Office that we cannot trust the patents to be valid even though the Congress said that patents are to be "presumed valid." Moreover the party with proven economic interest in the subject matter, the infringer-licensee, must be induced to be a private policeman to rid the marketplace of the many invalid patents that have issued; so public policy is not only that he may not be estopped from contesting patent validity, he must be encouraged to do so.

Accordingly the law now is thus: A patent owner may select the time to bring suit against the plagiarist to be before the market bloom for his invention, and may select the forum of his litigation to be in his own home town, and bring his infringement suit against the trespasser upon his patent property. Public policy heretofore favored settlement of law suits, and patent owners and infringers bargained for a royalty rate that reflected the compromise between them of any uncertainty of the patent as they saw it. But under *Lear* if there is a settlement by license wherein the infringer promised to pay a compromise low royalty, the nonlicensed-infringer gets disposal of the patent owner's suit, and may then initiate his own law suit. I.e., the alleged settlement does not finally settle anything for the licensee is not bound.

Worse: the trespassing infringer may now select the forum of his choice and a time of his choice to sue to invalidate the licensed patent and thereby be relieved of his duty to pay even the low royalty he promised as his part of the compromise.

Moreover, by the act of taking the license at a low royalty, the trespassing infringer assures himself of a limit on his damages for his deliberate infringement and assures himself by his license and litigation of an immunity from injunction at what may have otherwise been a most unhappy time—if enjoined at all it will be years down the road after the market bloom is likely passed.

A big infringer may, and in my practice has, driven the patentee from the market and bankrupted him during the litigation. Absolutely nothing a court can do at so late a date, can effect any sort of justice—or encouragement of this inventor back into innovation endeavor.

In short, the trespassing infringer gets varied and important considerations from the patent owner and is not bound by the contract he signed; but the patent owner may get little or nothing but is bound by the license contract. This severely biases against settlements and contributes to the overload of our courts with patent cases.

More important: this is one of the many sponges that absorbs the capital and interest that we need to have invested in innovation patents sufficiently well examined in the Patent Office, that we can trust them.

The system cries out for parties to infringement actions to *finally* settle their law suits and for law to hold them *both* to their bargain, whereby if the infringer *agrees* to pay the royalty he *does* pay the royalty. For now we have the law of patents actually and absolutely inducing fraud in the inducement of license contracts, fraud by infringers against patent owners, and the Supreme Court is calling it "public policy".

—Absolute lunacy, begot by a Supreme Court overkill of essentially a non-problem.

The mischief of invalid *licensed*-patents even under present Patent Office performance is *de minimis* by comparison with the mischief of the rule of *Lear*. Why? Because the clearly invalid patents are to a substantial degree self-purging from the system. Few to none of the clearly invalid patents are ever licensed for sums equivalent to litigation costs; if a patent is licensed for enough money to induce the hideous expense of patent litigation, it is not unreasonable for society to depend upon statutory presumption that the patent has some substance and is valid for purposes of supporting the contract of the parties.

Also there is the confusion of the law as to what is a lawful license of a patent. And what is a misuse of patent. A Department of Justice official has said of this area of law: There are no per se legalities. There are no safe harbors for the licensor. Carrying on his theme I add: There are only illegal licenses, and uncertain licenses that somebody may urge in court later to be an illegal license with a chance of winning his point, thereby to render the licensed patent unenforceable.

I've been told of a Continuing Legal Education program of a few years back, where the instructor presented something like six common every-day licensing issues to his class of practicing lawyers and asked their opinions as to legality. The greatest uniformity of opinion he got on any of them, was something like 70% to 30%, most of the questions begetting more uncertainty than that.

Do you think that degree of uncertainty in the law of what patent license is lawful bothers a businessman about to invest in patents?

Sure, a lot of money has been made on many patents and in recent years, too. Inventions you know about like: Land's Polaroid instant snap shot camera, now in litigation with Kodak. Carlson's Xerographic plain paper copiers, often in litigation. Ballas' Weed Eater Lawn Trimmer, now in litigation with many infringers.

And hundreds of inventions you don't know about, like Self's severe service chemical refinery valves, now in litigation. Mobil's catalyst which gives 20 percent more gaoline per barrel of crude oil, also litigated. *Mobil* v. *Grace,* 367 F. Supp. 207 (D.C. Conn. 1973).

But all these folks have spent over half a million dollars each, some of them millions in patent litigation costs. As to some of them the validity of their patents is not yet finally decided by the courts.

Innovation is a high risk investment with cost overruns on the technical side as certain as death and taxes, and technical and market success as unpredictable as the weather.

If in that discouraging context the investor in innovation cannot be confident of protection of what his R&D buck will buy * * *

If the investor in innovation likely must spend hundreds of thousands of dollars in litigation costs * * *

If it cannot be known for years and years whether a given invention is protected * * *

That is, if the patent system functions as often it *now in fact does function,* then there is no wonder that investment in innovation is on the decline.

Who is smart enough to have earned and saved some venture capital to invest, and simultaneously so stupid as to spend it on R&D, or on development of an invention, when it will cost him literally hundreds of thousands of dollars and eight or ten years of time, just to find out whether or not he owns the intellectual product which is R&D money paid for? Would you? If you would, there are *many* opportunities available for you to spend your money in innovation.

In a very real sense, the patent promise of an exclusive property right in an invention, is a euphemism. Euphemism for what? Euphemism for a ticket to the court house, which authorizes the patent owner to pay several hundred thousand dollars and having so paid, after some years to ask the court whether the patent owner is entitled to the exclusive right which the Constitution, statute and patent all promised him. Though he paid his money, and waited years for leave to put the question, the patent owner is not entitled to an answer to his question to the court often for still more years.

So most commonly he compromises. Often he gives up his claim and right to an exclusive, by the grant of licenses at royalties often low enough to reflect his compromise of those hideous litigation costs, delays and uncertainties.

As too often modified by cost, delay and legal uncertainty, the system still works and works importantly to provide a very substantial service in inducing innovation. But it works oh *so inelegantly.*

The system plan—a guaranteed exclusive property right in any invention not previously obvious to those of ordinary skill in the art, i.e., any invention not previously available for public enjoyment—specs out to be as a powerful V-8 engine, a real power plant for innovation. But it is coughing along on only five cylinders, in this time where our need for an efficiently functioning patent system of incentives to innovate, is more important than ever in our history.

What a tremendous important blessing that we have the patent system. What a pity that we do not service it into full function.

Yes, one of the significant factors in the decline of innovation, is the imperfection not in the plan of the patent system, but in its *de facto* implementation by our Patent Office and our courts.

Who is to blame?

There is enough blame to go around. Certainly the Congress. Absolutely the courts. Assuredly the Department of Commerce. Positively the Patent and Trademark Office. Equally the lawyers who often draft unclear patents, or who by pursuit of a well presented lawsuit in context of uncertain law—so made by the courts and left uncorrected by the Congress—may litigate the cost of justice up to levels multiples higher than the value of the justice they pursue.—*Each* of these has

mightily burdened the patent system plan with costs in time, money and uncertainity that deplete and absorb unacceptably large portions of the motivation for innovation which the system should be providing—and this at a time when for other reasons our nation most critically needs the most efficient system obtainable.

Performance specifications for the patent system

The performance specifications of a patent system that will sharply increase the incentives for R&D and innovation, may be written as seven in number:

(1) A standard of patentability which will protect the regular new and non-obvious product not currently in public use, that an R&D invested buck normally will buy.

If as in some courts the patent law protects only the once-in-a-life-time-breakthrough-invention, it will provide month-in and month-out no Return on Investment, no ROI on R&D investment. Providing no ROI on innovation investment, it provides no incentive to innovate.

The standard of what inventions are patentable as intended in the present statute, it well balanced to secure innovation-inducing protection while not permitting anybody to take from the public domain by his patent anything that the public theretofore had a realistic access to. Unfortunately the present statute on this point suffers minor technical defects of verbiage, and is not followed by at least many courts, anyway.

(2) The availability of a search of the prior art, by an attorney for an inventor in innovation, which the innovation inventor can 80 percent rely upon.

That inherently means that the attorney needs access not just to a technology search facility, but to an excellent search facility. One like you would have expected Vince Lombardi to produce, if the patent system had been his game instead of football.

No such facility now exists in this country. The present Patent and Trademark Office search facility is in critical need of many major improvements, including integrity checks of the search shoes, computerized search capability, etc., etc.

(3) The availability of *an opinion by an attorney* which an investor in innovatin can 80 percent rely upon.

This requires not only a good search, but a pattern of statutory language and of judicial structure and attitude for application of the statute by which the uniformity of judgment by patent examiners, judges, and lawyers alike, can be sharply increased.

The know-how to realize much of this goal is available. The *will* to make the sacrifices necessary to achieve it, is not.

(4) The availability of an action on an application for patent by the Patent and Trademark Office, which the innovation inventors can 75 percent or so rely upon.

That is, 75 percent of issued patents sustainable in the courts. The requirements to realize this goal are of course the same as for (3) above.

If the investor can 75 percent rely upon the patent allowed by the Patent and Trademark Office, so will most infringers. Thereby, few patent infringement suits will go to court. The exclusive right will thereby commonly be available for the $3,000 or $4,000 of a Patent Office Examination, instead of, as now, the $300,000 or $400,000 of a very uncertain court re-examination.

(5) The availability of a final determination of the right to an exclusive, a property right, in an invention. —One which can be absolutely relied upon. I.e., a substantially in rem judgment of a property right against all the world, just as my title to my car or house is determined substantially good against all the world.

The Supreme Court has made the present law, by which a single judgment by a single court of invalidity of a patent, is an in rem judgment of invalidity in spite of prior judgments of "valid"; but a judgment of validity is not binding upon other infringers. So a series of infringers are permitted each to have his day in court after court after court until the plagiarist-infringers have financially exhausted the patent owner, or until any one of them has won a judgment of invalidity in any single court among the many having different views of the law, a judgement which opens the invention up to most if not all the world in spite of many other courts' prior determinations that the patent was valid.

This fifth performance spec of any efficiently functioning patent system, compels a compromise of this favoritism toward the plurality of infringers in the wars of the patent court room.

(6) Such "final determination" to be available within two years from a request for such a final determination after threat of commencement of infringement.

This performance specification is obtainable only with some radical surgery to the Court system and improved timeliness of Congressional support of growing needs of the court system, including some sort of "speedy trial act" for patent cases. As of now, courts very frequently take over a year to decide a patent case after the trial is concluded, and commonly take several years to reach trial.

If as now, the exclusive right which is promised by law, is in fact commonly not obtainable during any of the eight years of primary market development and license negotiation concerning the invention, then the statutory promise of the exclusive is a fraud upon those who rely upon it, and is a tremendously reduced inducement to innovation.

(7) Such "final determination" of title to an invention, to be available for $100,000 or so.

This performance specification will require a special set of rules for the trial and appeal of patent cases.

It will also require a sacrifice of the pursuit of perfect-justice-but-only-at-unaffordable-costs in favor of an acknowledged less-perfect litigation, at a price innovation investors can more commonly afford to pay. The perfect justice we now pursue at unacceptable cost is in truth not attainable even at unlimited costs; less costly litigation need not necessarily reduce justice by any significant amount.

From the point of view of the intelligent investor in innovation, each of those performance specifications is a reasonable thing to ask for.

If realized they would assuredly beget undreamed of investment in innovation—investment of sweat, intellect and capital now more commonly put into safer investments like real estate.

But under our present system, the investor in innovation enjoys none of those performance specifications of the patent system.

Little wonder that the incentives of the patent system for innovation, in this time of special national need, are a dilute 40 to 60 percent possibly, of what they very easily could be.

Little wonder that our nation's technology leadership of the world is slipping from our grasp.

That bothers me.

APPENDIX

The recommendations of the American Patent Law Association for amendments to S. 1215 follow:

SECTION 201(c)(7)

The purpose of Section 201 is to effectuate the commercialization of patented inventions owned by the Federal Government by authorizing the Secretary of Commerce to affirmatively attempt to license such patents. The purpose is desirable, but the means of achieving the goal and particularly subsections 201(c) (4), (6), and (7) give us pause.

These three subsections authorize and direct the Secretary to "evaluate" the "commercial potential" of inventions, to "make market surveys", "acquire technical information", and to "demonstrate the practicability of the inventions". Such activities will require substantial funding to carry out. Furthermore, even if this effort were undertaken, we seriously question its effectiveness in achieving the purpose of Section 201.

Rather, we recommend creating a program to effectively publicize just what inventions the government own. The Commerce Department is a logical location for the program. Perhaps the Small Business Administration could assist in delivering this information to its constituency. If the private sector is meaningfully informed of what the Government has, the forces of the free enterprise system will work a real-world evaluation of the inventions more effectively and efficiently than can be accomplished by the Secretary of Commerce.

If the present approach of S. 1215 must be retained, we especially find the provision of 201(c)(7) which directs the Secretary to "acquire technical information" to be troublesome.

The parameters of the authority of the Secretary to make demands for information is not made clear. It is possible, and indeed likely, that the Secretary will demand information that the government contractor considers secret or proprietary in nature. How will such disputes be resolved and how will the contractor be compensated for property taken in this manner by Government authority? If the authority to "acquire technical information" could be interpreted to mean from government contractors, over their objections, and without reasonable compensation we urge that it be eliminated from the bill.

SECTION 201(c)(9)

This subsection authorizes the Secretary to retain the income from the Government licensing program to use to further the purposes of the Act.

We are sympathetic to the view that such authority will give financial flexibility and freedom to the Administrator of this new program. Such authority may well be desirable in an established Executive branch program where the services provided, the cost, and the income can be ascertained with relative certainty. However, in this new program, we believe that annual authorization and appropriation functions by the Congress would have a continual and effective "oversight" effect on the operation, and particularly the financial operation, of this new program.

Therefore, we recommend that in subsection 201(c)(9) on line 9, the word "Provided" and all that follows in that subsection be struck out. The monies collected by the Secretary should be directly deposited in the general fund of the United States Treasury.

SECTION 302(b)

We support the clearly intended purpose of this Section. However, we believe the Section as intended could be made more effective and clear by the addition of the following sentence to be inserted as a new last sentence of 302(b):

"Contractor's license to practice the invention, or to have it practiced on contractor's behalf, shall include the right to grant sublicenses of the same scope to subsidiaries and affiliates within the corporate structure of contractor's organization, and to existing licensees whom contractor is legally obligated to sublicense or assure freedom from infringement liability."

SECTION 304

We offer the following two amendments which are clarifying in nature and which we believe comport with the intent of the Section.

(1) On page 15, line 18, strike out "or" and add, "and has refused to offer a license to the invention to responsible applicants upon terms reasonable under the circumstances."

(2) After subsection (a), renumber (b) as "(c)" and insert the following new subsection:

"(b) A contractor whose title to an invention has been affected pursuant to the exercise of authority granted in (a) shall retain an irrevocable non-exclusive and royalty free license under such invention if such contractor is using or has made substantial investment leading to the use of the invention."

SECTION 305(a)(2)

This subsection as drafted in certain narrow circumstances could act as a serious barrier to the development and commercialization of practical and useful inventions, and thus be counterproductive to achieving the purposes of the Act. Our fear goes to products invented or improved, the nature of which limit the potential buyers to governmental entities; for example, highway safety devices and equipment. If the statute provides that the potential purchasers of these new products are reserved a paid up license to make, use, and sell the invention, there will be a serious chilling effect on inducing a private manufacturer to invest capital to develop the product to the point of commercialization.

We recommend that the contractor have the right to petition the government agency to withhold this grant of rights to State or municipal governments, "if the agency determines that such a grant would substantially interfere with the commercialization of the patented invention." While this standard is more narrow than "not in the public interest" currently in S. 1215, we think it more precisely identifies the public interest in the context of the bill and, therefore, in the few meritorious cases which are likely to arise, would be more attainable.

Senator STEVENSON. Thank you, sir.

Mr. Manbeck?

STATEMENT OF H. F. MANBECK, JR., GENERAL PATENT COUNSEL, GENERAL ELECTRIC CO.

Mr. MANBECK. Thank you, Senator.

My name is Harry Manbeck. I am general patent counsel of General Electric Co.

My purpose in testifying here today is to present some thoughts and recommendations on needed improvements in the patent system.

The changes which I will suggest were developed as part of a study on technology policy currently being conducted by the Committee for Economic Development.

The Committee for Economic Development, a nonprofit organization, is composed of 200 trustees, including many corporate executives and university presidents, and its study is intended to determine what policy changes are needed to stimulate technical progress in the United States.

The patent working group, chartered as a part of this study, was given the opportunity to consider the effect of the patent system in the innovation process and what changes should be made in the system to enable it to support innovation more effectively.

The report of the working group has been submitted and accepted in principle, and a copy of it is being furnished for the hearing record. I should emphasize, however, that at this time the report has not yet received final approval from CED.

The overall summary chapter of the CED study, which includes much more than patents, tax policy, regulatory policy, et cetera, has been presented to the executive branch of the Government.

We had a meeting on Wednesday of this week in Dr. Press' office with a number of people. So the same recommendations have been made on the executive side, too.

The first conclusion reached by our group is that the patent system unquestionably serves as a stimulus to industrial innovation. The protection provided by patents encourages the investment of funds, not only in research and development, but also in facilities to commercialize the R. & D. output.

Now I will depart from my prepared text here just to emphasize the two-step process we're talking about. Mr. Arnold spoke particularly of funds for research and development but it is much more than that.

It is the commitment often of much, much larger funds, millions to hundreds of millions of dollars to put in a plant to bring out new products, to put new processes in place that we're talking about, that the patent system supports.

If businessmen were to lose confidence in this protection, many innovative products might never be developed or reach that marketplace. To maintain that confidence, we propose a number of changes in the patent system which should increase its effectiveness and strengthen its supportive role in the innovative process.

These changes relate primarily to two key areas of improvement. The first area involves the resolution of disputes over issued patents while the second area lies in the timing of the patent grant and thereby its reliability in business planning.

Turning first to the resolution of disputes, it is believed that the cost and time currently required to resolve contested situations seriously detract from the prompt and effective functioning of the system.

When patents relate to commercially important products or processes, differences often arise between competitors as to the validity and scope of the patent coverage.

Most of these differences are settled by negotiation between the companies involved, but sometimes irreconcilable positions are taken which require resolution by a third party.

Unfortunately, because of certain court decisions, these differences cannot normally be taken to arbitration, and if they are taken to court, the decisional process becomes very time consuming and very expensive.

A patent lawsuit ordinarily takes years to complete and will involve hundreds of thousands of dollars in expense.

As an aside here, I can mention in the last 3 years we've had two cases in my own company in which we've spent over $500,000 in each case and we have yet to have 1 day of trial in either case.

In fact, one case has now been terminated. The other one continues.

So these things are very, very expensive.

Also, the results are often not as predictable as they should be due to differences in legal precedents among the various Federal appellate courts. Given these factors, we suggest three changes:

First, arbitration should be endorsed by statute as an acceptable way of settling patent controversies. Arbitration is widely used in labor and other commercial matters, which often involve far greater amounts of money than most patent disputes.

It is extremely unfortunate that arbitration is not available in the patent field for those who wish to use it. Section 294 of the McClellan bill, S. 2255 of the 94th Congress which passed the Senate in 1976, would have provided for voluntary arbitration of patent disputes, including questions of both infringement and invalidity.

We recommend that a similar statutory provision be enacted promptly.

Second, a single court of appeals for patent cases should be established to provide nationwide uniformity of the patent law. Not only would this make litigation results more predictable; it would also get rid of the expensive and time-consuming forum shopping that often occurs in patent litigation. Legislation providing for such a court has been sponsored by the Department of Justice and the Senate currently has it under active consideration.

Now my prepared text mentions S. 677 and S. 678. There is a successor bill to these bills which has been introduced as a result of the hearings which occurred on those bills, and I'm sorry, I don't have the number. It is more restricted to patent cases than the first bills were, which I believe included tax and trademarks, too.

And we urge support for that bill.

Third, a statutory reexamination procedure should be instituted to enable the Patent and Trademark Office to strike invalid patents from the rolls. As our system now stands, a businessman faced with a baseless charge under a worthless patent has no avenue except to sue or be sued, or to make an unjustified settlement.

There should be a procedure available allowing him to take his evidence of prior patenting or prior publication to the Patent Office and have the patent struck from the rolls.

Obviously, it would take very convincing evidence for this to happen, but it should be available.

Coming now to a second area of improvement, the timing of the patent grant, here two changes are important. The first deals with the protection of agricultural chemical industry and the pharmaceutical industry. The second is concerned with the uncertainties which are caused when patents are held up in the Patent Office for years because of interference contests between two inventors claiming the same subject matter.

To protect innovation adequately in fields subject to Government regulation, a procedure should be established providing for an appropriate adjustment in the patent term when commercialization is held up due to regulatory delay.

As matters now stand, patents in some industries may issue a number of years before the products involved can appear on the market.

Thus, the patents expire relatively early in the commercial lives of the products, enabling potential competitors to get into the field without having to design around the patents or develop competitive new products.

Gentlemen, here let me mention a point of the patent system which is rarely emphasized.

The patent system forces people to do their own work. And you often get progress in America simply because one businessman has to design around another businessman's patent. It is important that we don't cut into the life of patents in these industries which are subject to regulation. Otherwise, why not wait, then poach on what the other guy has done.

To continue with the last sentence of my prepared text on this, the time in which the innovators of the products can recoup their investments is correspondingly shortened and this possibility acts as yet another deterrent to innovation in these fields.

Now to the second point on timing. To prevent prolonged, extended controversies and long delays in the issuance of patents when two or more inventors are claiming the same improvement, the Nation should change to a first-to-file system where the first inventor to file his application would receive the patent, although a personal right of use could be preserved for anyone filing later who, in fact, invented first and took steps leading to commercialization.

With this system, the present interference practice in the Patent Office would be eliminated and the ownership of all patents would be determined promptly.

It seems incredible, but you can have interference litigation that goes on for years and years and years to determine who is entitled to the patent.

The reliability and predictability of the system would be increased and businessmen and the public would benefit by early publication of the patent disclosure.

The rest of the industrialized western world with the exception of Canada uses the first-to-file system that we propose, and even in Canada, the government has proposed changing to a first-to-file system.

I must note, however, that CED members from the pharmaceutical and agricultural chemical industries have indicated that they would prefer to stay with the present system, believing it is better

for them. However, allowing for adjustment in the patent term to compensate for regulatory delays might make the first-to-file system more acceptable to them.

I have besides these two main areas of improvements some other ones which are less important. They are in the text.

Would you like me to go forward, or have I taken enough time?

Senator STEVENSON. Let's put them all in the record, and maybe we will get to them in the course of questions. After examining the record, we may have additional questions.

Mr. MANBECK. I have two or three other things. One, we strongly support S. 1215 because my own company experience shows us, proves to us, that the contractors are the ones who are most likely to carry the Government-sponsored technology into commercial practice.

If the contractor doesn't do it, nobody's going to do it, really. And if the contractor is subject to a claim by the Government under patents, or if the competitors can quickly copy the product without a patent deterrent, there's much less reason for the contractor to risk his funds in commercialization.

And my last point doesn't have to do with the changes in the patent system but merely to say that we were very pleased to see the Senate pass in the appropriations bill an item which increased the Patent and Trademark Office budget. It was very badly needed, and we do appreciate it and hope that you will hang in tough with the House and get it through there, too.

Thank you.

[The statement and material referred to follow:]

STATEMENT OF HARRY F. MANBECK, JR., CHAIRMAN OF TASK GROUP ON PATENT POLICY

My name is Harry F. Manbeck, Jr., and I am General Patent Counsel of General Electric Company. My purpose in testifying today is to present some thoughts and recommendations on needed improvements to the U.S. patent system.

The changes which I will suggest were developed as part of a study on technology policy currently being conducted by the Committee For Economic Development. The Committee For Economic Development, a non-profit organization, is composed of 200 trustees, including many corporate executives and university presidents, and its study is intended to determine what policy changes are needed to stimulate technical progress in the United States. The patent working group, chartered as a part of this study, was given the opportunity to consider the effect of the patent system in the innovation process and what changes should be made in the system to enable it to support innovation more effectively. The report of the working group has been submitted and accepted in principle, and a copy of it is being furnished for the hearing record. I should emphasize, however, that at this time the report has not yet received final approval from CED.

The first conclusion reached by our group is that the patent system unquestionably serves as a stimulus to industrial innovation. The protection provided by patents encourages the investment of funds, not only in research and development but also in facilities to commercialize the R&D output. If businessmen were to lose confidence in this protection, many innovative products might never be developed or reach the marketplace. To maintain that confidence, we propose a number of changes in the patent system which should increase its effectiveness and strengthen its supportive role in the innovative process.

These changes relate primarily to two key areas of improvement. The first area involves the resolution of disputes over issued patents while the second area lies in the timing of the patent grant and thereby its reliability in business planning.

Turning first to the resolution of disputes, it is believed that the cost and time currently required to resolve contested situations seriously detract from the prompt and effective functioning of the system. When patents relate to commercially important products or processes, differences often arise between competitors as to the

validity and scope of the patent coverage. Most of these differences are settled by negotiation between the companies involved, but sometimes irreconcilable positions are taken which require resolution by a third party. Unfortunately, because of certain court decisions, these differences cannot normally be taken to arbitration, and if they are taken to court, the decisional process becomes very time-consuming and very expensive. A patent lawsuit ordinarily takes years to complete and will involve hundreds of thousands of dollars in expense. Also, the results are often not as predictable as they should be due to differences in legal precedents among the various Federal appellate courts. Given these factors, we suggest three changes:

(1) Arbitration should be endorsed by statute as an acceptable way of settling patent controversies. Arbitration is widely used in labor and other commercial matters, which often involve far greater amounts of money than most patent disputes. It is extremely unfortunate that arbitration is not available in the patent field for those who wish to use it. Section 294 of the McClellan Bill, S. 2255 of the 94th Congress which passed the Senate in 1976, would have provided for voluntary arbitration of patent disputes, including questions of both infringement and invalidity. We recommend that a similar statutory provision be enacted promptly.

(2) A single court of appeals for patent cases should be established to provide nationwide uniformity of the patent law. Not only would this make litigation results more predictable, it would also get rid of the expensive and time-consuming forum shopping that often occurs in patent litigation. Legislation providing for such a court has been sponsored by the Department of Justice, and the Senate currently has it under active consideration through bills S. 677 and S. 678 introduced by Senator Kennedy.

(3) A statutory re-examination procedure should be instituted to enable the Patent and Trademark Office to strike invalid patents from the rolls. As our system now stands, a businessman faced with a baseless charge under a worthless patent has no avenue except to sue or be sued, or to make an unjustified settlement. There should be a procedure available allowing him to take his evidence of prior patenting or prior publication to the Patent Office and have the patent struck from the rolls.

Coming now to a second area of improvement, the timing of the patent grant, here two changes are important. The first deals with the protection of innovation in fields subject to government regulation, examples being the agricultural chemical industry and the pharmaceutical industry. The second is concerned with the uncertainties which are caused when patents are held up in the Patent Office for years because of interference contests between two inventors claiming the same subject matter.

(1) To protect innovation adequately in fields subject to government regulation, a procedure should be established providing for an appropriate adjustment in the patent term when commercialization is held up due to regulatory delay. As matters now stand, patents in some industries may issue a number of years before the products involved can appear on the market. Thus, the patents expire relatively early in the commercial lives of the products, enabling potential competititors to get into the field without having to design around the patents or develop competitive new products. The time in which the innovators of the products can recoup their investments is correspondingly shortened and this possibility acts as yet another deterrent to innovation in these fields.

(2) To prevent prolonged, extended controversies and long delays in the issuance of patents when two or more inventors are claiming the same improvement, the nation should change to a first-to-file system where the first inventor to file his application would receive the patent (although a personal right of use could be preserved for anyone filing later who, in fact, invented first and took steps leading to commercialization). With this system, the present interference practice in the Patent Office would be eliminated and the ownership of all patents would be determined promptly. The reliability and predictability of the system would be increased and businessmen and the public would benefit by early publication of the patent disclosure. The rest of the industrialized western world with the exception of Canada uses the first-to-file system that we propose, and even in Canada the government has proposed changing to a first-to-file system. I must note, however, that CED members from the pharmaceutical and agricultural chemical industries have indicated that they would prefer to stay with the present system, believing it is better for them. However, allowing for adjustment in the patent term to compensate for regulatory delays might make the first-to-file system more acceptable to them.

Besides these two main areas of improvement, we have a couple of other unrelated proposals. One is that better defined protection should be afforded to computer programs. This we believe should be done not through a change in the patent

system but rather by following a proposal which was made on July 31, 1978 by the National Commission on New Technology Uses of Copyright Work. Specifically, the Commission proposed an amendment to the copyright law to make it explicit that computer programs are proper subjects of copyright. Our other proposal is that the law be changed in respect to process patents so that they can be asserted against products made abroad by the patented process and brought into this country. Again, this would bring U.S. law in conformity with the laws of many other countries and would encourage the process innovator by giving him the protection he deserves. Of course, even with this change, a process patent could not be asserted against identical products not made by the patented process.

Turning now to S. 1215 itself, we strongly endorse its concept whereby government contractors would, in most instances, be afforded title to the patents based on contractor originated inventions. Experience has shown that the entity most likely to carry the results of government-funded R&D to the marketplace is the contractor itself. If the contractor will be subject to a claim by the government under the patents, and/or if its competitors can quickly copy its product (as by reverse engineering) without any patent deterrent, there is much less reason for the contractor to risk its funds in commercialization. The same general theorem applies to the results of government-funded R&D work done by non-profit contractors, such as universities. Unless the universities get substantial rights from patents, there is absolutely no incentive for them to establish technology transfer and patent programs which may lead to commercialization of the research. The government policies should support the profit motive no matter what the class of contractor, for it is the expectation of profits (or licensing income, in the case of the universities) which will encourage the investment of private funds necessary to commercial programs. Thus, to enhance the possibility of government sponsored R&D being using for commercial products, we support the passage of S. 1215.

As my last item, I would like to comment very briefly on funding for the Patent and Trademark Office. During our study, we became aware that a very serious underfunding situation has been building up in the PTO due to its financial support being reduced when taken on a constant dollar basis. This is of considerable concern since a reduction in the level of funding of the PTO would cause a progressive deterioration in pendancy time, and less reliable patents because search files could not receive needed updating. I was very pleased to learn that since our CED paper was written, the Senate Appropriations Subcommittee on State, Justice, Commerce, and related agencies has increased the PTO budget for fiscal year 1980 by $4,400,000. It is very important that this increased funding be made available, and we urge support for it.

If there are any questions, I would be glad to try to answer them.

Revised Position Paper

CED Subcommittee on Technology Policy—Report of Group 4—Patents

This Patent Group, formed and chartered under the auspices of the Committee For Economic Development, was assigned three principal areas of inquiry: (*a*) the significance of patents in the innovative process; (*b*) changes in patent laws or regulations which might enhance the climate for innovation; and, (*c*) inhibitions by Federal patent regulations of the commercial use of government-developed technology.

Patent group participants

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Significance of Patents in the Innovative Process

I. The patent system today

The patent laws are one of three branches of law which regulate the ownership and use of intellectual property. Trade secret law and copyright law are the two other branches. In the field of technology the patent and trade secret laws overshadow the copyright law.

Once brought forth, intellectual work can be owned and otherwise assume the elements of "property" only to the extent provided by law. This characteristic of property, or "appropriability of exclusive rights" to innovative work, largely determines whether or not such work is reproduced on a commercial scale. If the results of innovative work were freely available to all who might copy or steal them, then there would be little reason to invest in research and development. The property rights created under the patent and trade secret laws are thus important, if not essential, to the willingness of prudent businessmen to sponsor research and development and to invest in the facilities needed for innovative new products.

A well-functioning patent system meets three criteria. The first is accessibility. The system should be simple, inexpensive, and available to everyone. The second criterion is reliability. The system should allow a person who receives a patent, as well as those who are asked to respect the patent, to know the metes and bounds of the protection and to rely upon the patent's ability to stand up under litigation. The third criterion is selectiveness. The system should protect and encourage singificant discoveries without burdening the public with patents on minor and obvious variants of what was previously known. The inventive contribution must be worthy of the protection provided by the government.

A patent is sometimes referred to as a limited monopoly, but patents truly deserving of that appellation are rare instruments. The usual patent covers only a specific product, product freature or process in such a way that unpatented design alternatives inevitably exist.

Patents are generally granted about two years following filing of the patent application. Interferences, a highly technical quasi-judicial proceeding for resolving priority of inventorship between two or more contestants, can extend the Patent and Trademark Office (PTO) proceeding by many years, as can appeals from adverse decisions by PTO Examiners. The seventeen-year term of a patent is, however, measured from the date of grant, regardless of delays in the patenting process, whether caused by the Government or not. Many innovations are introduced rapidly and so the timing of commencement of the patent right, which must await grant of the patent, is of great importance. The length of the patent term, seventeen years, is generally not considered controversial today except where government actions delay the commercialization of the patented innovation.

There are a number of key distinctions between patents, with which this paper is concerned, and trade secrets, which are not this paper's subject. A patent owner has rights superior to those of a second inventor who makes the same invention, whereas the trade secret proprietor has no rights against a later discoverer of the same trade secret. U.S. patents run for a term of seventeen years from the date of grant, whereas the life of a trade secret is indeterminate. Patents are obtainable only thorugh disclosing to the public the invention and the preferred manner in which it is practiced, whereas trade secrets depend for their existence upon being closely held and known only to a few. Thus, if an invention is ascertainable from a product as sold, the only real protection available is through the patent system.

The patent owner shoulders the burden of detecting infringement and enforcement of his patent. Such enforcement lies through the bringing of a civil action in a federal district court. The federal courts have not been inclined to share their exclusive jurisdiction over patents. The validity of a patent is said to hold such public interest that settlement of a controversy through arbitration is inappropriate. The cost of enforcing or defending against a patent in court is often high, usually amounting to several hundred thousand dollars for each party.

About half of the research and development in the United States is paid for by the federal government. How do government contracts affect patents? Some people favor ownership by the government of most patents on inventions arising out of govenment-funded work. Others, equally numerous, favor retention of patent rights by the contractor. In a later Section, this paper takes up the pros and cons of this controversy and its implications for the generation and utilization of new technology.

The number of U.S. patents issued per year has reached a plateau at approximately 75,000. However, the patents issued to foreign corporations have been increasing for some time by more than 1,000 patents per year and are presently nearing a level of 30,000 patents per year. Thirty-seven percent of all U.S. patents issued in 1977 were issued to foreigners. There has been a steady and noticeable decline in U.S. patents granted to U.S. residents.

II. Role of patents

The role of the patent, and of the trade secret law, when applicable, is to give to developed technology the element of controllable property, i.e., appropriability. As already noted, the element of appropriability probably determines in large measure

whether or not new technology development will be undertaken at all. To be sure, all advancement of technology would not cease if the patent and trade secret law were repealed. Such advancement would probably continue unaffected in universities, but research and development directly funded by commercial enterprises would decline. Today the commercial sector accounts for about fifty percent of the total R&D funded by all sources in the United States and for most of the R&D directed toward future commercial products.

Patents are used in a number of different ways to reward the innovator. One use of patents is licensing, under which others are permitted to practice the invention in return for royalty payments. Patents also are used to reserve a particular product feature or process for the exclusive use of the patent owner, although probably not as often as commonly believed. Patents occasionally are used as trading stock for freedom to operate under the corresponding patents of others.

Another common role of patents is to provide the basis for acquiring counterpart patents in other countries for use in connection with product sales in those countries. Where export sales may be impractical, patents can be used to support licensing in foreign countries.

There is an obvious correlation between patents granted and R&D undertaken, although few would argue that the correlation is exact. The decline in U.S. patents issued to U.S. residents has been publicly reported for some time. A number of explanations have been advanced, but perhaps the most plausible theory is that while total R&D activity has not decreased, the work in potentially patentable areas has fallen off. Diversions of technology to areas which will not result in patents include research done to protect the environment, to reduce energy consumption, or to comply with certain government requirments and also work done to develop computer software. Diversion of technology to short-range "fire fighting" from longer range, more creative work, has also been called a cause of the decline.

The following sections describe several possible solutions to enhance the contribution that our patent system makes to the invention and innovation processes.

RECOMMENDED CHANGES IN PATENT LAWS OR REGULATIONS TO ENHANCE THE INNOVATIVE CLIMATE

I. First-to-file patent system

The U.S. Patent System provides for "interferences" between two or more patent applicants who seek a patent for substantially the same invention. The interference is a procedure to determine who first made the invention. That party will be entitled to the patent to the exclusion of those who invented later. The interference starts out as a "mini-litigation", that is, a quasi-judicial proceeding in the PTO, and occasionally proceeds into the Federal Courts as full scale litigation.

Patent interferences are highly technical proceedings of questionable efficacy in terms of reaching equitable determinations of priority of invention. Much time is spent proving what happened before the filing dates; trying to prove that the inventor was incorrectly named, did not really have the invention in hand, failed to discharge various obligations, etc. In a significant majority of interferences the patent is awarded to the first to file after all. According to one informal survey, while approximately 110,000 U.S. patent applications are presently filed per year, our interference practice produces a result different from a first-to-file system in only 75 to 80 instances per year.

The U.S. and Canada are unique among all the industrial countries of the world in utilizing the interference approach. The European countries have always considered that the patent should go to the party first to disclose to the public by filing a patent application. Many countries provide a personal defense to one who can show he was actually the first to invent and use rather than the first to file. Examples include the United Kingdom, France, Germany and Holland. The new European patent system carries along these principles.

Since the purpose of the patent system is to encourage disclosure to the public, the party first to file should be rewarded. The U.S. patent system should be changed accordingly. While converting to a first-to-file principle could result in filing a less complete patent application, it would serve the Constitutional purpose of early disclosure. All other industrial countries (except Canada) have been willing to accept such a possible disadvantage in return for the advantages of a first-to-file system. Even in Canada the Canadian government has proposed a revision in the Canadian Patent Law which would provide for a first-to-file system.

Adoption of a first-to-file system would eliminate patent interference proceedings, simplify patent litigation, enhance certainty with respect to patent validity and generally make the patent system serve the interests of the inventor and the public

in a more efficient manner. Some might object to this recommendation,[1] but most of the objections could be answered by the further adoption of provision in the law which would grant a prior inventor a personal right to use the invention. Such a right would be contingent on not having abandoned the invention and should require the taking of steps leading to commercialization of the invention.

II. Reexamination of patents

A serious problem affecting the predictability of litigation is that the United States Patent and Trademark Office has often not taken into account certain prior patents or other background material in its examination of the patent. In the relatively short time a patent examiner has to search for pertinent references, it cannot be expected that he or she will find all the prior references, particularly those from foreign countries, which a potential defendant in an infringement suit may be able to uncover. At present, a patent owner faced with new references brought forward by an infringer can ask for a reissue of his patent to overcome these references. The reissue patent is a substitute for the original patent that expires on the same date as the original patent would have expired but which differs in scope of coverage from the original patent. On the other hand, the infringer or other party advancing the new references must await a lawsuit or bring a declaratory judgment suit.

The present procedure, allowing a patent owner to solicit reissue of his patent when faced with new references in a contested situation, should be continued and encouraged. Anyone opposed to the reissue, either wholly or in part, has the opportunity to submit references and to present written arguments. This practice, too, should be continued. We do not suggest that a full inter partes (adversary) proceeding be established in the PTO since this would increase both the time and expense involved in the reissue proceedings.

If the patent for which reissue is sought is already in the courts, the judge should retain the discretion to stay the action in order to allow for the reissue. Allowing the reissue to be completed, while staying the judicial process, may often allow for greater certainty in the proper coverage of the patent with an attendant reduction in the amount of judicial time required. On other occasions, the reissue procedure may be insufficient because oral testimony, for example, may be essential to explain the references and other background matter submitted by the defendant. In such cases, the judge might properly refuse to stay the suit. The present procedures is reasonably satisfactory insofar as the patent owner is concerned, and it should not be changed with respect to his opportunities.

A new right should be provided to a defendant or potential defendant faced with an adverse patent claim, however. If the defendant feels that his references are so strong as to invalidate the patent without the need for or expense of a trial, he should have the opportunity to take his references to the PTO and ask for reexamination of the patent in light of those references. In other words, he should be able to call for a PTO action akin to the reissue proceedings which might result in a PTO decision that the patent should not have been granted. Such proceedings would in certain situations, particularly when baseless patents are involved, avoid the time and expense of a trial. To that end, the judge should have the discretion to stay any trial proceeding pending the outcome of a PTO reexamination requested by the defendant.

The reexamination procedure should require payment of fees, by the person requesting reexamination, which will approximate the PTO costs involved.

The concept of a reexamination of issued patents has appeared in the last few years in various Congressional bills. The version of a reexamination statute that received the support of the American Patent Law Association, the Patent, Copyright and Trademark Section of the American Bar Association, the New York Patent Law Association and others is contained in the Wiggins Bill H.R. 14632 of the 96th Congress. We recommend that steps be taken to encourage Congress to pass legislation resembling the Wiggins Bill since a reexamination procedure will increase certainty in the patent system at a relatively modest cost to all involved.

Through proposed rules published at 43 Fed. Reg. 59401 (December 20, 1978), and later withdrawn, the Commissioner of Patents and Trademarks raised the possibility that a limited reexamination procedure could be established in the PTO based on his rule making authority. However, we believe a statute is needed since the Commissioner cannot provide for court review of the PTO decisions or authorize cancellation of patents found to be invalid, features which are required for an acceptable reexamination system.

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[1] It should be noted that the pharmaceutical and agricultural chemical industries have questioned the "first-to-file" system as applied to them. They believe that the present system is preferable in their businesses, given the extensive testing needed to prove practical results.

III. Arbitration of patent disputes

Commercially important patents often invite controversy. Competitors interested in the patented product or its equivalents frequently disagree with the patent owner as to the true scope and value of the patent. The result may be a suit in the federal courts. Unfortunately, fully contested patent litigation is very expensive, often $500,000 or more for each party. Protracted pretrial procedures coupled with the difficulties of dealing with technical subjects tend to make the litigation very expensive.

Patent litigation is also protracted. A suit on an important patent will commonly take years to resolve. The cost and time required for litigation detract from the ability of patents to foster innovation. The cost of enforcing patents may very well influence business to invest in less risky programs than in the research and development needed for innovation and productivity gains.

In order to reduce the cost and time required for the resolution of certain patent disputes, arbitration should be available for those who wish to use it. In certain judicial decisions, it has been held that patent validity has too great a public impact to allow it to be submitted to arbitration. In other words, only federal judges should rule on it. We believe, however, that arbitration should be a legitimate method for solving patent problems. Arbitration is a common method of resolving disputes in almost all other commecial areas including very large labor settlements, and it is difficult to see why it should not be allowed for patent questions.

The McClellan Bill, S. 2255 of the 94th Congress which passed the Senate in 1976, would have provided for voluntary arbitration of patent disputes, including questions of both infringement and validity. We recommend that a similar statutory provision be passed promptly. Arbitration cannot be required since such a requirement would be a violation of due process, but it should be available when both parties wish to use it. The results of arbitration are, of course, binding only on the participants.

To our knowledge there is very little data on arbitration in patent cases. However, information provided by the American Arbitration Association showed that in a sample of 200 commercial arbitrations in the construction field, it averaged less than four months from filing to issuance of an arbitrator's award. The savings in time and money would be substantial if anything like this could be attained in patent cases. It is certainly worth a try.

IV Special patent court

Honest irreconcilable differences occasionally dictate the need to litigate patent questions. Unfortunately, there are sometimes material differences in legal precedents about patents among different judicial circuits. The precedents in one circuit may indicate a favorable result for the plaintiff while the precedents in another circuit may not. Because the result of the litigation can be affected, or even determined, by the circuit selected, the selection process (forum shopping) frequently becomes a major added complication in the controversy.

Proposals have been made for a single court of appeals for patent litigation. This change would be particularly useful in eliminating much of the costly procedural maneuvering at the early stages of patent litigation devoted solely to selection of the forum.

A single court of appeals should also contribute to greater certainty in the predicted outcome of patent litigation. A single court would tend to develop a more cohesive body of precedents than would the many independent circuit courts. This greater certainty in expected result might also reduce the number of patent suits brought. Few suits are brought or accepted with the expectation of losing.

In a single court there could be difficulties in the handling of issues ancillary to patent validity and infringment. We believe, however, that a single court of appeals for patent litigation would contribute far more to the value of the patent system than it would detract from it. We recommend that passage of legislation establishing such a court.

V. Computer software protection

An increasing proportion of money invested in research and development work is being applied to the information processing field. The resulting computer software has not found legal protection in the same manner as afforded other technology. While some of the software may find limited protection under the patent system, much of it appears to be protected by its owners as trade secrets. Some industries have sought to protect computer programs by copyrights. There has been an increasing need for legislation which would better define the protection which is, or should be, available for computer programs under the copyright law. To date no such legislation has been forthcoming.

There have been numerous recommendations that the present copyright statute be amended so as to clearly afford protection for computer programs. One such recommendation is set forth in NBS Publication 500-17 by Roy G. Saltman of the National Bureau of Standards entitled Copyright in Computer-Readable Works: Policy Impacts of Technological Change. Subsequently the National Commission on New Technological Uses of Copyrighted Works recommended on July 31, 1978, to the President of the United States that the copyright laws be amended to make explicit that computer programs are proper subject matter of copyrights:

"The new copyright law should be amended (1) to make it explicit that computer programs, to the extent that they embody an author's original creation are proper subject matter of copyright; (2) apply to all computer uses of copyrighted programs by the deletion of the present Section 117; and (3) to assure that rightful processors of copies of computer programs can use or adapt these copies of their use."

We urge that the recommendation of the National Commission be implemented.

VI. Process patent protection against imports

A problem of patent enforcement which may discourage investment in process development, is the powerlessness of a United States patent over products produced abroad by that process and brought into this country. There is a proceeding available before the U.S. International Trade Commission which may lead to the exclusion of such goods but it has not proven satisfactory to many patent owners. Other major countries, unlike the U.S., do allow a process patent to be enforced through an infringment suit against foreign-made goods brought into the home country of the patent.

In order to encourage investment in process innovation, we recommend expanding the rights available under process patents. Specifically, a patent owner should be able to enforce his patent against goods, made abroad by use of the patended process and then imported into the U.S. Such a right would not bar the importation of identical goods not made by the patented process but would secure to the patent owner what should be rightfully his.

VII. Adjustment of patent term for Government-caused delays

Governmental regulatory requirements and resultant delays in clearing products for commercialization often undermine the value of patents obtained on such products by diminishing the effective life of the patent. This is particularly true in the cases of agricultural chemical products (which must be registered by the Environmental Protection Agency before commercialization) and pharmaceutical products (which must be cleared by the Food and Drug Administration before commercialization), and is also true in other fields, such as the electronics industry in connection with the standardization of a particular color television system by the Federal Communications Commission.

The reduced values of such patents occur because, in many cases, they issue a number of years before the products themselves can appear on the market. The patents thus expire relatively early in the commercial lives of the products, and potential infringers are enabled to get into the field quite soon without having to "design around" the patents or develop competing new products. The time in which the innovators of the products can recoup their investments is corresponding shortened and this possibility acts as yet another deterrent to innovation in these fields.

We recommend, therefore, that provisions be added to the patent laws which would allow patent owners to receive extensions, equal to the lengths of the regulatory delays, of the lives of patents which have been prevented by governmental regulatory delays from reaching their full economic potential. To balance this proposed extension of patent rights, there probably should be some maximum total length of time for any extension as well as a precise definition of the kind and causes of regulatory delays which might qualify patents for extensions. An alternate recommendation to solve the problem of regulatory delays would be to allow a patent owner to delay the effective date of his patent protection until any necessary governmental approvals for marketing the patented product are obtained.

RECOMMENDATIONS FOR GOVERNMENT-DEVELOPED TECHNOLOGY

I. Uniform Government contractor policy

It is estimated that in 1979 approximately $51 billion will be spent on research and development in the United States. The federal government will provide $25.8 billion of that sum. Until the 1970's, much, if not most, of such federal funding was spent on military and space programs. In recent years, there has been a growing emphasis on development programs in other areas, such as energy. It is clearly in the national interest that the technology developed by the federal funding be made

available for use by private industry in providing products and services for the general public, In many areas of the government, however, patent policies have been instituted either through statute or agency rule making, which seem to discourage commercialization of the federally funded R. & D.

Experience has shown that the entity most likely to carry the results of government-funded R. & D. to the market place is the contractor itself. If the contractor will be subject to a claim by the government under the patents, and/or if its competitors can quickly copy its product (as by reverse engineering) without any patent deterrent, there is much less reason for the contractor to risk its funds in commercialization. The same general theorem applies to the results of government-funded R. & D. work done by non-profit contractors, such as universities. Unless the universities get substantial rights from patents, there is absolutely no incentive for them to establish technology transfer and patent programs which may lead to a commercialization of the research. The government policies should support the profit motive no matter what the class of contractor, for it is the expectation of profits (or licensing income, in the case of the universities) which will encourage the investment of private funds necessary to commercial programs.

To enhance the possibility of government-funded R. & D. being used for commercial products, contractors should in most instances receive title to the inventions and patents made under government contract. This is not to say that the government should not keep a non-exclusive license for government programs and march-in rights allowing it to require the contractor to license others in certain circumstances, that is, if the contractor fails to produce enough products to supply the market.

There are some instances in which the government taking title may be the best course. For example, an agency may fund a development and then by regulation adopt it as a national standard for commercial products. To prevent economic dislocation, it is desirable that all competitors receive the same royalty-free right to use the required technology or feature.

A uniform government patent policy could be attained by passing a statute similar to the Thornton bill H.R. 6249, introduced in the 95th Congress, At the time, the Thornton bill received the support of various industry associations and various patent law associations.

Government patent policy should further extend to improved procedures within the government through which it can more promptly and more readily recognize valid patents of others bearing on government activities. Also important is discouragement of any contracting practices needlessly tending to appropriate background rights of the contractor in existing patents or data.

II. Government-owned patents

A substantial portion of the government R. & D. funding goes to support laboratories and other acitivities which are integral parts of the government agencies. The unclassified technology developed by these laboratories has normally been patented, presumably to make sure that it becomes known to the public.

The administration of patents on technology generated in government laboratories, however, presents a situation which is conceptually less straightforward than administration of patents generated from contractor-developed technology. Not having developed the technology, the commercially oriented engineers are likely to have, or at least envision, different ways of accomplishing the same end. Thus, there is at least some question as to whether the internally generated government patents serve as an effective tool for commercialization.

Such patents can certainly discourage manufacturers if they fear a claim being made under the patents by the government. The best course, therefore, is probably to license the patents on a royalty-free basis to all domestic manufacturers. In this way, the patents would serve to publish the technology, and at the same time, would not deter commercialization. (The patents could, however, serve to protect efficient domestic production from foreign dumping or the like; and in the rare instance where exclusive licensing might be needed to elicit money for commercialization, such licensing could be contemplated.)

In many instances, government patents are taken out solely for defensive reasons, that is, to publish results of the technical work without any thought of the patents having commercial value. Considering the very large number of patent applications filed by the government each year on inventions made by government employees (averaging 1332 applications per year for fiscal years 1963 through 1975), we believe that the workload of the Patent and Trademark Office could be substantially reduced if this so-called defensive filing were eliminated by the government agencies.

To do this, we suggest that a technical journal be established for publishing selected government inventions. This journal would publish descriptions of those inventions on which patents are not needed for national purposes. In this way the government would be protected against adverse claims by later inventors; the technology would be made available to those interested; the government inventors would receive recognition; the Patent and Trademark Office workload problems would be greatly reduced; and the government patenting costs would be decreased.

OTHER SUBJECTS CONSIDERED BY TASK GROUP

I. Funding of Patent and Trademark Office

It was assumed for purposes of this report that there would be adequate funding of the PTO, since the level of funding bears a direct relationship to the quality of patent examination and, consequently, of issued patents. Despite this obvious relationship, the PTO's financial support is diminishing when taken on a constant dollar basis. Specifically, the 1979 budget results in a decrease of $1.692 million in constant dollars for the PTO, and the proposed 1980 budget will result in a further decrease of $1.633 million. The consequences, already started, will be a progressive deterioration in pendency time, and less reliable patents because search files will not receive needed updating.

We believe that funding of the PTO operating budget should at very least keep up with inflation. The imposition of addition duties (new reissue provisions and proposed reexamination of issued patents) makes this condition especially important, and additional funding beyond adjustment for inflation will be essential in the relatively near future if we are to avoid a substantial increase in the pendency time and in the PTO backlog.

II. Mandatory licensing

Foreign patent systems often include provisions for compulsory licensing of patents, normally in the event of insufficient local use of the invention. Numerous studies of mandatory licensing for use in the United States have been made and, so far as is known, all have rejected the idea for one reason or another. We agree with this. A recent such study entitled "The Economic Effects Of Mandatory Patent Licensing" was reported by Prof. F. M. Scherer of Northwestern University at a public meeting of ERDA at Germantown, Maryland, on January 12, 1977.

III. Return of Government seed money

At least one legislative effort was made in the last Congress to consider reimbursement of the Government for money it devoted to the making of inventions that later proved to be a commercial success. This effort took the form of the proposed "Small Business Nonprofit Organization Patent Procedures Act"—S. 3496. Section 204 of that Bill provided that when the commercial success involving utilization of any invention based on government-funded work reaches a designated threshold, the patent owner should begin to return to the government the money which the government originally invested.

It would be a substantial administrative burden to trace any given subject invention through a complex license program or to allocate appropriately any particular contributed value to such an invention. While patents are occasionally licensed alone, the more significant license programs tend to involve many patents, related technology and technical assistance in the form of person-to-person contacts. In that setting there is no value which is broken out as being attributable to rights under inventions in general, and certainly no allocation is made in respect to any given invention. Similarly, there is no reasonable way to determine the profits attributable to the use of any particular invention in any given product which incorporates varied technologies.

The cost of attempting to administer a broad repayment program would almost surely exceed any returns that might be expected. Thus, we urge that the government continue to regard increased general tax revenues and the better business health of the country as its return for priming the pump used by the contractors.

Although not related to the seed money concept, the Task Group notes that it sees no logic to the line drawn by S. 3496 between large and small government contractors. If it is desirable (as we believe it is) to place title to contract inventions in the contractors' hands for purposes of commercialization, the size of the contractor is irrelevant.

IV. Petty patents

A number of other countries (notably Germany and Japan) have provisions for the grant of shorter term "lesser patents", suited for the protection of more minor

advances in technology. The introduction of lesser patents might reduce the workload in the Patent and Trademark Office. In any event, experience with such patents in other countries should be studied and evaluated to determine if similar patents would foster innovation in the United States.

V. Maintenance fees

Many other countries have patent systems under which the patent owner must make payments at fixed periods during the patent term to keep the patent in effect. Besides producing revenue, such a system tends to force reexamination of the worth of patents and thereby rid the patent rolls of worthless patents. We believe, however, that the institution of maintenance fees in the U.S. would not increase innovation.

VI. Patents in third-world countries

Public officials in some foreign countries assert that their patent systems benefit only foreigners, leading to the conclusion that strong, national patent systems are not in their best interest. As a result there is little or no effective patent protection in large geographical areas of the world—notably, in Latin America, Asia, and Oceania (with the exception of Japan, Australia, and New Zealand) and in Africa (with the exception of South Africa). This movement toward ineffective patent systems can have an adverse effect on the more research-intensive segments of United States industry.

A U.S. posture looking toward improved patent protection in third-world countries probably would be supported by other western nations, and would be in the enlightened interest of the developing countries themselves. Specifically, reliable patent systems should help the third-world countries to enjoy more rapid industrial development. This is because the optimum transfer of technology between countries occurs through voluntary cooperation between the transferor and the transferee in a climate where valuable industrial property rights are protectable.

During the past ten to fifteen years, it appears that a number of inter-governmental organizations, particularly agencies of the United Nations, have been prime movers in skeptically viewing strong patent systems for third-world countries. Without any improper interference in the affairs of other countries, we believe that the United States should encourage, where appropriate, the establishment of effective laws to protect property rights in inventions and innovation.

Senator STEVENSON. Thank you, sir.

Mr. Arnold, you said that you took exception to one of the recommendations. Which recommendation?

Mr. ARNOLD. Senator, you've used a vague and indefinite word—"you." I am here on behalf of the American Patent Law Association, that has adopted a position contrary to one that I personally hold myself.

The first-to-file issue is a very controversial issue among the bar. Ten years or so ago I was active in fighting first to file in favor of our present first-to-invent system. And the American Patent Law Association, the last time they addressed the issue some years back, was divided on it but decided that they like the present first-to-invent concept.

Let me take just one minute to explain why.

The present system is the one of higher sophistication in pursuit of justice. Everybody would agree that it is a better effort to find the just patent owner.

The difficulty with it is that the cost of administering the first-to-invent system, as we call it, seems to me now as it did not 10 years ago when I was testifying on the same topic, to outweigh the value of chasing that extra justice.

It seems to me now—contrary to the majority of the Association, on behalf of whom I'm here—that first-to-file does have enough advantage in its simplicity, in its time-saving, in its money saving, in its certainty, to outweigh the circumstance that we may some-

times have the second inventor getting the patent instead of the first.

So I personally now agree with Mr. Manbeck's position. I must advise you that there is a lot of thought which I honor and respect, which is to the contrary view.

Senator STEVENSON. Mr. Arnold, Mr. Manbeck, at the close of his remarks, supported S. 1215.

We've heard that the administration may recommend legislation that would maintain the Government use public use distinction—that is to say, in the case of military and perhaps space R. & D. contracts, the contractor would generally retain title.

With respect to civil R. & D. contracts, the Government would generally retain title.

We are told that the rationale for this distinction is that the commercialization of military-related inventions entails additional private investment and risk. But in the case of civil R. & D., the argument goes, Government assumes responsibility for carrying an invention to the marketplace and, therefore, exclusive contractor rights are unnecessary to achieve commercialization.

What do you think of that rationalization?

Mr. ARNOLD. I am sure that examples exist to support it. But I believe that those examples are far too de minimus in number as a proportion of the whole to persuade as to general policy. My personal experience suggests to the contrary, that in civil R. & D., whether it be in the work that I was involved in for Project Molehole that ended up aborting, or whether it be the electrodes that had to do with monitoring the health of the astronauts in space, that then became a technology to be transferred into local hospital operations.

In each of these instances, it has seemed to me, you still needed the extra effort of the private investor to successfully commercialize the invention.

Whether it be civil research or military research, in the vast majority of instances, I believe you still have the same need for some commercial undertaking to have the incentive to spend developmental money, technical or market developmental money.

Mr. Manbeck made reference to that when he said that the patent system not only supports research and development in the sense of technical development, but also the market development. And typically, the market development need is still there.

Senator STEVENSON. Mr. Manbeck said that most industrialized countries, except Canada, have the first-to-file system. Can you tell us more about the systems of other industrialized countries?

I address this to both of you. Do they have stronger patent systems that put us at a competitive disadvantage?

Mr. MANBECK. It varies from country to country, Senator. The Germans and the Swedes, I would say, have very strong patent systems, stronger than ours, perhaps.

Senator STEVENSON. What makes them stronger?

Mr. MANBECK. In the first place, they have very rigorous examination systems in the Patent Office. The examiners are highly trained. They have excellent technical libraries and they do a very good job.

That is one thing.

Second, there is a respect given to patents, and I'm speaking particularly of Germany, I must say in my experience, we have never been faced with a real controversy in Sweden.

In Germany, the courts are very respectful of the patent grant. In fact, to invalidate or nullify the patent, you have to go back to the Patent Office there. You can't even raise invalidity in the litigation, although it will be delayed until the Patent Office has had a chance to look at the invalidity question.

But they issue the patent only after very thorough examination and they give it very considerable respect after it's issued.

Now Great Britain, in my opinion, does not provide as good an examination. Their system is just plain different. Holland has good examination. France, in effect, and Belgium are registration systems. You litigate when you are done.

Really, everybody tends to look at the German patent. There is a new patent convention over there now, the European patent convention, however, where you can handle all your patents, all your prosecution through one central examination system. And this is probably going to take over more and more in the future because it is a cheaper way to get your overall bundle of patents which you must get to have adequate protection in the European countries.

And again, this will be a very thorough, well financed examining staff.

May I add just one more thing? So that we understand what we're talking about by the first-to-file system, we're talking about a system whereby the first inventor to present his application to the Patent Office becomes the owner of the patent—he still must invent it himself and not derive it from somebody else.

And the benefit here, as I said before, is certainty to investors, and also, certainty to the public in that there is in this way an early disclosure of the invention through the patent, which, after all, is one of the purposes of the system.

And to the extent that there are perceived inequities, this can be taken by giving a prior inventor who didn't submit his application quickly, a right to commercialize, provided he has been putting the funds in.

Remember, an inventor, small or large, can get to the Patent Office quickly.

Mr. ARNOLD. In Germany, you would typically spend $50,000 to $100,000 in the same litigation that in this country you would spend $400,000 to $500,000 on. That difference is representative of something important in what you give up in litigation sophistry. I would not give up as much as they do in Germany to keep those costs down, but I would sure like to save a lot of that money. I feel like we overdo our litigation, and their system functions better in part just because you can get a final decision for $50,000 when here you can not get a final one for $500,000 on some occasions.

Senator STEVENSON. If the patents are strong and the courts respect them, there is probably much less litigation, isn 't there?

Mr. ARNOLD. Correct.

Senator STEVENSON. Can you give us information about the Japanese system?

Mr. MANBECK. I don't want to seem to be an expert. I will tell you what I understand. The Japanese, too, have a strong system—a

very thorough examination system—and they respect patents. It is my own impression that it is part of the Japanese way of life that once patents are issued, litigation really does not occur that much. They have a system where, if you think the patent isn't valid or that it is at least too broad, you can go into the Patent Office and ask for a restriction of those claims. Now that has just happened to us in an important chemical patent. Ours has been restricted in the Patent Office. We don't like it. We think they are wrong, and we are continuing, but it is still a good system that this can be done without extensive litigation.

I will say that the one infringement case we have had over there has gone on a long time because of a very great difficulty of proof. Now I would add one thing. I was in Japan some years ago, and one of our local agents arranged a courtsey call in the Patent Office for me with the man who would correspond to our Commissioner of Patents. I was received very graciously, but the point of my story is, the next day he called in all his top people and said, "See how an American company has someone over here trying to learn from us; it shows how much harder we must work to stay ahead of the Americans." So they have a good patent system, and they work at it.

Senator STEVENSON. Senator Schmitt?

Senator SCHMITT. Thank you, Mr. Chairman.

Mr. Arnold, you indicated that you served on the Advisory Committee on Patents for the administration's Domestic Policy Review. Could you, in very general terms, compare the conclusions and findings of that subcommittee with the provisions of S. 1215?

Mr. ARNOLD. Well, I guess I am sufficiently cold on exactly what the subcommittee report was by comparison with the bill that I can't do other than speak in generalities, but I feel confident that the basic concept of our subcommittee's report was square onto S. 1215. There may be some details that were different, but I don't remember what they were.

As a basic concept, I'm sure that the advisory committee's report was fully supportive of S. 1215.

Senator SCHMITT. Has the administration responded to the subcommittee report?

Mr. ARNOLD. I've only rumor information that I would not wish to suggest to you because it is likely to be in error. I am led to believe that our recommendations have not been adopted fully, but I don't know enough about it that I would just—I believe I should not comment on what the administration view has been.

Senator SCHMITT. Gentlemen, I would like to have you both consider this next question. It has been suggested that any governmentwide patent policy should include a statutory payback requirement or recoupment of some kind whereby the Government would recover a portion of its investment when inventions in which the contractor received title are developed and marketed. Do you believe this would be an appropriate provision?

Can you suggest what form such payback requirement might take? Or do you think it ought to be applied on a selective basis?

Mr. MANBECK. In answering this question, one necessarily does it from his own experience and obviously his own viewpoints. We think that the payback provision is undesirable for these reasons.

First of all, it will create another bureaucracy.

Second, it is very hard in an awful lot of equipment to figure out how much of it is due to any one patent. Now let me give you an example. Some very successful programs of ours—the General Electric Co.'s in the aircraft engine field—have come, or at least used in part, military-sponsored technology. An aircraft engine is an extremely complex device. You may have a patent covering an important improvement in the blades of the third stage in the turbine. Now how much should the Government get back on a payback if the patent that covers the third stage blades comes out of Government research when there are a lot of other patents covering many other things which came out of private research on the engine? It is a very, very difficult administrative problem to take care of.

Another point is, when something goes commercial, you make money on it. If you don't make money on it, you made a mistake.

Senator SCHMITT. If you don't make money, it ain't commercial.

Mr. MANBECK. Right. I'm not sure what the present tax rate is, but it is around 50 percent, and every dollar of profit that the contractor makes, the Government gets 50 percent. And let me tell you, the contractor is working pretty hard to make profit, and the Government is going to share in that way.

Another thing is that if you are going to say—I shouldn't say you, but if the Government is going to say, "Well, we are going to expect so much payback"—and if there are alternatives, the amount of the payback, if large, is obviously going to tip the contractor toward the other alternative.

Now I can't say this will or won't occur. It is a question. So, all in all, we think the Government will get its money back through the tax revenue, and that to add further complications on top of that is just not desirable.

Senator SCHMITT. Mr. Arnold?

Mr. ARNOLD. I would subscribe to everything that has been said. I might say that I have litigated the allocation of cost and profits as among different elements of a commercial undertaking, and I find that it is a game. At least in the substantial majority of instances, our accounting processes simply do not admit to a realistic allocation of how much of the cost and how much of the profit was attributable to this element or that of a total technology. We make judgments and come up with a conclusion that, when you get through, you realize, "Gee, we went to all of this expense and all of this trouble, and we maintained all of this accounting for all of these years, and in truth we haven't accomplished anything that you can sink your teeth into and say, Yes, this is right."

So I emphasize to you that frequently the nature of the intertwining of all of the different technologies are such that this allocation is commonly not a feasible thing to do. The pessimism about the reliability of the accountings and the like will be a discouraging bias to some potential contractors. And for these reasons, among the others that Mr. Manbeck has mentioned to you, the bureaucracy—I hazard a guess that the total cost both inside the Government and in the contractor undertaking the accounting for these purposes will exceed the amount of money the Government will get back.

Senator SCHMITT. Would you say the same thing about just a royalty agreement, say, which I think in some NASA aircraft engine joint development programs with industry there have been royalty recoupments?

Mr. ARNOLD. I guess I'm not as confident about that because the royalty provisions have the advantage of being somewhat more easily arrived at, somewhat more mechanically arrived at on the one hand, with costs passed on. But let's come right back to the example that Mr. Manbeck gave. What is a reasonable royalty on the improvement of the blade in the third stage?

Here the J-59 engine cost half a billion dollars to develop.

Senator SCHMITT. That is probably not an appropriate use of royalty recoupment. But let's say it's a brandnew engine development, a new engine is going to be marketed, and there is a joint use of test facilities and development capabilities. Would it be reasonable to collect a royalty on the profits?

Mr. ARNOLD. I guess I would want to look more specifically at specific cases than I am able to, right off the top of my head. I'm still suspicious of it, but at least I don't want to kick it out until I would study it some more.

Senator SCHMITT. Then let me pursue this just a little bit farther. As I'm sure you are well aware, one of the criticisms that will be raised against my bill and other attempts to allow more rapid use of technology in the private sector is that it is a give-away, that is, that the company or the inventor is going to have a windfall. How do you address this? What are the alternative mechanisms that we can use to address this concern?

Mr. ARNOLD. Both of us want to jump on that one, but it is Harry's turn.

Mr. MANBECK. Senator, I would not want to mislead you. In the aircraft engine business of which I spoke, there are a couple of cases where we are subject to recoupment of development cost clauses where the, let's call it the core engine, has been to a very large degree Government-sponsored. And you can say, well, this whole package of technology is going into use in the commercial thing, and, all right, therefore, you will pay us so much an engine, or something like that.

I still think it is counterproductive, but we have learned to live with it. And the administrative burden is not so bad, because you're not going through the engine and picking out piece by piece and this sort of thing.

But this whole concept of give-away bothers me to a great degree. If the contractor doesn't take it to the commercial stage, there is no give-away because nobody has done anything. If he does take it to the commercial stage, the Government will get half of every dollar of profit that he's going to make.

Now, if the Government says, well, on top of that—I can't go through the numbers, because I did not come prepared to testify on that—but if the Government says, well, we want some more on top of that, again, I come back to the point that it tends to tip you to the other line of research that you may have or other line of product development.

Mr. ARNOLD. I agree 100 percent, and I feel that the basic concept of give-away is misspoken. What's our goal; what are we

trying to do? Are we trying to focus our attention on getting the technology into use, by which the public will benefit the most? Then, we ought not to be pennypinching or nitpicking about something that is as small in the overall picture as the difference between what the Government is going to get back by some strings attached to a special royalty and what the Government is going to get back through taxes and through the public enjoying the invention.

I just feel like we are indulging in overkill of an idea that is not that real. I do not believe the so-called windfall profit that is to be made from the give-away is that real.

Senator SCHMITT. Well, gentlemen, it is very real, because that has killed every attempt in the last few years to get a uniform patent policy and one which puts the presumption of title in the private sector. We can't say it is not real, because it is a real issue. Even though you and I may think it is a nonissue, it is a real one.

Mr. ARNOLD. Senator, I would say to that that you have to indulge the practicality of what can be done politically. And it may be that we have to yield to some things as a matter of practical politics that I do not believe are real in terms of the economics of the marketplace. And I certainly honor the circumstance that you, who make the legislation, have to include some considerations that I do not have in my mind.

But I suggest to you that, as a matter of what is real in the marketplace, this idea is not going to have a substantial net benefit to the Government. The "give-away" is an expression which has a lot of political appeal, but you are not really giving it away—anything important. And, therefore, on the merits the public would be well served not to worry about the alleged give-away. If, for political reasons, we have to do something else, then we will live with it.

Mr. MANBECK. May I suggest—I think we all realize the political problems, but that to tie payback to a per patent basis—that is, on each patent—is a very difficult thing. The patent is an expression of the technology. If the technology is really important and can be pinned down, it seems to me—and I am speaking about my own personal views; I'm not testifying at this point for the company or the Committee on Economic Development—it would seem to me that if there is an important piece of technology which can be identified, and it is necessary for political reasons to include something, that that approach might be considered rather than trying to tie it on each patent.

And another thing, you will even get the patents not covering what they should for fear the owners might have to pay back on them. They won't take the patents out, which is undesirable, because that, gentlemen—I don't mean to be xenophobic, but it opens our country up to foreign competition on some stuff where it shouldn't be. And I just think that this whole business of tying it patent by patent is self-defeating. I really do.

Senator SCHMITT. Do you gentlemen think that the availability to the Government of march-in rights provides an effective self-enforcing mechanism to promote the commercialization of an invention?

Mr. MANBECK. Our report supports march-in rights. We think it is part of the answer to the so-called windfall situation. And quite frankly, if the contractor does not go to commercialization with the technology and there is somebody else who wants to—I think it unlikely—but if there is somebody else that wants to, it seems to me that the Government should—it seems to us, this is more than personally—that the Government should have that right.

Senator SCHMITT. Should there be a provision for exceptional circumstances before the march-in right is operable?

Mr. MANBECK. It seems to me that before you go to the march-in rights, before the march-in right is exercised, that the contractor or the inventor should have an opportunity to explain in a fair hearing as to why he hasn't done it and to how he is going to do it in the future. Does that answer your question, Senator?

Senator SCHMITT. Yes.

Mr. ARNOLD. I certainly share that.

Senator SCHMITT. Mr. Arnold, do you think there should be a distinction between large and small businesses in a bill of this kind?

Mr. ARNOLD. I do not. I do believe that there exists a de facto distinction that works now in the way the patent system is working. But I don't believe we should treat that statutorily. An example of this distinction that I referred to was the small entrepreneurship, and I can give you three examples in 3 minutes, if I can have that time, that is current in my law practice.

The inventor of the Weed-Eater that you may be acquainted with created a whole new industry, lawn trimmers with a swinging line. Another inventor founded a business in severe service valves for the chemical industry. And there is the invention of the technique disposal of the major wastes from coal burning power plants. When we scrub the SO_2 and fly ash out of the blue gas and sky, we create tons and tons—millions of tons—of waste. These inventions were all made by the private entrepreneur or the very small company.

Now those three inventions all made by the private entrepreneur and the very small company needed capital to expand. In 1969, the inventors could have gone public with a stock offering and gotten that capital. In 1969, 3.5 billion dollars' worth of capital was raised from the public trough—venture capital, risk capital. Last year, according to the Washington Post that I read the other day, $214 million of the dollars that have been inflated since 1969 by a tremendous amount, was all that new businesses could get from the public trough.

So as to these three inventions that I referred to, when the crunch came in terms of need of the private entrepreneurships to expand, they went to the only available source of risk capital—big business. Big business could afford the litigation costs which the entrepreneur could not afford. The litigation costs were there. All of these patents were in litigation. All of these litigations were costing a half a million dollars and up apiece. The small entrepreneur with no source of big venture capital simply could not afford the burdens and uncertainty of the litigation and plant expansion without going to the source of capital. The only source of capital they had was big business.

Isn't it great that big business has capital for that; financial health of business is vital to everyone's interest; but isn't it sad that the alternative sources of risk capital have dried up.

So we do find a degree in which there is a difference in the big business and the small business approach to these things. Not approach—that's the wrong word—in what happens. The big business has the capital that the small business did not have to fight this time delay and financial burden of litigation, and so the entrepreneurship had a difficulty. But I don't believe we should address that statutorily in the patent law. That should be addressed in tax law and banking law.

What we need, is to do something about capital markets where the entrepreneurship can get access to the capital that it needs, and then maybe some of these things would smooth out.

Senator SCHMITT. Mr. Manbeck, did you have anything further on that subject, that is, small versus large business?

Mr. MANBECK. Well, obviously I'm associated with big business. The costs are horrendous on all of us. This is why we are making some of these suggestions.

We think that sometimes we are attacked by strike suits just because we are big business, and that the patent system sometimes works against us there for that reason. We suggest reexamination. There is no question about it. Mr. Arnold is right. It takes money today in the United States to enforce a patent, although I believe that most corporations are responsive to taking licenses where there is a justified patent. You don't take a suit that you're going to lose.

Senator SCHMITT. Do you think we should draw a distinction between large and small business in the area being dealt with in this bill?

Mr. MANBECK. Absolutely not. Senator, I would like to put in a written statement as to why I think the payback is undesirable, if I may.

Senator SCHMITT. Yes sir. We would appreciate that very much.

[The following information was subsequently received for the record:]

COUNTER-PRODUCTIVE EFFECTS OF PAYBACK PROVISIONS IN GOVERNMENT PATENT POLICY

The inclusion of payback provisions in the government patent policy to be established by S. 1215 is undesirable for a number of reasons. These reasons outweigh any benefit to the government or the public that might be produced by the limited revenues in question, and militate strongly against the inclusion of payback provisions. They are as follows:

(a) *A significant adminstrative burden would be imposed on the contractor.*—Much government-sponsored technology which may be translated to commercial products relates to large, complex equipment such as aircraft, aircraft engines, electronic equipment and transportation equipment. It would be a substantial burden on the contractor to trace any given invention through a commercial program or to allocate any particular contributed value to an invention. Take, for example, a patent on an electronic switch which is used in a complex commercial radar system. It would take considerable time and effort to verify whether, in fact, the patented switch is used, the amount of the use and what portion of the equipment is attributable to the switch. Also, is that switch so much better than an unpatented alternative that any royalties should be justified?

Further, suppose that the overall radar equipment were licensed to a foreign manufacturer with appropriate government approvals. The switch patent would be only a modest part of the total license, the main value of the agreement really being

the technology and technical assistance passing from the licensor to the licensee. In fact, there is probably no value which can be broken out as being attributable to patents as such and certainly no way of determining the value attributable to the particular electronic switch invention.

All in all, the effort required to try to reach some resolution both on the base for the payback and the rate at which the payback would be made, far exceed any benefit to the government possibly resulting from the modest monetary flow that might be created.

(b) *A further government bureaucracy would be needed.*—Just as it is difficult, if not impossible, for the manufacturer of complex equipment to assign a value to any one patent, so also would it be difficult for the government to monitor the payments. Clearly, more and more people would be needed in the government agencies; in fact, the cost of people added to the government for control purposes might well exceed the amount of money paid to the government.

(c) *The government will receive a payback in any case through its tax revenues.*—Presumably, the commercialized version of the government-financed technology will earn a profit for the contractor. Otherwise, there is no reason for the contractor to carry the technology to the marketplace. Whatever profit the contractor makes will be taxed at 46 percent, the current corporate tax rate, and the government will get a significant payback through that avenue. The tax structure clearly makes the government a partner as any monies start to flow.

(d) *Royalty provisons or profit sharing on top of the tax liability act as a deterrent to commercialization.*—Why should a contractor commercialize government-financed technology if there is alternate technology available if it has to pay a premium for the use of the government-financed technology? In fact, a payback provision would be a good reason for a contractor to separate the government-financed technology from its commercial technology in order to avoid any payback liability.

(e) *If the payback provision should extend to inventions only as contrasted to patents, then the contractor would be placed at a disadvantage compared to anyone else.*—He would pay for commercializing something which others could then follow without any liability for payments.

The use of government technology with payment to the government through tax revenues is not a windfall for the contractor. To utilize the government technology commercially, it must invest its own funds in product redesign, in manufacturing facilities and in marketing and servicing activities. If the government really wants its patent policy to act as an incentive to commercialization, it should not restrict that incentive so as to remove much of its attractiveness. That is exactly what payback provisions would do.

Senator SCHMITT. I would welcome your suggestions as to any alternative approaches which counter this argument that somehow there is going to be a windfall. I do not believe the argument that the Government reaps a windfall by the commercialization of the invention, but, unfortunately, the argument will continue to be raised.

The final point I would like to have you comment briefly on is something that was said by a previous witness from NASA. One of the principal justifications for an approach such as in S. 1215 is that it will tap the enthusiasm of the inventor toward commercialization, rather than what is now the case with most Government inventions or Government-sponsored inventions, that is, that they are sitting around with nobody very enthusiastic about using them. Do you agree there is a psychological reservoir? You've talked about investment capital and that kind of thing, but is there a reservoir of enthusiasm that we must tap also?

Mr. ARNOLD. It's very critical. I agree 100 percent. There are many, many inventions that can be offered by A and B and C and fail, but offered by D who is enthusiastic, it will succeed.

Senator SCHMITT. Is the inventor the one most likely to be enthusiastic?

Mr. ARNOLD. He certainly is the most likely. It's his baby. We find that, for example, in the outside disclosure, to many corpora-

tions—and we have named the psychological phenomena "NIH," for "not invented here," which is an expression I am sure you know. Inside the corporation a man comes with idea A and he takes it to the budget committee for R. & D., and they start punching holes in it and say it will never work, and he says, "Oh, but you're just looking at the wrong side. We can solve that problem, we can solve that problem, we can solve that problem."

The outsider tries to present the same idea. He has a very difficult time because he is not there to argue with the budget committee that "We can solve that problem, we can solve that problem, we can solve that problem."

The idea that is sitting on the shelf is dead. It has no communication capacity to sell itself over the natural reaction that we all have, to look at an idea and see first what is wrong with it. That is the first thing we see: We always see what is wrong with it and say what's wrong with it, and leave it alone, unless it has a champion to advocate its merit and be enthusiastic.

So, every idea needs a champion to sell it, to attract capital support, whether it's inside a corporation or inside a Government agency. You need a chance for that idea to attract capital support. And the most likely person to do that, is the inventor or his group at the contractor's place.

Mr. MANBECK. I would only add that unless the inventor or the contractor has the rights, his enthusiasm won't do any good. Let's look at it from the other viewpoint because nobody is going to put any money in, no matter how enthusiastic he is, unless they can go forward with it without interference.

Senator SCHMITT. Thank you, gentlemen. We appreciate your testimony. We will ask you some questions for the record.

Mr. ARNOLD. It's been our pleasure to be here.

Mr. MANBECK. Thank you very much.

Senator SCHMITT. If I may, I would like to ask the final four witnesses to come forward as a panel: Mr. Jerome H. Lemelson, president, Licensing Management Corp.; Herbert G. Burkard, corporate patent counsel, Raychem Corp.; Gerald A. Lodge, chairman, Innoven Capital Corp.; and Jacob Rabinow, consultant, National Bureau of Standards.

Gentlemen, if you would correct me on any mispronunciations I may have made. We will go with Mr. Lemelson first. If you have prepared testimony and you wish to summarize that, your prepared testimony will be in our record in its entirety.

STATEMENT OF JEROME H. LEMELSON, PRESIDENT, LICENSING MANAGEMENT CORP.

Mr. LEMELSON. Good morning, ladies and gentlemen. My name is Jerome Lemelson. I am a professional inventor. I am a member of the Patent and Trademark Office Advisory Committee. A licensed invention of mine that you may be familiar with is the mechanical drive that made the cassette tape recorder a commercial reality.

I have been asked to reflect on some of my experiences in the field of technology, licensing, and patents. I would like to apologize for my close adherence to the written text of my statement. The subject matter of this statement is of such great importance to me, both emotionally as well as from a business point of view, that I

tend to get overinvolved. I have been hurt so many times by the system that I do get emotional when I discuss this matter. As a result, my advisers have asked that I attempt to closely follow the statement.

Senator SCHMITT. More of our advisers should make us do that.

Mr. LEMELSON. I own over 350 patents and have found it necessary to form a corporation to market my inventions. That company is Licensing Management Corp. I am the president and sole owner. We market inventions for individuals, businesses, and the Federal Government.

I therefore tailor my testimony around two focal points: my experiences as an inventor and my experiences in marketing and licensing inventions.

One of the greatest hazards of being an inventor is losing an invention to an infringer. Infringement may occur as the result of independent idea conception or downright thievery.

I was told when I was in college that a patent is an exclusive constitutional right for a limited number of years to manufacture, use, or sell your invention. I soon learned that in practice a patent is a right to sue someone who is benefiting from your invention and often it is the door of opportunity to a potential thief.

Ed Mahler, former chief patent attorney for Olin Mathieson Chemical Co., told me in the early 1960's that many U.S. corporations, as a matter of policy, stall inventors and do whatever is possible to stop the enforcement of patents. Unfortunately, I have found that to be true.

I have four file drawers of literature on products, processes, and manufacturing machinery that infringe my patents, for which I have not been paid 1 cent. I have brought over 20 infringement actions, of which 8 have been concluded—all against my patent rights.

I have a patent action awaiting a trial court decision; one is pending on petition before the U.S. Supreme Court, and two are awaiting trial. I have been accused of being litigious, but I know of no other way to at least attempt the protection of my 350 patents.

In one of my cases at trial some years ago in the second circuit, the honorable judge announced that it was then 10:15 a.m. and as the action before him was a patent case and he had better things to do with his time than to try patent cases, the trial must be completed by 3 p.m. that day. During our few hours of trial my counsel objected for one reason or another, and as a part of one objection he stated that Congress had mandated that patents be considered prima facie valid.

The judge responded, "Mr. Fattibene, you know as well as I do that four out of five patents issued by that Patent Office are invalid." Then, at 3 p.m., the honorable judge walked out of the courtroom, leaving my witness on the stand, and the jury still impaneled. A few moments later he returned and said, "Pardon me, ladies and gentlemen, you are dismissed." That ended it.

A second example of what may happen to a patent holder can be shown by my experience with my automatic warehousing patents. A very dynamic individual, Raymond Q. Armington, a pioneer in automatic warehousing with a strong belief in the patent system, licensed 15 of my patents and obtained more than 50 patents for

his company in the automatic warehousing field. He built an entire business, the Triax Co., with massive investments in research and development and outside patents.

Before he could reap the benefits of his investment, his patented product was pirated. We immediately filed suit to defend our rights. After 10 years of litigation, the patents that were not declared invalid were declared "not infringed." The legal expenses of that litigation have used more than half of my royalties, and Triax has been unable to protect their investment.

Now I would like to tell you about my most recent heartbreak. My only invention in the toy field resulting in any substantial royalties was declared invalid on a pretrial motion for summary judgment. Confusing as it seems to me, my counsel tells me that the law in the second, fourth, and seventh circuit courts differs from that in the rest of the country. These three circuit courts apply a judicially created administrative rule that is not followed by the Patent and Trademark Office. As a result, my U.S. patent on the Velcro dart game, a patent that created over 200 direct jobs and untold numbers of indirect jobs and millions of dollars in gross national product, was declared invalid without my getting a day in court to defend it.

In addition, it is our information that since the patent was declared invalid, a substantial number of foreign companies have entered the market with less expensive Velcro dart games and have taken substantial sales away from the U.S. toy industry.

I would now like to speak on some of my experience in licensing. I have been in the business of licensing inventions for nearly 30 years. For 20 of those years I went to company after company in the United States attempting to sell my inventions. I borrowed money just to eat in the early days. By far the majority of the large U.S. companies required that I sign a nonconfidential disclosure agreement, which limited their liability to my patent rights and in effect prohibited me from suing the reviewing company. But when you are hungry and have no idea where the rent is going to come from, you tend to ignore the ramifications of such agreements. The procedure then is nearly always the same.

The company representatives look at your invention and keep the drawing in order to fully analyze its potential. If the invention does not meet that particular company's needs, you may get a letter returning everything and saying the company is not interested. If the company likes your invention, you either get a letter saying they are not interested at this time or you don't hear further from them. Then suddenly, you see your invention on the market. You write a letter to the company telling them that they are infringing, and you get the standard legal response: "Your patent is invalid, and we are not infringing."

Then comes your first tough decision: Do you spend the six-figure amount required to sue the infringer? If you signed the nonconfidential disclosure statement limiting the infringer's liability, it is time to move on to another invention. If you have not yet found out that there are countries that honor their patent systems and you therefore have not been successful in licensing your invention, and you cannot afford to bring the suit, then the rights to your invention are finished.

For argument's sake, we will assume that either the Japanese are paying you well on a license or that you are independently wealthy, allowing you to have a limited choice. Either you go into business for yourself and compete with the infringer to try to at least salvage something out of the fact that you created a new product, or you go to court. If your product is successful, the big boys in the marketplace will put you out of business. If you have taken the latter choice to sue for damages, chances are your patent will be declared invalid.

This scenario I have just given you is real. It happens to just about every successful professional inventor. There are company managers at this hearing who have taken me to the point of the legal letter telling me that my patent is invalid and not infringed. I am now deciding whether to start another suit.

Such corporate attitude is to be expected, I suppose. Company managers know that the odds an inventor may be able to afford the costly litigation are less than 1 in 10. Even if a suit is brought by the inventor, the odds are four out of five that the courts will hold the patent invalid. When royalties are expected to exceed legal expenses, it makes good business sense to attack a patent.

I think it appropriate to contrast the U.S. antipatent philosophy with my experiences in the world market.

I advertise in a number of trade journals in Europe and Japan. I also annually attend a world technology show. Last February in Atlanta at the Tech-Ex show, Licensing Management Corp.'s booth had visitors literally three deep, from opening until closing time. Most of the inquiries were from Europe and Japan.

The licensing procedure is somewhat different in the international marketplace. First and foremost, they come to me as the result of advertising. I am not required to do telephone soliciting. Second, they do not require that I sign a nonconfidential disclosure statement. Quite to the contrary, they will sign my confidential disclosure statement indicating their willingness to keep my disclosure confidential; stipulating a time for a decision of the reviewed technology, and indicating a willingness to pay either under patent rights where they exist, or where no patent rights exist agreeing to pay for the transfer of know-how.

This substantially different attitude is obviously much more congenial to the inventor. This congeniality is further enhanced by the fact that although the majority of my income is derived from foreign licensing, I have never had to enforce a patent against a foreign infringer.

I leave it to you to conclude the reason as to why the attitude of foreign companies is so different. My licensees have told me that they recognize the clear value of invention from an economical point of view. They feel the United States has lived off the fat of its own technology for so long that we do not recognize that the consequence of the legal destruction of patents is a decline in innovation, a situation that is not within any nation's economic interests.

What all this means to the inventor is that he either quits inventing or he licenses foreign. It is not at all surprising that the balance of payments reflects the foreign sales advantage. You don't have to guess who the foreign licensees sell to. For example, how

many millions of dollars were paid overseas as the result of the import of cassette tape recorders?

To give you an idea, assuming that the royalties paid on my cassette recorder patents were one-tenth of 1 percent of wholesale price, they would amount to well into six figures annually. Or, more recently, I received a patent on the drive used in most video cassette recorders. Nearly 600,000 were imported into the United States in 1978 alone, and market projections place annual sales to be over 1 million units. At an average wholesale price of $500, one invention from one inventor could cut—or add, depending on who licensed it—$500 million a year from our gross national product.

Gentlemen, I would love to sell in my own country because I believe we need it. I hope you will make every effort to take the steps needed to improve the patent system in the United States so that American companies and investors can take advantage of American know-how and creativity.

Senator SCHMITT. Thank you, sir.

Mr. Burkard.

STATEMENT OF HERBERT G. BURKARD, CORPORATE PATENT COUNSEL, RAYCHEM CORP.

Mr. BURKARD. I would like to apologize for being the only individual who was so ill-mannered as to use 13-inch paper. I hope you will put that down to the fact that we out West are slow to adopt new things.

I would like to address only two things in the course of my testimony, to avoid prolonging it unnecessarily.

By way of background, my corporation is a young corporation. We are 22 years old and in that time we have come from ground zero to well over $300 million. So, my experience is with what I think it is fair to characterize as a fast-growing but presently medium-sized corporation. We like to think of ourselves as innovative and technologically oriented. For example, we spend between 6 and 7 percent of our annual sales dollar on R. & D. effort. We think our success springs largely from our ability to provide novel solutions to existing problems. Certainly, most of Raychem's products are products which, once marketed, could be readily copied. We therefore rely heavily on the patent system, both in the United States and worldwide.

I should point out that over half our sales are outside the United States. We have approximately 200 U.S. patents and approximately 1,000 foreign patents issued, and approximately equivalent numbers pending. Approximately half my patent staff is located overseas, so for whatever it is worth, I have a reasonable familiarity with both foreign as well as U.S. patent systems.

I should also point out that my opinions are not a statement of corporate policy. They are my own thoughts on the matter.

As some of you may be aware, we are located in an area of the United States that is called Silicon Valley. I think that has some relevance to a point raised by one of the other witnesses in connection with S. 1215, although, in general, I am not prepared to comment extensively on this bill. That was the question of what influence the present system, whereby Government-sponsored research requires the granting of Government rights in patents, has.

A large number of companies in Silicon Valley don't even consider doing sponsored research, for precisely this reason: They just simply refuse to get into, if you will, the hassle. It is not a matter of corporate policy on Raychem's part, but I should note parenthetically that we do no sponsored research. I think most of our technology is less likely to be of immediate interest to the Government, but, certainly, in the Silicon Valley area a relatively large percentage of the firms simply do not become involved in it, precisely because of that reason.

I am, I think, less qualified to suggest what changes, if any, would alter this situation, but I think it is the situation, and that it is of some significance.

The other point I would like to comment on is some changes which I feel would be appropriate in the patent system. I recognize that a number of my suggestions are contrary to a number of the suggestions made by previous distinguished witnesses, but I suppose it is for you gentlemen to resolve, what is the choice to be made.

In patents, as in many other areas, a major problem for industry is uncertainty. Businessmen want—and I think it is in the public interest—for the various corporate staff people, including patent lawyers, to be able to give them definitive answers. I feel that the changes I am proposing in the patent law will facilitate the giving of definitive answers to businessmen.

The changes I am proposing I don't think are fundamental changes in the patent system. I think the present system is a good one, and I believe that the proposed changes will enhance the value of the patent system to U.S. industry.

I should note that the changes I propose would, I think, tend to bring the U.S. system more into conformity with the system practiced in most European countries. I think this is incidental. It is not that the foreign patent system is necessarily better, but I think in an international context a greater degree of uniformity is desirable.

The first suggestion I would make is for the provision of an opposition and reexamination system in the United States. Several questions were asked with respect to why patents experience a greater degree of respect and are less litigation-prone in a number of European countries. I think one of the major reasons is, as was indicated, the greater comprehensiveness, if you will, of the examination conducted in the European patent offices.

However, I think another major factor which bears on this is the opposition system which exists in the examples cited—Sweden and Germany, and also in Holland and in Japan for example. The system there is that after the patent office is prepared to allow an application, it is then published, and for 90 days, or 60 days in the case of Japan, essentially anyone can submit arguments to the patent office as to why the claims the patent office has indicated it is willing to allow are in whole or in part invalid or overbroad.

In effect, then, the patent applicant and the opposers argue further in an interparties situation before the patent office, and until the patent office is finally prepared to accept or reject a set of claims. The patent which then issues, I would submit, is, just as a

matter of simple logic, far more entitled to be considered valid. It has had its trial by combat, as it were.

No such system prevails in the United States. There have been suggestions made that the U.S. Patent Office adopt a system where the Patent Office examiner would serve as an advocate for the other side, and there would be a separate section of the Patent Office which would in effect serve as a judge or tribunal to decide the dispute between the applicant and the examiner.

I don't think there is anything wrong with that, but I think an opposition system is much better.

First of all, you have, in many cases, real parties in interest contesting the patent. Second of all, in many cases, the opposer is intimately familiar with the precise area of technology to which the application pertains. He therefore is frequently able to immediately focus on the most relevant art. Patents which emerge from this system are given greater validity before the courts, and are entitled to it.

The situation specifically in Germany, I think, can be oversimplified in terms of why patent validity is more likely to be sustained there. No. 1, you have two separate trials. The trial of infringement is held in a separate regular court, if you will. The only thing that the patent court decides is the question of validity. I am not certain on this, but I believe the statistics in Germany is that only one out of four patents is held invalid, and a somewhat lesser percentage are held partly invalid. So, the batting average for validity in Germany is well over 50 percent that is cited here.

We hear numbers in the United States of 50 percent invalidity or even 70 percent. My colleague here indicated four out of five. I don't know what the exact number is.

The only comment I care to make in that connection is: Bear in mind that, I believe, one-tenth of 1 percent of the issued U.S. patents are litigated. On any other statistical basis, that is a ridiculous sampling to make any kind of an analysis from.

I think businessmen, in general, are correctly aware of the fact that a patent does not mean that you have a valid patent. On the other hand, I think they are not deterred by abstract statistics. I think they tend—and certainly should—to get their legal counselors to advise them as to their analysis of the patent in question. I don't think they are meaningfully influenced by statistics in general, and I think certainly being influenced by the statistics is foolhardy.

The effect of an opposition and reexamination—by reexamination, I mean that after the patent is issued, someone could come back and effectively request the Patent Office to reconsider that patent on the grounds of newly cited art or theoretically on the basis of the fact that the Patent Office had misunderstood what had been applied.

There are disadvantages to this system: No. 1, it would increase the burden and hence the operating cost of the Patent Office; there is no question.

I think the advantage is that it would reduce the burden on the courts. The vast majority of the patents which are held invalid today are held invalid on grounds not considered by the Patent Office.

I think to a certain extent the question revolves around where you want to allocate your funds. I think many of the issues which, of necessity today, are handled in the courtroom in litigation would be more expeditiously handled in the Patent Office.

There exists a possibility of using an opposition or reexamination procedure to bully a small inventor, yes. On the other hand, the present litigation situation has been, I think correctly, pointed out as being extremely arduous for a small corporation, certainly for a small inventor. The reexamination or opposition, I think, to a certain extent would provide a cheaper forum for the small corporation or inventor to get a determination on the merits of his position, and undoubtedly much more expeditiously than the present court procedure.

I recognize that related proposals have been made in bills S. 2255 and S. 214, and that very serious cost-effectiveness questions have been raised about this proposal. I am not prepared to say whether it is cost effective or not. It certainly would be expensive. I think it would be preferable, on balance, but I can't honestly give any numbers.

My second proposal is that the first to file claiming a given invention gets the patent. That has been addressed quite extensively by previous witnesses. I don't think I can add anything useful to their arguments, except that it would, at the very least, encourage prompt filing and presumably earlier issuance, which is a clear benefit to the public.

This is certainly contrary to the position taken by the APLA and by the patent section of the ABA. As has been indicated, there has been a fair dichotomy of opinion with respect to this, even within the profession.

The third suggestion is that the patent term run from the date of filing; more particularly, that a patent term would be 10 years from the date of issue or 20 years from the date of filing, whichever is longer. This is virtually the universal system outside of the—well, that is a little strong, but certainly in most major industrial countries outside the United States and Canada, a patent term does not run from the date of issuance. The date of issuance starting the term encourages or, at the very least, does not prejudice delay in prosecution.

I certainly think a 10- to 20-year period would permit adequate time to commercially exploit the vast majority of inventions, and certainly discourage undue delay or, at the very least, not encourage it.

Last but not least, I would suggest that another anomaly in the U.S. law should be eliminated; that is that the combination of inventors on an application should be permitted. I think we should recognize that the vast majority of inventing is done in a corporate or similar environment, where a number of research and development groups work in interrelated areas, even though they may not directly interface. U.S. law, in effect, provides that an application must name only the inventor or inventors of the entire invention claimed, and that the patent application can claim only what a single inventive entity has invented.

A recent series of cases has held that the claimed invention must be patentable over known, purely internal, prior art. I can't say

that these decisions are not defensible as a matter of legal theory, but I think they are unsound as a matter of policy. An application should, it seems to me, be able to combine related discoveries to add up to a single claimed invention regardless of the precise informational relationship between the inventors.

The present requirement, which is unique to the United States, as far as I can tell has no significant advantage to anyone and has a disadvantage that it requires in many cases that the U.S. patent application be significantly narrower in scope than the equivalent foreign patent. This can frequently prove to be a very severe handicap to domestic business entities. In other words, your foreign application discloses or covers far more than the U.S. application, so that infringement of the U.S. patent—strike infringement—circumvention of the U.S. patent is facilitated by being within the scope of the foreign claims but yet being without the scope of the U.S. claim. And, to the best of my knowledge, it doesn't have any benefit to anybody; it is an anomaly of the U.S. law. I would strongly suggest that that be changed.

[The statement follows:]

STATEMENT OF HERBERT G. BURKARD, CORPORATE PATENT COUNSEL, RAYCHEM CORP.

In connection with this Subcommittee's hearings on Bill S. 1215 and more particularly the patent system as it affects technological innovation by U.S. industry, Mr. Merrill asked me to address three questions:

I. Is the U.S. patent system meaningfully useful considering the attrition rate suffered by litigated patents?

II. What influences a patentee's decision to sue an infringer?

III. What changes would I recommend in our patent system to increase its usefulness to U.S. industry from the standpoint of encouraging the industrial innovation process?

I am Patent Counsel for Raychem Corporation of Menlo Park, California, which in 22 years has grown to sales of well over $300 million per year. I am therefore speaking from the standpoint of experience with a fast growing presently medium sized domestic corporation. We like to think of ourselves as innovative and technologically oriented.

Raychem's success springs largely from an ability to provide novel products which solve existing problems. Often they are products which, once on the market, can be copied quite easily by competitors, and which have world-wide application. So we rely heavily on the patent system, both in the United States and elewhere, to protect our investment in research and development. An important factor in Raychem's continuing growth is (and has always been) the quality and enforceability of its patent portfolio, which is a good deal larger than that of most companies of comparable size. Thus, we currently hold well over 200 U.S. patents and almost 1000 foreign patents, with similar numbers of pending applications. We have been (and are) involved in patent litigation, both as plaintiff and defendant, in the United States and in Europe.

I have given the information above as background to the remarks that follow, but the views I express below are my own and certainly not any expression of an official corporate position.

I

Abe Lincoln's famous remark "The patent system added the fuel of interest to the fire of genius" is still true today. The cost of innovation in the sense of product development and introduction is unfortunately increasing even faster than inflation and the market place is ever more competitive. Without the limited right of exclusivity offered by a patent, most companies could not risk undertaking extensive research programs. While certain processes or formulations can be maintained as a trade secret, this is not a generally available alternative. Slugging it out in the market place with competitors, especially lower production cost foreign competitiors

who have not incurred significant research and development costs, is bad business. In such an environment I feel innovation must inevitably suffer.

Given the failure rate of patentees in court, why does a company such as Raychem expend so much time, money and effort on its patent portfolio? First of all, the statistics are almost surely misleading. A variety of numbers has been bandied about but rates in excess of 50% are generally cited. The quoted failure rate is, of course, for patents litigated to final decision. Many patents are never challenged because there is no reasonable basis to doubt their validity. Conversely, many patentees are unwilling to bring suit either because they themselves seriously doubt validity or simply because the results could not be cost effective. Other patent suits are settled on the courthouse steps which doubtless also skews the quoted rate. In short, it seems probable that the patents fully litigated are in general those about which some reasonable doubt exists. Thus the 50% or more failure rate cited is dramatic but possibly not that terrifying or even surprising.

I think most corporations analyze their patents on an individual basis in the context of a particular potential litigation and therefore are probably not meaningfully influenced by general averages. This is certainly true of Raychem's management.

In my discussions with Mr. Merrill I indicated that a few years ago Raychem had been successful as a patentee Plaintiff against ITT in Boston. The patent in suit involved a high performance, light weight aircraft wire called "44" wire which at the time suit was brought had achieved outstanding worldwide acceptance in both the commercial and military context.

Although details of the suit are probably not appropriate for discussion Raychem's success in enforcing its patent is, I believe, significant in connection with three aspects of your present considerations.

First, on balance the patent system has a vigorous procompetitive impact. Had there not existed the opportunity for exclusivity in the commercial market Raychem could not have afforded to expend at an early stage in its existence (Raychem was only 7 years old when the patent application was filed) the sums necessary to develop 44 wire. "What if" speculation is probably fruitless but certainly even today 44 wire shows significant weight and performance advantages when compared to alternative wire constructions and is widely sold.

Second, disparity of size between litigants is clearly not an insurmountable barrier. At the time suit was commenced Raychem's sales were about 70 MM/year. I don't know ITT's size then or now but on a comparative or indeed an absolute basis it was certainly enormous.

Third, I would like to strongly urge that the present court system be maintained as opposed to a special patent court at either the trial or appellate level. The patent in suit was of a basically chemical nature. Our trial was held before Mr. Justice Tauro who characterzed himself as knowing no chemistry. That may or may not have been true but there is absolutely no doubt whatsoever on my part that by the end of the trial he had a comprehensive understanding of the complex legal and technical issues involved. I think few patent trial lawyers believe that they win or lose cases because the trial judge didn't understand the issues.

Although frequently complex, patent litigation is no more so than many other types for which specialized courts are not being seriously considered. The major disadvantage of specialized courts at either the trial or appellant level is that they tend to stultify new approaches, or adaption and development of the law to meet changed conditions. Such development and adaptability is one of the most significant advantages of the American legal system. The only arguments which seem to me cogent favoring such a single court system are possibly greater technical expertise on the part of the judges and greater uniformity of applied legal standards. As I have already indicated, I feel the former point is a solution to a non-existent problem and certainly could never be more than marginally significant give the great scope of technology encompassed by patents. The second supposed benefit is certainly a two edged sword and in any event is probably illusory since I believe that at the appellate level approximately three-fourths of the lower court decisions are affirmed regardless of whether the patent is upheld or not.

II

The decision to bring (or not) suit for infringement ordinarily follows a reasonably logical sequence of determinations, or at least educated guesses. The patentee must:

1. Determine with as much certainty as possible if the patent is infringed. In some cases mere examination of the competitive product provides the definitive answer. In other cases, e.g. a process patent, even sophisticated chemical analysis does not provide a conclusive answer, which must await pre-trail discovery.

2. Decide if some compromise satisfactory to the patentee, e.g. a license agreement, is possible. In many cases the infringer will not take a license or the licensor may not wish to license at a rate the infringer is willing to pay. Delay in enforcement can cause problems such as laches, statute of limitations or lead other potential infringers to conclude that the patent can safely be ignored.

3. Estimate if the cost of suit, which is always higher than expected, is likely to exceed the reasonably anticipated benefits of a favorable decision from the standpoint of an exclusive position for the patentee, past damages, higher license fees, and/or the deterrence of other would be infringers. In general, patent litigation costs are higher than those of other civil litigation because of the extensive documentation, frequent geographical separation of litigants e.g. our suit was in Boston, and great variety of available defenses.

4. Decide if the patent is valid, i.e. does it meet the 35 USC statutory requirements of patentability: to wit, is it new, useful, and unobvious and is the invention properly disclosed and claimed. These requirements are, I'm sure, familiar to all of you and certainly an exhaustive validity analysis is, or always should be, a condition precedent to bringing suit.

5. Decide is the patent enforceable? i.e. even if statutorily valid has the patentee estopped himself by inequitable conduct either during prosecution or after issuance. Pre-issuance misconduct can, of course, be either affirmative such as misrepresentation to the Examiner or negative in the sense of withholding information relevant to patentability. Post-issuance misconduct (patent misuse) includes a variety of unfair trade practices such as tying, block booking, price or territorial fixing with other licensees or the like. Although misuse can be purged, the existence of such behavior can frequently make suit inadvisable.

The critical factor to bear in mind is that with respect to points 4 and 5 all of these defenses are at least analytically available to the defendant and the patentee must prevail on all of them. Given the fact of in rem invalidity it is clear that suit for infringement should never be undertaken without the most detailed and carefully considered analysis.

III

In patents, as in may other areas, a major problem for industry is uncertainty. Businessmen want, and it is in the public interest for patent lawyers to be able to give, definitive answers. The changes I am proposing in our patent law will in general facilitate such definitive answers. While these changes are significant from a procedural patent law standpoint they certainly do not amount to a change in the fundamental theory of our patent system. I think our present system is a good one and the proposed changes are basically designed to enhance the value of our patent system of U.S. industry. Parenthetically, I should note that the proposed changes would tend to bring the U.S. system more closely into line with that of virtually all other major industrial nations.

1. *Opposition and Reexamination.*—To increase the certainity of validity of a patent and reduce the court burden, I favor an opposition/reexamination system. An opposition system entails the publication by the Patent Office of an application together with the claims the Patent Office is prepared to allow. Any interested party is given a brief period, say 90 days, to cite to the Patent Office reasons why the claims are over broad or invalide either as they stand or in toto. The applicant and opposer(s) then argue their case before the Patent Office until a final decision is reached. An opposed patent which nontheless issues should enjoy a far greater presumption of validity than one which has issued unopposed. This is certainly true in existing opposition system countries e.g. Germany, Japan and Holland. In effect the searching facilities of the Patent Office have been augmented by a substantial number of people, many of whom are intimately familiar with the subject matter of an application.

By reexamination I mean a modification of the present reissue practice where an outside party as well as the inventor could cite prior art or other grounds of invalidity (not including those of the anti-trust or misuse type) to the Patent Office and request a reexamination by it of an issued patent. The applicant would of course be allowed to argue in return as in the case of an opposition. What would be the effect of this change?

(a) Clearly it would increase the burden on the Patent Office. Conversely, it would reduce the court burden and the Patent Office can in general more easily consider many of the technical issues which consume so much court time.

(b) The vast majority of patents are today held invalid on grounds never considered by the Patent Office in the initial prosecution. Either new references, undisclosed public use or some fraud or misuse type misconduct knocks the patent out at

trial. An opposition and reexamination procedure would enable a potential infringer to get his best non-antitrust shot(s) considered by the Patent Office which should certainly result in less full scale litigation of surviving patents.

(c) There are undeniably certain potential disadvantages to this proposal. First, there is the possibility for bullying the little patentee. I think this possibility exists but certainly no more so and possibly less so than under the present system where elaborate pre-trial discovery etc. can prove very arduous for the small patentee. The same avenues of redress are available. Conversely, the small party confronted with a patent he believes invalid on prior art or prior use grounds could get a determination on the merits of his position relatively expeditiously and inexpensively without having to take the risk of infringing and then waiting to be sued.

2. *The First Applicant To File Claiming A Given Invention Gets The Patent.*—The U.S. and Canada are now virtually unique in having a so-called interference practice—in effect a trial by the patent office of who conceived of the invention first, who first actually carried out the invention and whether there was "due diligence" during the intervening period. Under this procedure the first inventor can in some cases knock out an existing earlier filed application or issued patent and get a patent in his name for the same invention. The interference procedure is long and horribly complex in many cases. While as a lawyer I greatly enjoyed interference practice I think the disadvantages of the system far outweigh the advantages. Abolition would:

(a) encourage prompt filing and presumably earlier issuance—a benefit to the public, and

(b) preclude situations such as the polypropylene multiparty interference where foreign patents had actually expired while the equivalent U.S. were applications still pending. Many companies were reluctant to invest in further developing the technology because of uncertainty as to who would ultimately prevail.

3. *Patent Term Runs From Date Of Filing.*—U.S. practice presently provides for a patent term running from the date of issue. This encourages or at least does not prejudice delay in prosecution. I recommend a patent term of the greater of 10 years from issue or 20 years from filing. This should certainly permit adequate time to commercially exploit an invention but yet not encourage undue delay.

4. *Combination Of Inventors Should Be Permitted.*—We must recognize that the vast majority of inventing is done in a corporate or similar environment where a number of research and development groups work in interrelated areas although they may not directly interface. U.S. Law provides that an application must name the inventor(s) of the entire invention only and can claim only what a single inventive entity has invented. A recent series of casers have held that the claimed invention must be patentable over purely internal corporate prior art known to the inventor. While legally defensible these decision seem unsound as a matter of policy. Any application should be allowed to combine all related discoveries to add up to single claimed invention regardless of the precise informational relationship between the inventors. The present requirement, which is unique to the U.S., appears to have no significant advantages to anyone and in many cases results in a U.S. patent being narrower in scope than the equivalent foreign patent. This can prove a severe handicap to domestic business entities.

Senator SCHMITT. Thank you very much.

Mr. Lodge.

STATEMENT OF GERALD A. LODGE, CHAIRMAN, INNOVEN CAPITAL CORP.

Mr. LODGE. Senator, I also wish to apologize in that I don't have 13-inch paper. I don't have any paper. I was invited only recently and I did not have the time to prepare a written statement, for which I apologize.

Senator SCHMITT. We will see how good you are at dictation.

Mr. LODGE. I also must confess that having listened to the testimony this morning that I feel a little bit like the lamb among the wolves in that I am far from an expert on the specific subjects that are being discussed today.

My background is really as a businessman and that is the perspective that I bring to this testimony. Perhaps it would be useful

for you to hear about my background and how it might apply, and therefore you might be able to put my testimony in perspective.

I spent about 15 years in the investment banking business, primarily in investment research and corporate finance, financing typically smaller or medium size companies. Since 1972, I've been the chief executive officer of an entity called the Innoven Capital Corp. This is a venture capital investment firm with assets of approximately $20 million. The business of my firm is to provide growth capital for small emerging companies. Since formation, we have made 14 such investments. Thirteen of the fourteen companies have significant technological content in their product line. Some examples are large scientific computers, radiation processing equipment, pollution control equipment, telecommunication equipment, medical therapeutics and recombinant DNA.

The ownership interest that my organization has in these companies ranges from 4 percent to 85 percent. Therefore, as I said earlier my testimony is based on my experience as a director and owner and investor/entrepreneur. I represent Innoven as an owner; I sit on four boards of directors of our portfolio companies; additionally I sit on two other boards of public companies, one having revenues of approximately $80 million, another one having revenues of approximately $2.4 billion.

In my letter of invitation you asked for my opinion or comments on a series of questions and what I would like to do is attempt to give you my thoughts. Other people have commented much more eloquently on the specifics of these than I could, but perhaps it might be useful for me to reinforce some of their ideas from my persective.

The question of the utility of patents to someone in our position: in other words, a sponsor of a small technological company, we, as investors, are skeptical as to the value of patents. If someone arrives in our office with an issued patent that would be one factor that we might consider out of many, but we certainly would not want to bet everything that we have on the value of the patent. It turns out that every single company we have invested in has either a pending or issued patent so that the managements of the companies seem to have some faith in the patent system.

I make my comment as a value judgment, in other words, based on the management time and the dollar costs, the question is do you get the equivalent amount of protection or is there an economic utility balance there? We tend to counsel our managements to not patent their devices, where possible, but rather to rely on keeping the process or the product or the elements of the product a proprietary secret and then to attempt to exploit it very rapidly and gain a timely market posture—rather than to go spend the time and money to patent it.

There was another question relating to the circumstances where a patent might be essential in the commercialization of innovative technologies. In reviewing our portfolio, I would say that 3 of the 14 companies would not be in existence without the benefit of a strong patent portfolio.

I make no judgment on the other ones, but clearly those three would not have survived. It is difficult to articulate the exact circumstances that what makes a product or a market product

combination such that you need that protection. Clearly, some of the characteristics would be that you cannot protect it on a proprietary secret basis. It may be that it takes you a long time to bring the product to market and that a premature disclosure would allow a competitor to bring that product to the market almost as soon as you can and then prevent you from therefore exploiting your advantage.

Another reason might be a significant capital expenditure in certain kinds of plant or equipment as discussed by your GE witness. All of those kinds of considerations would suggest that a development would not be exploited without adequate patent protection.

Another question was: what trends in the patenting process have diminished the value of patents. I don't want to be presumptuous here. As I said earlier, I'm not a patent lawyer, I'm not a lawyer, even. Our view——

Senator SCHMITT. You don't have to apologize for that fact.

Mr. LODGE. My view is that the most serious problem we have is that we have had doubts about the integrity of the patent office search. We have had three specific instances wherein we have had competent searches fail to surface an important issued patent. In some cases we have been directed by a company concerning the patent and we have been unable to find it. This is very disconcerting, when you are considering the investment of substantial amounts of money, when you can't even verify that someone does or does not have an issued patent in an area of interest to you. Another thing that has bothered us is that we have noted over the years that the opinions that we have gotten from patent counsels regarding the validity of a patent, either our own patent or someone else's patent, including the extent of the claims in those patents, have gotten less and less certain.

In other words, it is almost worthless to get an opinion because the hedges are so great. In other words, this tends to reinforce the increasing amount of uncertainty surrounding the entire business of patents because patent counsels are unwilling to give us clear-cut opinions.

Senator SCHMITT. This is your own counsel?

Mr. LODGE. These are counsels that we have hired.

Senator SCHMITT. Do you have a patent counsel in your own organization?

Mr. LODGE. No, we do not. We hire outside patent counsel.

Another perception that I have is that the patenting process takes more time and costs more money than necessary because of a perceived failure that I have seen in the examining process. It appears to the layman that the examiner could be better trained. It would be nice if he had some understanding of technology. It would be nice if he were required to update himself. It would be nice if there were a certain minimum level of proficiency.

As a result, it takes a great deal of time to explain to the examiner what it is that you are talking about.

I've been asked to comment as to what Congress should do to strengthen the patent system. I have a rather simplistic view of that. I think that clearly the number of examiners should be increased; clearly the quality of the examiners should be upgraded

through better selection, improved training, mimimum proficiency, et cetera. I am aware of a variety of data retrieval systems available that would drastically improve the integrity of the patent file using current state of the art. I would think that is a clear cut priority.

And lastly I would like to emphasize the points made by some of the earlier witnesses that there should be some attempt to improve the environment as far as litigation is concerned. As a representative of the small company fraternity, we have been on the other end of the legal harassment, such things as excessive discovery et cetera, that just literally snows the small management with inadequate staffs.

Second, although it has been adequately covered, I think it should again be mentioned that it is very disconcerting to find that different Federal courts given almost the same facts, will arrive at different decisions. I think that for business planning purposes one ought to be able to evaluate the merits of an invention. A patent counsel ought to be able to evaluate the merits of an invention, allow you to plan appropriately, take whatever risks are required in the marketplace, but hopefully not take the risk that you have been wrong in evaluating the validity of your patent. The only way that can happen, it seems to me, is that the courts are uniform in their application of the law.

I would just like to make one last general statement. Upon reflecting on this point, which I have not been reflecting on very often, as to the merits or the value of the patent system, it appears to me that the dollars spent in improving the patent system have a lot of leverage. In other words, I think that there will be a significant number of R. & D. dollars that will be unloosened and there will be a significant number of other dollars such as capital investment, plant and equipment, missionary marketing, et cetera, all hinged upon an improved patent portfolio.

And therefore I think the Congress would be well to spend the money in the event you do want to improve the innovative posture of the United States. I just have a few comments on S. 1215. In general, I endorse the aims of the bill. I think that if enacted it will have a substantial positive impact. As a director of a company, in some cases I have ordered management to avoid any Government contract for fear that they will taint their technology. Clearly, this offers an avenue where appropriate contractors who might be the most suitable to do a particular research contract will now feel they can do it without losing their technology.

I would suggest one modification. As to the rights of the Government, when a particular type of research contract is awarded, I would make the distinction between basic research and applied research. I think that the Government should retain title to any process or body or knowledge that is developed that could be defined as basic research.

I clearly, as I said earlier, am in favor of a contractor getting title to anything that would be applied, in other words a specific product or a process leading to a specific series of products. What I am trying to avoid is the patenting of science. I think it is in the Government's interest that universities and nonprofit institutions are funded and that they conduct investigations into basic science.

I think it is in our country's interest that those results be promptly published so that everyone can read the results and we can get the cross-industry communication that I think causes the technology to advance. I think if the Government does not retain title and allow the private contractors to do so, it is possible that publishing will diminish. I am not very optimistic about the ability of universities to commercially exploit it, and therefore I feel that it would not be in the country's interest to do that.

That is all I have, sir.

Senator SCHMITT. Thank you. Mr. Rabinow?

STATEMENT OF JACOB RABINOW, CONSULTANT, NATIONAL BUREAU OF STANDARDS, DEPARTMENT OF COMMERCE

Mr. RABINOW. I'm an electrical engineer and I have been inventing for some 60 years. I started when I was very young. About half my working life was spent in the Government and half in industry. I now hold 215 U.S. patents and about 100 in foreign countries which are essentially duplicates. My work now is as a part-time consultant at the Bureau of Standards and everything I say here is strictly my own. The Bureau makes sure that I say this.

Senator SCHMITT. That is standard.

Mr. RABINOW. Yes, because they know that I don't always agree with official policy.

I was asked to comment first about the bill and then patents in general. One trouble with being the last speaker is that much of what you wanted to say has been said and said very well. One of the great advantages, however, is with the many things that were said with which I disagree very violently—and it gives me a chance to rebut.

I think that S. 1215 is very good. I think it is time the Goverment came to grips with this. I think it is flexible enough and you have to be flexible; for example, if the Government has patent rights on a nuclear submarine it has to treat them differently from patents on magnetic particle clutches. That is something that Admiral Rickover should well note. I think that the flexibility is good.

I think that the implication that the Government could collect, royalties is nonsense. It was said well enough earlier today that collecting royalties is a bureaucratic process. You have to have contracts, you have to check books, you have to have very involved legal procedures.

On the other hand, it is not as difficult in a technical sense, as was said earlier. For example, I would have no difficulty writing a contract on a blade of the third stage of a compressor in a turbine of an engine. I've done this for the clutch of an automatic transmission. There are formulas, there are logical ways of doing it; that is not the problem.

The problem is the general nuisance of checking books and checking production figures. In general, when our Government is a 50-percent partner—actually the State also collects a piece, there are taxes on employees, there are taxes on dividends—so the Government is much more than a 50-percent partner and I will make a deal with anyone who wants one of my patents that I would take 50 percent of the profits in exchange for royalties, any time.

Not only that, the 50 percent is not for the life of the patent, but forever. It also goes on all subsequent inventions made by the company based on the Government invention; in other words, the 50 percent is a tremendous return to the Government plus all of the other advantages of greater employment, increase of sales, and so on.

So I think that for the Government to insist, as it must, for political reasons—and I suppose it must—on collecting royalties is wrong. Because somebody may say that not collecting royalties is a giveaway, it may have to be done. But I'm sorry it has to be done. I wish it didn't have to be.

Senator SCHMITT. I'm not convinced it has to be done. We just want to be sure we're thinking about it.

Mr. RABINOW. It's pure unadulterated nonsense. The Government is not a private party; it does not have to make a profit in royalties in the sense that I do as an inventor. It has a completely different position. The Government does give away money when it has to, if it wants to, for example to farmers, to the underprivileged, to education, and so on.

So for the Government to say it must make a buck because it gave somebody a buck and a half is pure nonsense and it has to be countered. This business of giveaways—the Government does give away things in very curious ways. During the war we confiscated 15,000 German, Italian, and other patents. These were industrial patents owned by the great industrial organizations of Europe. They were unfortunately on the other side of the fence, so we confiscated them and made them available free to everybody.

And the result is that no one used them. This is an interesting case where the Government gave something away. We gave away free patents and they died. If we had licensed them to people on an exclusive basis where it made sense, they would have been used much more. The Government now owns 28,000 patents and it doesn't know really what to do with them. Very few are licensed. The returns are negligible to society.

So I think the bill is an excellent bill and I hope it is implemented. There's some problems with Government-owned patents that are derived from Government employees.

I have generated some 60 patents for the U.S. Government which were assigned completely to the Government. For example, I have a patent on a magnetic particle clutch which started a new subclass in the Patent Office. It was made free to everybody in the United States. It didn't do very well. It is used only occasionally, only when absolutely necessary. In Europe I owned the rights, and I sold them to Eaton who sublicensed them to Smith's and the invention was used in four automobiles. It is used a great deal more, relatively speaking, in Europe because it was promoted. I did make some money on the European rights. To be exact, I made $26,000, after taxes, which to me at the time was a large sum.

There were 22 countries covered with 42 patents. That cost a lot of money, but Eaton took over the patents and paid for most of this. The thing that's interesting is that giving good patents to the industry in general, free, means that nobody picks them up. Industry simply doesn't want to spend money on something available to everyone and they will do as little on it as they can.

On the other hand, when I worked on a reading machine for the Government, the Government gave me all commercial rights because at that time I was working on a military contract. This technology started my private business when I left the Government. I finally sold my company for a lot of money to Control Data and it became a division of that corporation.

The first reading machine I invented is now in the Smithsonian Institution. If I had not gotten the commercial rights, I certainly wouldn't have put in the great deal of effort to develop it because there's no sense for a small man like myself to develop something and then have it copied by somebody else.

I don't want to talk much more about the bill. I like it. I wish it well, and I think that when people talk about Government giveaways you just have to take it. This is a political piece of nonsense that has to be countered.

Now, about the U.S. patent system——

Senator SCHMITT. Excuse me, before you leave that, do you have any specific improvements on title IV of the bill which deals with the Government-inventor rights?

Mr. RABINOW. The bill proposes, as I understand it, that the Government will take title when the invention is made part of the job in the conventional sense, and the Government will own it. As I understand the bill, but it isn't very clear to me, the Government will be able to issue exclusive licenses on those patents. I believe this because the early paragraphs of S. 1215 say that whenever the Government owns patent rights it can issue exclusive licenses.

So I take it for granted, then, that even if the invention is made by a Government employee at the National Bureau of Standards, somebody in the Government—perhaps the Secretary of Commerce—would be able to issue an exclusive license. Is that correct?

Senator SCHMITT. Well, we welcome any suggestions you might have to clarify that position.

Mr. RABINOW. The bill is not clear on this. The bill lumps all inventions together, and at the end it has a separate part on the employee inventor. Frankly, I would like to see it clarified. I think it should be clearly stated that wherever possible the Government patents should be licensed exclusively. It would make better sense.

Now there are some problems. For example, yesterday in discussing this with some friends, they said: "Why not give it to the highest bidder?" I told them that I thought that would be socially objectionable because the highest bidder could well be the largest corporation in America or the world. And the Government is not in the business of necessarily increasing the power of very large corporations.

So I think there may be some conflicts. But I think that if one considers the social values and the economic value of the invention to the public, not to the Government—and this should be said over and over again—the problems can be handled. It is more important to produce products and increase employment than for the Government to receive a buck from the highest bidder.

I think, then, that the Government could have a policy which states quite clearly that patents should be licensed exclusively to one or perhaps two companies, and it should be so licensed wherever possible. People have asked me: "What do you do with an

invention for a cure for cancer?" My answer is that invention will take care of itself. I think the Government could well afford to give the inventor a billion dollars if he cures cancer. I believe society would be perfectly willing to make that deal. That is something one doesn't have to worry about in the patent bill.

Senator SCHMITT. Mr. Rabinow, in about 5 minutes, I will have to go vote. So if you could complete your testimony, and then I will be able to dismiss the panel and we can all have lunch.

Mr. RABINOW. It is very hard to discuss a patent system, with which you've worked so hard for so many years, in 5 minutes.

First of all, I believe the U.S. patent system is much better than the foreign systems. I don't believe in the "first to file." I think that it is a mistake to change to that system. The fact of the matter is that we've done very well with over 100 years of our system, and Europe has not done as well. And the inventors I spoke to—and I spoke before large groups of them in Europe and Asia—all say that our system is better than theirs. They would like to work under our system. It does lead to interferences, which are a big pain in the neck, but the interference procedures can be speeded up. There are regulations that could be changed so the interference could be resolved quickly.

The problems of interference procedures are not a good reason to abandon our patent system just because it is a little cheaper to use the other system. And that is the only argument—that the "first to file" is cheaper for the Patent Office. It is not cheaper for the country. I don't believe that running to the Patent Office with every trivial invention to get in first makes any sense, and this is what they do in Europe. And they keep their mouths shut; they don't talk to their associates; they don't talk to their own families, because if they do, somebody will hear of what you're working on and immediately invent the same thing. Or if he has an idea like it, he will run to the Patent Office and win a patent case because he was there first.

I think this is basically not good. It doesn't work well, contrary to some popular conceptions.

Second, I would like to talk about the quality of the patent system. I agree with Mr. Lodge that we should have more examiners and better examiners. The fact is that our "take" from foreign licensing alone—I'm not talking about imported equipment: I'm talking about imported dollars on what we license to foreigners—is over a billion dollars a year. I don't know the figures for internal taxes. I know what they were for people like Mr. Lemelson and myself—I know that the taxes are heavy.

I would like to see a change in the Internal Revenue forms, not in the tax laws, that would report royalties—U.S. royalties and royalties from foreign countries. The present income tax form does not distinguish royalties on patents from royalties from music and books, and nobody knows what the patent royalties are. If the Internal Revenue would change its forms, we would know finally what the Patent Office earns for the U.S. Government. Computers could easily break out this information and you would know for once that the Patent Office is much more than self-supporting in actual dollars. And I'm not talking about cross-licensing or anything else of that kind.

I would like to agree that the courts' procedures are terrible. This, in spite of the fact that none of my 215 were ever held invalid. I've never sued anybody. I'm not as pessimistic about justice of the system. I think that the patents that get into court are not a sign of weakness or of the strength in a patent. When it goes to court, according to Professor Kayton, who is a Professor of Patent Law at George Washington University, it is when the royalties are very much larger than the cost of the suit. It has nothing to do with the weakness or strength of the patent. In other words, if you're going to pay $2 million in royalties and it's going to cost you $50,000 or $100,000 to test the validity in court, you will go to court, particularly if you've got an even chance.

Very few cases go to court, as was said earlier. I think that if the inventor is reasonable, he may have to take less royalties than he otherwise would get. But that is no different from any other business.

I do believe that all validity cases should be tried in the CCPA. They should not be tried by courts all over the country. I think it is a tragedy that you can win nine cases and lose the last one and lose your patent. I think that this should stop. And it would stop if it were tried in one court.

I do not believe in opposition proceedings because they do not work. What happens in opposition proceedings is this: You are getting a patent, and I know you're going to get it. I know that I can easily come in and destroy it. I will keep my mouth shut because as long as I don't compete with you until later, there's no reason for me to destroy your patent. I am perfectly willing to let you have it, so that other people stay out of the business. And when, finally, I decide to go into the same business, I will come to you and say, "You know, Mr. Schmitt, I have some evidence that your patent is not really as good as you say, but I'm a nice guy and you're a nice guy, and we don't want to go to court. How about a cross-license?" And you look at my new evidence and you say, "You know, you've got a point there," and you give me a cross-license, and we keep third parties out of it. This is exactly what happens in many of the countries that have opposition proceedings. The general idea is, if my evidence is really good, it can always be used later. There is no requirement that it be brought in as the patent is being issued. Therefore, if you're not going to use the patent, why bother? It costs money to come in with evidence, and who wants to read 60,000 patents a year to see what is new and old about them. I look over the patents issued every week, and I would be damned if I would come in with opposition just because I know some of the patents are invalid. If I'm not interested in the business, I will just keep my mouth shut. I can always use that argument later if I must.

I do like the idea of reexamination. If I'm going to fight you on validity, I think that it should first go back to the Patent Office by court order, and not because I want to annoy anybody. The court should say, "This is worth looking into. We have some new evidence." The Patent Office should look it over again and be required to give a decision within a year, and then the court can settle whatever differences there are left. This is the way I would like to treat it.

I feel that American technology is dying. I think it is in terrible condition but not for the reasons stated earlier today. It isn't because the courts are tough or the patent system isn't working. I think the management of our large businesses is very bad. I can give you evidence. Here is an article about the organization man (Newsweek, June 18) that says they checked 3,600 top management people, and they find that, as you would expect, they are WASP's, they're fathers of families, and other such blah details, but they do not like innovation. They do not like new things. These are too risky.

My experience with industry supports this. I'm sorry that I don't have time to give you examples. I would love to give you several cases. Our American technical industry, by and large, now is run by bookkeepers and not engineers. Commander MacDonald, the man who founded Zenith, is dead. People like this are very rare now. There is still Mr. Land at Polaroid and a few others. Most of our industries now are run by people who don't give a damn about the technical products which they produce or the service they render. All they care about is the "bottom line."

Some time after I licensed Harman-Kardon for my record player and talked to the manager, I said, "Why don't you build a new model that plays both sides of the record; you have a good patent on it." And he said: "Jack, it will take 3 years to develop it; we are owned by Beatrice Foods; they own 400 companies; we never meet the management; I will lose my job if I start innovating and developing something new; I have to show profit every year, and the best way to do it is to make few changes."

Harman-Kardon was just sold to a Japanese company, and now my record player will be built in Japan. This means that it will have the name of Harman-Kardon but all of the equipment will be built in Japan. My record player invention is now also built by Bang and Olufsen in Denmark and Revox in Switzerland. The basic patent expired and now many companies will be building it next year. I understand all high-fi fancy record players will be built under my expired patent. I'm very proud of this. I have no regrets. The only thing I do regret is it is not being built in the United States. It is being built in Japan.

[The statement follows:]

STATEMENT OF JACOB RABINOW

My name is Jacob Rabinow. I was born in Russia. I was educated in the schools of New York and received two degrees in Electrical Engineering from the City College of New York. I have been working in Washington since 1938. At the present time, I am a part-time employee of the National Bureau of Standards. I retired from full-time Government service in 1975, after having spent some 20 years in Government service and roughly an equivalent time in industry. I am an inventor who has been granted 215 U.S. patents. Another two or three patents have been recently allowed and there are some still pending. I also hold perhaps 100 patents in foreign countries.

Of my U.S. patents, about 57 were assigned to the Government and another 10 were partially licensed to the Government and I retained certain commercial rights. Of the rest, 18 were assigned to clients for whom I was a consultant and 128 are owned by me or by companies which I headed and which eventually became parts of other corporations.

The fields of technology in which I have patents are ordnance, computer equipment, Post Office automation, photography, sound recording and reproduction, ho-

rology (clocks and watches), electrical and mechanical equipment of all types, and some labeled "Miscellaneous."

I was asked to speak today by Mr. William C. Gibb, Minority Staff Counsel for Senator Schmitt, and Mr. Steve Merrill of Senator Stevenson's staff. I was particularly asked to comment about the Bill, S–1215, that deals with Government ownership of patents, to express some general comments about the patent system of the United States and to relate some of my personal experience with it. I was told that I would have 15 minutes for my initial presentation and, hopefully, will have an opportunity to answer questions. I would like to make two comments bout the invitation to speak here today.

One is that it is impossible to say much in 15 minutes about a subject that has been my primary interest for some 60 years. Secondly, everything I say here represents my personal opinions and in no way should be taken to mean that I am speaking for the National Bureau of Standards or for anyone else. My talk was not reviewed or approved by anyone else and I can only hope that my opinions do not disagree seriously with those of the management of the National Bureau of Standards—an organization and people for whom I have the greatest respect.

In general, I agree with the spirit and wording of Senate Bill 1215. I think it is high time that the Government come to grips with the realities of the real world which may use the technologies developed directly by the Government or under its sponsorship.

No single set of rules can apply to all Government patents. Obviously, patents on weapons and on atomic energy have to be treated differently from patents on ordinary machinery, patents in agriculture, or patents in drugs. "Free license" policies may well operate in the field of agriculture where no farmer can have a large share of the market and where he cannot afford to do basic research that affects the whole industry. Such patents have to be treated differently from patents on my magnetic particle clutch that would have taken $1,000,000 for development and which did not get full development because no one was able to obtain an exclusive license.

I agree with the proposed bill that the Government should issue exclusive licenses wherever possible and the only criticism I have of the bill is that the granting of such licenses is made more or less permissive. I am afraid that a timid Government bureaucrat would prefer to take the easy and, for him, the safe route of not issuing exclusive licenses so as not to be accused of "Government give away." I would prefer to see the law strengthen so that the granting of exclusive licesses could be the normal and easy procedure and not granting exclusive licenses would require strong justification.

There is an implication in the bill that the Government may collect royalties and fees on Government-granted patent licenses. I think this is unnecessary and counterproductive. The Government is not a private company; it collects taxes on more than half of the profits. In addition, any profits made on the invention result in taxes not only to the Federal Government but to State and city Governments also. There are also taxes on wages, on dividends, etc., and I believe that because of this it is unnecessary to go to the trouble of contracts, inspections, bookkeeping, and other legal difficulties in royalty collections. The collection of taxes is much more straightforward and is well organized and accepted. I cannot help but express the thought that I would be very happy to take half of the profits made on any of my inventions in lieu of royalties, particularly when this profit sharing will run not for the length of the patent grant but for the full life of the corporation and, in fact, will apply to all inventions and develpments made as a result of my invention by others and for all eternity.

The experience with Government-owned patents has, in general, been disastrous. One needs only to cite the history of the patents owned by enemy aliens during World War II. These were taken over by the U.S. Government and made available free to all. The 15,000 patents involved "died on the vine." It should be remembered that these were highly valued industrial patents obtained by the Germans and others over a period of years, many of which protected very profitable products.

I need not mention that the U.S. Government now owns some 28,000 patents and their exploitation has not been profitable, either to the Government or to our nation as a whole. When considering patents owned by the Government, the question is not "Who should have it?" or "Who owns it?" but rather, "What will happen to the technology?"

I have often heard arguments that, at least in the case of Government owned patents, they should be made free to everyone because then their use would be assured and widespread. If this argument is correct, then one cannot justify the existence of any patent system at all. One could the argue that no patent should

ever be issued, that results of inventions should be made free to everyone, and that the inventor should be rewarded in some other way as, for example, by special honors, awards from the Government and/or industry, and so on. It is a curious fact that the patent system, as we know it, was first put into practice in Venice in 1474 and has since been adopted by all the nations of the world with the present exception of only China. Even communist countries like Russia and others have a system that reward inventors and yet a Department of Justice attorney once told me that patents are unnecessary. When I related the above history, he told me that the whole world was wrong.

The other subject I was asked to comment on today was the general question of the value of patents and particularly the U.S. patent system. I must repeat that my time here for even a cursory discussion is much too short but I will try to be as brief as I can. The U.S. patent system is unique in that the inventor is the kingpin of the system. The first one to invent wins the patent, not the person who gets to the Patent Office first, as is true in all the rest of the world. This does lead to some difficulties in "interferences" when more than one person applies for a patent on the same invention within a reasonable time of each other. I was in interference twice. While interferences are costly and sometimes lengthy, they do not occur too often and procedural changes could and should be made in the system by which interference should be kept to a minimum and resolved promptly. This is the only serious, basic, criticism I have of the U.S. patent system.

Our patent system suffers from some other difficulties. One is that the "arts" are getting much more involved and the examination of the technologies much more difficult. There are some 10,000,000 patents that have to be searched, to say nothing of the staggering amount of technical literature that may be pertinent. The arts are more difficult to search not only because of quantity but because new inventions are very often related to many old inventions in many diverse fields. Therefore, the searching requires more expertise and more time. This leads to the simple and inevitable conclusion that the staff of our Patent Office should be increased, both in quantity and quality; that is, the training required should be higher and the number of examiners should be much greater. It is amazing that they do the job as well as they do with the means at hand today. That this increase of quantity and quality will cost money is beyond question, but is should be remembered that Government taxes, as a direct result of patents, are many times greater than the cost of the Patent Office. For example, the income from licensing our technologies to foreign countries, alone, brings to the United States an income which has been estimated to be between one and two billion dollars. There are no statistics on the amount of internal royalities but if one assumes that most of this money is taxed roughly 50% by the Federal Government, and even if one disregards cross-licenses, the direct returns of cash to the Government are many times greater than the possible cost of the patent system. Moreover, since many people, including myself, think that the patent system is of direct benefit of our society as a whole and the increase in productivity and technology helps us to maintain our high standards of living, then no one should quibble about the cost of the patent system as it exists today or the increased cost of a still better organization.

It would be very useful to all discussion of our patent system if the Internal Revenue Service could make a slight change in the income tax form so that income from royalties on patents should be reported on a separate line, or preferably two lines—one for domestic patents and one for foreign patents. Then, computer printouts could tell use the amounts of royalties collected and taxes paid on these. It is time we stop guessing.

There have been proposals made that the patent examination and searching should be computerized. Somehow or other computers are to be substituted for human brains to see where my invention is similar to or different from the invention of others. I have been involved in computer work as an engineer and in studies involved with the Patent Office. I think the dream of using computers to do the intelligent part of the patent search and evaluation is basically nonsense. Computers can be used for rapid retrieval of patents when you know their numbers or the name of the inventor; they can be used to produce copies when necessary and, in general, reduce the "leg work" involved, but the judgment of concepts is not in the computer's power, and the judgment of concepts is what inventions and the patent systems are all about.

The patent system of the United States is also in very serious trouble because of the procedures in our courts and the cost of litigation. Patents are often tried in courts before judges and juries which have not technical training whatever. Important decisions have to be made on infringements or on the validity of a patent where the technology is subtle, and the questions involved would cross the eyes of

the greatest scientists. In some districts of the United States, courts have almost always held patents invalid, while in other courts the percentage of validity is higher, perhaps half of those tried.

Contrary to popular belief, the patent cases that go to court (where the subject of infringement and validity of the patent are involved) are not based on the strength of the patent. It is simply a matter of economics. Irving Kayton, Professor of Law at George Washington University, has well pointed out many years ago that where the royalties are much greater than the cost of litigation modified by the probability of winning, the patent is challenged. This has very little to do with the strength of weakness of the patent.

There are two items to remember about patents that end up in court. One is that the percentage is very small, only a fraction of one percent; and, secondly, that the question of whether an invention if or isn't obvious, or is or isn't completely new, is basically a subjective matter. Becasue the case is usually decided in court many years after the invention is made, it is not at all difficult to see why the invention looks perfectly obvious when presented to a non-technical court by expert witnessess who point out that the invention is simple and obvious and anyone "well versed in the art" could have done it. The fact of the matter is that the very great inventions are simple and it is true that many others could have made them, but the important thing is that they did not.

I am firmly convinced that all technical matters that concern patents such as infringements, validity, and settlement of interferences should be tried only in the Court of Customs and Patent Appeals and in no other Federal Court except the Supreme Court. Only matters that are non-technical, such as contracts, financial matters, and such others, should be left to the District Courts, This would eliminate one of the greatest injustices of the present system. An inventor may have to defend his patents in many District Courts and while he may win in many, he may have his patent destroyed when held invalid by only a single court. If all of the cases were tried in a single court, it is obvious that the same battle would not be fought many times, as in the present practice.

In the recent past, the patent system of the United States has suffered from attacks on it by some misguided members of the Antitrust Division of the Department of Justice. I am glad to say that the Department of Justice is taking a more rational point of view today. For many years, the Department of Justice felt and stated that patents are monopolies and, as such, their power should be curtailed. I have been told by members of the Department of Justice that there is no reason to have a patent system at all since inventors have so much fun inventing things that they would do it even if they were not paid. I was also told that if I or someone else did not invent a particular device, it would be invented by someone else when it was needed. When I pointed out that my watch regulatory and magnetic particle clutch could have been invented by any competent engineer 100 years before me and that they weren't, their answer was that this was due to pure accidents. Such comments about the "fun" of producing and developing inventions and the automatic inevitability of inventions are not worth discussing.

In my opinion, the conflict between the Antitrust Laws and the Patent Laws should be resolved by Congress and should not be done by case law.

Judge Rifkind has put it well by saying in a speech before the American Patent Law Association several years ago, that it is time to divorce the patent laws from the antitrust laws. As an inventor, I would like to know my rights by a clear statement of law rather than the vague and risky interpretation of a large number of court cases.

When discussing patents, it is important to point out that they have different values to different segments of our society. To a private inventor, such as myself, it is absolutely necessary to have a patent if I am to receive any reward for my efforts. If I have an idea that cannot be protected by patents, I make no effort to develop it, to promote the invention by manufacturing it, or to sell it to anyone else. The value of patents is also great for a small business because a small technical company has nothing to sell but innovation and rapid changes in technologies, something which is not of the same importance to a large corporation.

Patents to a drug firm are very important because the cost of development and proof of performance is very expensive but the cost of manufacturing the drug is relatively small. Without patent protection, anyone can make a drug after another company has developed it and proved its value.

Patents have different values to a chemical company as compared to patents to large corporations that make machinery such as automobiles and computers. A large computer company does not depend on royalties for its profits. It depends on the economics of engineering and production and particularly on distribution and

service. This is also true of automobile companies. For such companies, patents are an unmitigated nuisance. They force them to do basic research in new fields so as not to be frozen out of new technologies. The patents cost them large sums of money for attorneys, patent fees and litigation in scores of countries. The officials of these companies frankly admit that if the patent system did not exist they would need to do less R&D, they could manufacture anything they wished and that their success depends on their economic strength, marketing abilities and their worldwide distribution of sales and services.

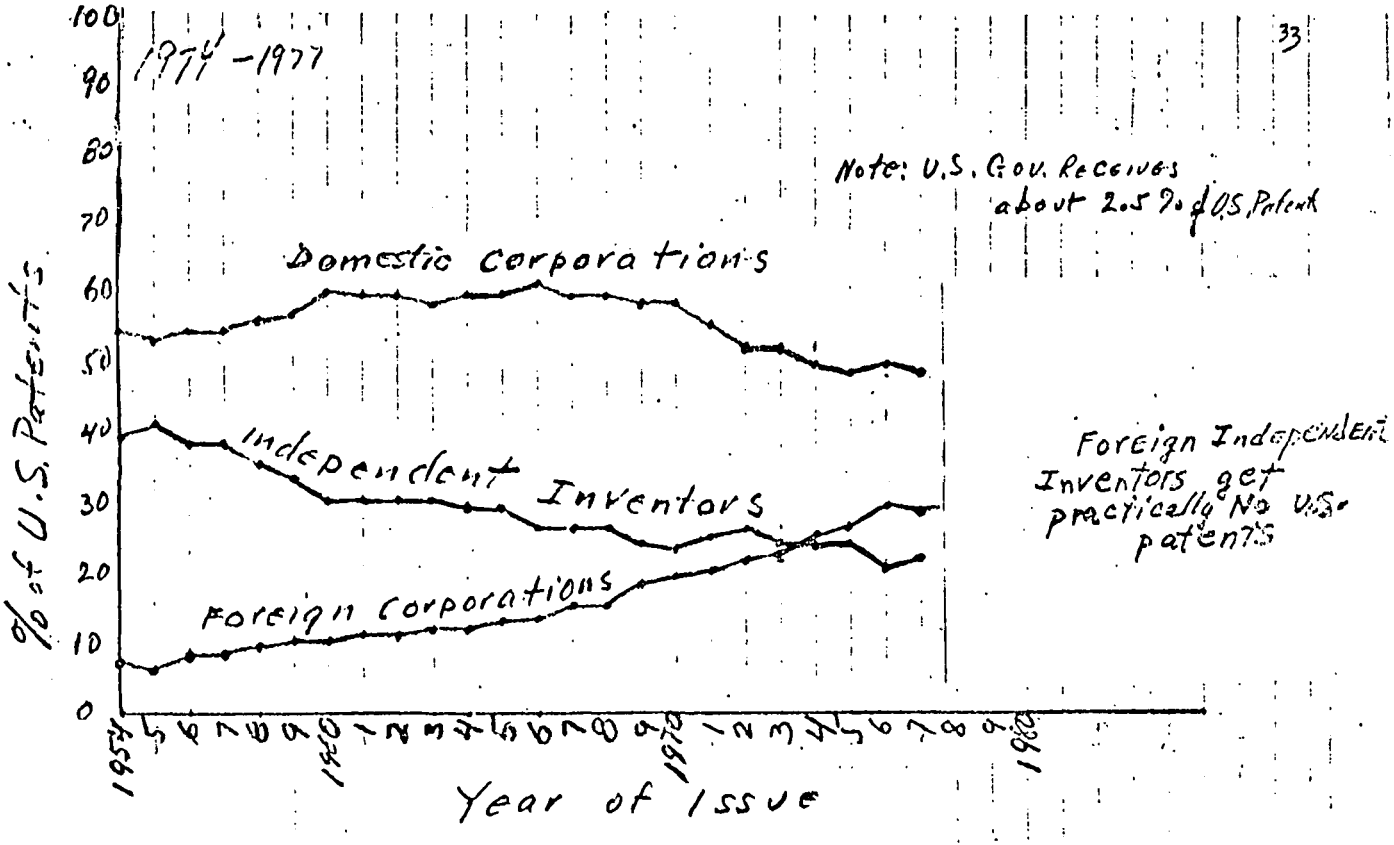
I believe that the present practice (due to the efforts of the Antitrust Division) that many large corporations must license others at some reasonable rate should be codified into actual legislation, that any corporation that has more than, say, 25 percent of an industry and has a gross income of more than, say, $500,000,000 must issue non-exclusive licenses are reasonable rates.

I wish to emphasize most strongly that patents are a means for increasing competition both by limiting the power of our large corporations and by forcing competitors to improve upon the patents developed by others. Patents are the main means of rewarding the brave soul who is willing to do something different. In a country without patents, power would be completely in the hands of those who have large sums of money and the chance for an innovative small company to become large or strong would be essentially zero.

Innovators suffer today because of the disillusionment of our investors, particularly Wall Street, with R&D. They also suffer because of the high interest rates that money can now earn. When capital can earn 12 or 13 percent essentially without risk, and double itself in some six years, and when a rich investor can double his money without paying taxes in about ten years, why should anyone invest in some new high-technology with its attendant risk? Society must recognize that invention and innovation is basically risky and that many new ventures must fail. No intelligent society could or should make use of all new inventions that are produced in a given period. The fact that an improvement exists does not justify the necessary scrapping of an old device or an old process which is still economically viable. Society must pick and choose and the inventor must have hope that he or she will sometimes be chosen. Without that possibility, our economy dies. The United States must produce an ever larger pie to be divided among its people if the standard of living is to rise. It cannot do this by conquering other nations or exploiting them. It does not have enough raw materials to simply sell in exchange for foreign goods. Farming involves only 5 percent of our population and certainly cannot support all of us. The only way we can raise our standard of living is to produce more goods and services for every hour of our work. This means that our technologies must always improve; we must produce ever better products and ever more efficient services, not only for ourselves but to trade with others. Unless we do so, our average standard of living shall fall and we shall become a second-class nation.

Attached is a curve of patents issued to domestic corporations, independent inventors and foreign corporations from 1954 to roughly the present time. Attached is a list of important innovations that were made outside of the laboratories of large corporations.

Thank you.


1974 - 1977
Note: U.S. Gov. Receives about 2.5% of US Patents
Domestic Corporations
Independent Inventors
Foreign Corporations
Foreign Independent Inventors get practically No U.S. patents
% of U.S. Patents
Year of Issue
100
90
80
70
60
50
40
30
20
10
0
1969
1970
1980

Atomic energy
Computers
Radar
Microwave technology
Cyclotron
Inertial guidance
Mechanized wiring (Printed circuits)
Mercury dry cell
OCR (Optical Character Recognition)
Magnetic core memories
Vacuum tube
Xerography
FM radio
Laser
Penicillin
Insulin
Catalytic cracking of petroleum
Jet engine
Fiber optics
Flotation glass
Magnetic recording
Holography
Oxygen steel-making process
Heterodyne radio
DDT
Streptomycin
Gyrocompass
Rockets
Titanium
Shell molding
Shrink-proof knitted wear
Dacron polyester fiber "Terylene"
Zipper
Automatic transmission
Continuous hot-strip rolling of steel
Helicopter
Power steering
Color photography
Air conditioning
Polaroid camera
Cellophane
Tungsten carbide
Bakelite
Velcro fasteners
Hovercraft
TV tape recording
Continuous casting of metals
Foam rubber

It is interesting to note that the first ten inventions on the list above were developed under Government sponsorship and many of the others had a considerable amount of Government aid in their development.

Senator SCHMITT. Gentlemen, I must go cast my vote, and I thank you for your testimony. Thank you again. This has been a very useful set of hearings. We anticipate that there may even be some more.

Thank you.

[Whereupon, at 12 noon, the hearing was adjourned.]

PATENT POLICY

THURSDAY, OCTOBER 25, 1979

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
SUBCOMMITTEE ON SCIENCE, TECHNOLOGY, AND SPACE,
Washington, D.C.

The subcommittee met at 10:30 a.m. in room 318, Russell Senate Office Building, Hon. Adlai E. Stevenson (chairman of the subcommittee) presiding.

OPENING STATEMENT BY SENATOR STEVENSON

Senator STEVENSON. The subcommittee will come to order. Today we continue hearings on Government patent policy, in particular S. 1215, introduced by Senator Schmitt, to establish a uniform policy for determining the rights of Government, its contractors, and employees to publicly financed inventions.

This bill basically extends the policy of the Department of Defense to the Federal Government's civilian research and development programs. Senator Schmitt.

OPENING STATEMENT BY SENATOR SCHMITT

Senator SCHMITT. Thank you, Mr. Chairman. I again welcome this opportunity to participate in these hearings, the third day of subcommittee hearings on Government patent policies and the impact of such policies on the governmental innovation process.

Testimony to date from a broad range of witnesses representing both the Government and private sectors has underscored the need to reevaluate the basic assumptions underlying the policy for managing our national investment in science and technology research and development. Experience has shown that current policies have failed miserably to effectuate the transfer of new technologies to the marketplace. Federal patent policies which were originally designed to protect the public interest by preventing the so-called giveaway have in fact operated to discourage contractor bidding, eliminate incentives to innovate or disclose new ideas, and delay the commercialization of inventions developed under Federal contracts. The real loser has been the consumer and the taxpayer.

Current Federal patent policy is scattered throughout a hodgepodge of statutes, Executive orders, and regulations which have formed a costly maze of bureaucratic redtape—all falsely in the name of the public interest. Delays in the processing of normal waiver applications can take several years, at a cost to both the contractor and the Government. Despite sizable patent staffs and aggressive technology transfer programs, the commercialization

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rate for agency-owned inventions is disappointingly low—in fact, less than 2 percent of NASA-owned inventions have been transferred to the marketplace. Governmentwide, nearly 3,000 inventions are collecting dust on agency shelves and less than 5 percent have been effectively utilized. The time is long past for questioning who should own the inventions created by the use of billions of tax dollars. We have a right to benefit from the fruits of those expenditures by demanding that potentially significant new inventions be allowed to reach the marketplace. The inventor is obviously the most likely person to see that this happens. His or her pride and livelihood is at stake.

It is not surprising that increased interest in reform of our Government's patent policy is being shown by both the executive and legislative branches. This past week the House Science and Technology Committee initiated its own investigation of the Government's patent policies and it appears willing to move forward in this area. As you well know, Mr. Chairman, the bill that you cosponsored along with the chairman of the full committee, Senator Cannon, has been introduced in the House. The administration has also conducted an extensive evaluation of the patent policy issue together with its domestic policy review. I understand that we can expect to receive the President's recommendations any day now. Whether you and I would agree with that policy remains to be seen.

Too often we seek solutions which require new and expensive programs rather than taking the time to reexamine and adjust existing policies which have been ineffective and oftentimes counterproductive. Mr. Chairman, the bill that you and Senator Cannon joined with me in sponsoring was offered as a moderate approach to bring some uniformity and commonsense to this much debated and controversial issue. It stands between the approaches of the past and I think takes advantage of the debate that has occurred up until this time. I have been encouraged by the thoughtful testimony of our previous witnesses, and I look forward to what promises to be a stimulating dialog today. Thank you, Mr. Chairman.

Senator STEVENSON. Thank you, Senator. Not all of our witnesses are here. I will call first Mr. Jacob Rabinow to continue his testimony. Mr. Rabinow is a former vice president of Control Data Corp., an electrical engineer with some 200 patents, and a consultant to the National Bureau of Standards. Your testimony was interrupted at our last meeting for which we both apologize.

Mr. RABINOW. It's always an honor to speak to you, even if the time is short.

Senator STEVENSON. You're very kind.

STATEMENT OF JACOB RABINOW, BETHESDA, MD.

Mr. RABINOW. I'm sorry that I'm first. I would have loved to hear Admiral Rickover, not because I agree with anything he says; as a matter of fact, I disagree most heartily with everything he says about patents. I read his testimony this morning. The difficulty is that he equates all patents with nuclear patents. I think they are not equatable. Nuclear submarines are not exactly the same kind

of thing as a cure for a disease or an automotive clutch, and I will have something more to say about that.

I was asked to repeat or summarize briefly what I said last time and can I do this or should I?

Senator STEVENSON. Yes.

Mr. RABINOW. First, I'm an electrical engineer. I was born in Kharkov, Russia, but I was educated in New York City. I have been in the United States since I was 11. I've spent one-half my engineering lifetime in government and half in industry. I had two of my own companies and that's how I became eventually vice president of Control Data. They bought one of my companies.

My patents cover ordnance, post office equipment, sound reproduction, electrical equipment, photography, computer equipment and many other things. I have 215 U.S. patents and perhaps something like 100 in foreign countries. These are duplicates. About 60 of my patens were obtained when I was a Government employee, which I still am, part time. I'm rather proud of the work I did, although my experience with those patents could have been be much better as far as utilization of the patents goes.

I agree in general with the proposed bill, S. 1215, because I think that's the correct way to approach the problem. There are things that bother me a little about some of the mechanics, but I believe that the general philosophy that the Government should not take title to patents is correct.

I believe that you need flexibility, that you cannot treat all patents alike, but certainly a patent on a nuclear submarine or a weapon where the Government is the only user and where secrecy or, at least control is important has to be treated differently from a patent on a medicine where development costs may be 1,000 times greater than the cost of the original invention.

I think, for example, that the Government has done well in many of the things it developed and where it gave commercial rights to the inventor or his company. For example, this was done in the computer business. The Univac computer was ordered by the Government from the University of Pennsylvania. It was designed by Eckert and Mauchly. They formed a corporation based on their patent rights and sold the first Univac to Census. The Bureau of Standards helped with the purchasing of the first Univac and I was involved in that. Later their company needed money and eventually it joined Remington Rand or Sperry Rand. The fact here is that if the Government had taken title to the patents that company would not have been formed. It was the patent position that started the computer business of the United States.

I have seen comparison between agricultural patents and patents on weapons, and again you can't make comparisons like this. Agriculture is a different kind of business entirely from manufacturing done in a factory. A farmer cannot monopolize a market.

The bill proposes that the Government can, if it wishes, receive royalties and fees for patents. To this, I object most violently, not because of any unfairness or because the Government doesn't have the right; it's just that the mechanics are silly. The Government is a 50-percent partner in any business that I have or any business that I hope to have. It collects income taxes on the profits of the corporation. It collects taxes on the dividends. It collects social

security taxes on the wages, State taxes are also collected, and so on. For the Government to say it deserves a 2- or 3-percent royalty on an invention that stems from Government R. & D. is nonsense. I would be very happy, any time I license anything under my patents, to take 50 percent of the profits in lieu of royalties. Also, it should be remembered that the Government taxes go on, not for the life of the patent, but forever, and they also are levied not only against the patent itself but on all subsequent patents, all future developments made by the same company or any other company.

So for people to worry, as Admiral Rickover worries, that the Government should collect royalties, or have some interest in the patent, is nonsense and I believe that this bill says this, partly. I think the political pressure is put upon you gentlemen that you shouldn't "give away" anything is unfortunate. I object to this giveaway nonsense. It seems perfectly proper for the Government to give me a free education, but for some reason it's improper to give me the rights to my own inventions and collect 50 percent royalties on it later, forever.

The fact is, today, contrary to the evidence that Admiral Rickover will give—and I'm using the evidence that I have in front of me in his written statement—that many corporations refuse, perfectly correctly, to take Government contracts in fields in which they are experts. They are perfectly willing to do Government research in new fields where they have no vested interest, but large corporations who are good in specific fields very often will refuse to do Government R. & D. work or take any Government contracts because of the fact that they don't want to lose their patent rights.

The other thing that happens with Government contracts under present rules is the tendency to follow questionable ethics. Companies will make sure that parallel with Government R. & D. they have a program in the back, someplace, where the really important developments take place so that the Government never gets the patent rights that Admiral Rickover thinks it would get.

What happens is that the great inventions are made just accidentally at the time when the employees are on company salaries, and the minor developments, technically speaking, during the large production contracts are happening to be done on the Government contract. This is a fact of life; that if I were working as a contractor for the Government I would make sure that my basic inventions were made on my own money.

The other thing that happens is that because of the patent policy of the Government most large industries today use the two-platoon system for Government research and development. They have a first platoon of very brilliant people who write the proposals and negotiate the contracts. When the contracts are let, the second platoon, which has much less technical skill, does the work. A friend of mine who was a proposal writer for one of our largest corporations many years ago, told me—and I don't know whether it's still true, but I suspect it's true in most companies—that he only wrote the proposals. He's a brilliant inventor. When I asked him, "Larry, who does the work after you get the contract," he said, "I haven't the vaguest idea."

I once mentioned this to the president of a very large corporation and he said, "We have a third platoon to explain to the Government later why the gadget didn't work."

I think that if the patents were left with the corporations so the benefits of this brilliance could be their own, these two platoons would not exist. They would be perfectly happy to do Government research with the same quality people they use on their own research. This is not true today.

Let me tell you about the Government experience when it owns good patents. During the war we confiscated all the patents belonging to enemy aliens that is, patents belonging to Germany, Italy, Austria, and many others. There were about 15,000 such patents. These were not Government patents. These were patents which were applied for in the United States by the industries of the world. These patents were administered after the war by John Green, who was then Chief of the Office of Technical Services. These patents died. Nobody asked for a license. They were available on a nonexclusive basis for the payment of $7 and I can assure you that if you didn't pay the $7, you certainly could use the patents. And John Green told me that the patents "died on the vine." These were his words because, he said, "Nobody wants to develop and put into production something his competitor will do after him for less money and do it better." The reason the competitor can do it for less money is because the market is established; he knows what people are buying; he therefore can do it without the usual market risks. The reason he can do it better is because he's second, and the second model is always better than the first.

People have asked me, as an inventor, why don't I invent the second model first? I'd like to do that but I don't know how.

The experience with Government patents, besides these 15,000, has been very informative. As mentioned by Senator Schmitt, the Government owns more than 20,000—nobody knows exactly how many—and these patents are doing very badly. I'll give you some cases from my own experience.

In 1947, I invented the magnetic particle clutch. It consisted of two metal plates and some iron dust. The patent was basic. This contradicts the testimony of Admiral Rickover that everything that needs to be done will be done anyway. I have also heard this from the Department of Justice people many years ago, that "anything that needs to be done will be done." Here's a clutch that could have been done by any kid in 1850. There was no principle of physics that wasn't known for 200 years, except it just didn't happen. I invented this clutch and it started a new subclass in the Patent Office. The Government issued no exclusive licenses so no one wanted to spend the millions of dollars it would have taken to get rid of the problems that arose, problems of the heat dissipation, shielding of shafts, settling of the powder, and many other problems that arise in industrial applications. I was given the foreign rights, however, and I sold these to Eaton and Eaton licensed many European companies. It was developed in Europe to a much higher extent than here. It was used in four European automobiles. It was never used in a car in the United States. It's used in airplanes only when absolutely necessary. This was a basic invention, simple, but

because it was a free patent to everybody nobody spent the money it would have taken to develop it fully.

The question of whether the royalties would have come to me if I had given the patent rights is really immaterial. It's not whether Jack Rabinow makes money. The question is whether the invention is used by the public to create jobs and create exports.

All these arguments about "why should the Government give somebody the right to make some money" should never be asked about a patent. The question is, does it get used? Do people produce it? Do people use it? Does it help our export business and does it help create jobs? And whether somebody does or doesn't make money for a few years is completely besides the point. I had no objection assigning it to the Government. I received a gold medal for it and it raised my salary $250 a year. This is not the point. But the Government should have given somebody an exclusive license so the couple of million dollars it would have taken to get it on the market could have been spent. It wasn't.

I'd like to contrast this with another one of my experiences. While in the Government I invented a reading machine. It's now in the Smithsonian at the Museum of History and Technology. The reading machine read the print of a portable typewriter. This was done in 1952 through 1954. In that case the Government did give me the commercial rights because it was done when I was a member of the Harry Diamond Laboratories. Under Department of Defense rules the commercial rights were given to the inventor.

I did start a company with that basic patent and the company was sold to Control Data for more money than I would like to mention in public. The fact is that the basic patent was the basis for many inventions that followed, made by myself and by my staff. We did have an incentive and I could and did get Wall Street money and the business was quite prosperous. Here's the same guy, the same Government. In one case the patent rights belonged to the Government and I have no rights and nobody spends any money. In the other case, I do have the rights and the money is spent and an effort is put into it and the thing becomes a great commercial success and today nearly all reading machines are based on that first patent on a reading machine.

Questions come up like, "What about things like cures for cancer; suppose the Government contractor develops a cure for cancer. Should he be given commercial rights?" My feeling about this is that this is one of these questions like "Do you beat your wife every Friday?" The cure for cancer would have enough moral controls on it, enough social pressures, so that I wouldn't worry about it. Besides, if a company did cure cancer and did make a billion dollars, I think society would well make that deal. But I think these are academic questions and I think that there would be enough other ways that the company would benefit from a cure for cancer so that we don't have to worry about the operation of the patent system of the United States because somebody may invent a cure for cancer.

I have been asked by Bill Gibb in a telephone conversation a few days ago about what I thought about mandatory licensing. This is a policy where the Government would require the exclusive licensee or licensor to license others. I don't like mandatory licensing,

which often destroys the value of a patent. If a patent is valuable, it is valuable because of the control it gives the owner. Mandatory licensing reduces this control. The fact that a company could make some money out of mandatory licensing is academic. The question is, will it use the money to develop the invention further. I have many doubts.

One of the interesting things about the patent system—and Admiral Rickover's testimony is basically directed not only against the Government policies but against all patent systems—is the belief that people will extort money and the inventor will get rich and his company will get rich and monopolies will be set up and so on. This is the basis of the general philosophy that patents are really not necessary—I have heard these arguments most of my life. I have heard this from the Department of Justice, which used to be opposed to patents, but which is much less so now. "Why should we pay inventors to invent? They have so much fun doing it that they will do it anyway."

I invent things and I often find them in the Patent Office files and I drop them. It's fun to invent, but it's not fun to develop the invention. If I cannot make it commercial for myself or my employer, I certainly do not follow it. There's no point in developing something that's available to everybody else. Development is very expensive and very difficult.

One of the most interesting things about the patent system that you gentlemen should remember is that the original system was invented in Venice in 1474, and since that time all the countries of the world, including the Communist countries, have adopted patent systems; and yet I once heard a Department of Justice attorney tell me—and Admiral Rickover would probably agree—"patents are unnecessary." And I said, "Then how come all the countries of the world, with the exception of China, have adopted a patent system?" His answer was, "Everybody is crazy." This does not deserve any comment. The fact is that Russia has a patent system and their inventors who all work for the Government nevertheless collect royalties. The chief of the patent system of Russia once told me that they have one inventor who so far has over 100 patents and he's earned 1 million Russian rubles in royalties. A million Russian rubles is not hay even in Russia. They also reward him with honors. They have found it does promote invention. China is now studying our patent system with a view of setting up their own patent system.

I think our laws should be quite clear in that the normal procedures should be that in nearly all cases the patent should be given to the company that invented it. If you're concerned about the fact that very large corporations would have too much power—this should be true not only of government patents but of all patents—let the antitrust laws take care of this matter. Most of our large corporations do not sue small companies. I never was sued by IBM. I'm sure GM would not sue me if I wanted to make an automobile. This fear that large corporations ride roughshod over small companies is essentially nonsense.

Nevertheless I would like to see the power of large corporations curtailed. I agree with Admiral Rickover when he says that our conglomerates are an evil. I think they are. This is not the subject

of today's discussion, but I think our conglomerates and our multinational conglomerates destroy American technology and ultimately I suspect they will destroy the capitalistic system as a whole, but that's another subject.

When we talk about patents, we talk about a very small part of the power of the conglomerate and it has nothing to do with the fact whether the Government gives them licenses or not.

There's some question about what government should do about patents granted to government employees. I think the Government should reward them and I sincerely hope that when the Government gives an award to an inventor, which occasionally it does, it doesn't tax the money. I know a case of a government employee who received an award of $50,000 for one of his inventions, and the taxes on it took more than half of it back. I think there's something somehow chintzy about the Government rewarding you with one hand and taking back most of it with another.

Mr. Whipple, who invented the jet engine in England did receive an award from the British Crown or from Parliament. I believe it was L750,000, the British apparently have a way of doing this which is much more elegant than that of our Government when it gives an award.

I'd like to make a few specific comments about the written testimony of Admiral Rickover and I'm really sorry that he's not here. I would have loved to hear his comments about what I have said.

First of all, there are some elements of fact. For example, he says, "From what I have seen over many years, the majority of patents are of little or no significance." There's been a study made of how many U.S. patents are used during the patent life. It may surprise you to know that more than 50 percent of all patents issued are used in industry before they expire. People seem to think it's 2 or 3 percent—this is not true. You must realize that these so-called minor patents which Admiral Rickover speaks of, are minor only to him. They are not minor to the industry that develops them. To a man who makes nuts and bolts, the shape of the thread is important. So when you and I may look at inventions that seem trivial, they are not trivial to the industry. He also talks about patent policies reducing attractiveness of government contracts and he says he doesn't think so. I think in nuclear energy he's right. Government will build nuclear submarines and need not worry about patents. That's not the kind of problem we have when you want to build a computer or post office equipment. I might tell you my experience with the Post Office.

I was the contractor who developed letter sorting machinery. The machinery was based on an invention of mine and of one of my engineers. There are now 400 of these machines sorting mail in the United States. The Government kept all the necessary rights. The result is that there was no incentive to me to improve the machinery. The machinery was developed by my staff but it was built in production by Burroughs and I spent no money to develop the machines further. If I had had the rights, even the Post Office rights, the Government might have made me richer, but I would have developed subsequent machinery which was obviously needed because the machinery is badly out of date. Burroughs has no

rights. I have no rights. The Government has all the rights, and therefore the machine is the same machine that was built in 1956. It should be replaced by much more advanced equipment.

Admiral Rickover says that if patents were free, then any citizen would pick them up. He doesn't seem to realize that "any citizen" will most likely be a large corporation. It will pick up a worthwhile idea before anybody else and certainly will run with it, leaving the individual and the small company far behind.

I'd like to close with two things. First, I'd like to read his paragraph which says:

> In my opinion, the proposed bill would impede, not enhance, the development and dissemination of technology; would hurt small business; would inhibit competition; would promote greater concentration of economic power in the hands of large corporations; and would be costly to the taxpayer.

I think all of these statements are incorrect. I once talked to the vice president for patents of one of the largest corporations in the world and he said to me:

> Patents are an unmitigated nuisance. If there were no patent systems in the world we would save a great deal of money in direct patenting and in the cost of litigation. We would not do as much R. & D. because we wouldn't have to defend our future with patents on things which may be necessary and may not be necessary in the future. We would build whatever we like.

The power of our large corporations depends on their marketing, their production capacity, their advertising, their service all over the world, this is why the vice president said, "Patents to us are just a nuisance." This was echoed, by the way, by the chief patent attorney of one of our largest automobile companies, and by many others.

So when Admiral Rickover speaks that, "If the patents were available to everybody it would help small business," he's talking nonsense. If patents were not granted and were not given to small businessmen who invent something, companies like my own would not exist. The large corporations would wait calmly until we made a product and proved its commercial viability and then would take the business away from me, and the only thing that permits small business to exist in high technology industries is the fact they had strong patents. If the patents were weak or made free to everybody, they are just pretty paper. I think people who believe naively that if you make everything free, everybody will use it don't know what they're talking about.

I invented an automobile clock that couldn't be sold for 9 years, even though the royalties finally were 1½ cents on a $5 clock. The reason was the industry simply didn't want to bother, and I can tell you of many such experiences. People do not adopt things which are free, and they do not take things even when you give it to them. So to hope that if everything is free and easy everybody will do the right thing, is childish and I'm sorry to see a man of Admiral Rickover's importance believing this.

I think that's all I'd like to say.

Senator STEVENSON. Thank you, sir. Your full statement has been entered in the record.

Senator STEVENSON. Senator Schmitt.

Senator SCHMITT. Thank you, Mr. Chairman.

Mr. Rabinow, thank you for your testimony and comments.

It has been generally the Government's policy to grant upon request nonexclusive royalty-free licenses to all inventions for which it holds title. The policy of granting nonexclusive licenses is based on the belief that inventions generated with tax dollars should be made freely available so as to benefit all taxpayers. In your opinion, what effect has this policy had on the commercial development of Government-owned inventions? You commented in general on that. Can you be additionally specific?

Mr. RABINOW. Yes; I think it just kills the patent because if you make it free to everybody you don't have to bother about giving licenses. The Government simply sits back and does nothing. To give a license to anybody who writes a letter is just as easy as not answering the letter. The man knows he has a free license and he knows you won't sue him. So the question is, if the technology developed by anybody is made free to everybody, will people use it? The fact that Government spent money on it is incidental. The Government spends money on many other things it does for society. The answer is, it doesn't work. If the argument is correct that making Government patents free improves their use, then why have any patent system at all? This argument should also hold for private patents and the inventor should be rewarded in some other way.

What I'm saying is if the proposition is that making Government patents, the 28,000, free to everybody will promote their use, then why not do that to all the other 60,000 a year, free to everybody? That should also promote their use and all you have to do is reward the company or inventor in some other way, by a grant, by Nobel Prizes or small prizes or whatever you like. The fact is that no one in their right mind suggests this. They say that making private patents free to everybody is counterproductive, but somehow they feel a Government patent is different. The patent is the same, whether the Government produced it, or paid for it, or I paid for it. So if making it free improves its use, then all patents should be used freely by everybody and the patent system should be abolished and we should reward inventors by some kind of grant system. No one proposes this in the United States or anywhere else in the world, not even in Russia. So I think the argument is false.

To answer you specifically, the Government should grant exclusive licenses unless it's absolutely necessary not to do so and there are a few special reasons. Preferably the grant should go to the inventor or to the company that produced it. It is supposed to be good for 17 years but in practice it's much less. There are other controls that you can exercise over monopoly powers, abuse of Government privileges, and abuse of society these controls should be applicable to all patents, not only Government patents.

Senator SCHMITT. Mr. Rabinow, do you see any distinction between exclusive license and title?

Mr. RABINOW. No, sir. In practice, it doesn't make much difference. As a private inventor, I prefer to give exclusive licenses because if the corporation goes bankrupt I can get the patent back. Once you give title and sell it as an outright purchase, usually you cannot get it back. But these are very minor differences. In practice, it's the same thing.

Senator SCHMITT. Take the Government situation now of exclusive license versus title. Do you see any distinction there between your own private inclinations and those of the Government?

Mr. RABINOW. It doesn't make much difference. I think the redtape is different. By the way, one of the things you have to worry about, gentlemen, is that if you start collecting royalties by giving exclusive licenses for a short period and recapturing because something happened, you will have to have a tremendous bureaucracy checking the books, checking the production and so on. When I give a license—and it's happened several times—I have been lucky—I do not check the books of the corporation. I assume that when they tell me they sold x number of units that they are telling the truth. I don't think a Government official could assume that. He would have to check the books. He would have to go in, or somebody would have to go in, and check the books of the corporation and make sure the royalties are paid and so on. I think this would be counterproductive and a waste of time.

I would rather see the Government give the company that invented it the rights so that it's your patent and we have no further interest in it.

Senator SCHMITT. So there is an important distinction between exclusive license with a royalty or a recapture and title?

Mr. RABINOW. Yes, sir. The mechanics are quite different. If you have recapture rights, then you certainly would end up with arguments and I see no need for this because in 17 years the patent dies anyway. Also, if you recapture the patent, the chance of another company using it is very small. Once the patent does not do well in one person's hands, nobody wants it. I have had a company turn back a patent to me and I found nobody else wanted it because business people copy each other and if it's failed in one place nobody else will touch it.

Senator SCHMITT. Now if the exclusive license were granted in a field of use—that is, some limitation of the license—implying that the Government then would find other fields of use where it would also grant exclusive license, would that be a workable procedure?

Mr. RABINOW. That could be done. The Department of Justice generally doesn't like this, at least for private patents—in their view, they feel it's extending monopoly right. My own feeling is it should be done when advisable. I would rather let the industry do that if you let them have the title. One thing about giving patents out and licensing people, you have to know the business very well. You have to be an expert in that. It's like a piece of property. You have to know not only what this lot is worth, but what are the neighbors doing, which way is the neighborhood going, what's going to happen 10 years down the line. This is true of patents.

So when you give licenses out you have to know a great deal more than just the patent itself. You have to know what is the strength of other patents, what is the prior art, which way is the industry going, is this likely to develop or die. This is a messy business. It's a very involved thing.

Senator SCHMITT. In order to define and administer a field of use exclusive licensing policy it would be a further addition to the bureaucratic problem?

Mr. RABINOW. Yes; particularly a license that's limited by field of use, or time, or something is a very involved business and to ask the Government official in the Department of Commerce to know the fields of use of 28,000 different patents and perhaps 2,000 or 3,000 different fields of technology is asking for a lot. It will cost the Government a great deal of money and while I'm a Government bureaucrat and feel that we do a good job at the Bureau in many ways, I feel that to ask the Government to evaluate patents to decide who should get it and who should not get it and so on is a very difficult job and I don't think it's worth it. I think the country would be better served if the inventor or his company got it and the Government just washed its hands of it. There may be some abuses, but there are abuses in all fields, and I don't think the abuses in this would be any greater than the abuses of the patent system, in general, and I'm convinced it works very well, in general.

Senator SCHMITT. As you know, it's been argued by some that acquisition of patents by big business is anticompetitive and leads to greater concentration of economic power in large corporations and we appreciate your earlier comments on that subject. Do you think the march-in rights of S. 1215 is an aid to protect the so-called public interest?

Mr. RABINOW. I don't believe in march-in rights. I think this is such a can of worms that I hope the Government does not do it. March-in rights mean you have a right to go in and not only demand certain rights for the immediate development for which you paid but you have a right for development which the company did long before it was involved with the Government. I don't think this is fair and I don't think any good corporation that has valuable patents would permit march-in rights. How do you decide which patents you're going to march in on and so on? I think the redtape is just unjustified. I don't really understand the ethics of this. A company says, "Build me a building but you have patent rights on some structures and you're going to use them in my building, but I want march-in rights so I can give contracts to somebody else and cross-license them." I don't understand the mechanics of that at all.

Senator SCHMITT. If the march-in rights were limited to the situations where the use of the invention was not exercised in a number of years, would that be acceptable in your view?

Mr. RABINOW. Let's look at what you're saying. I have a patent to make clutches. I make 10 clutches a year just to keep the patent. You come in and say you didn't exercise it. I sold 10 or 50 or 100 and then you say that's not enough. Then the argument develops about what is utilization of the patent. I say a sale of 10 clutches is utilization or you say, no, you should sell many more and you get into these crazy arguments of utilization, and I say this is just not justified. I certainly wouldn't dream of giving such a license unless the number is very large and unless we define it specifically. But look how much knowledge I have to have in the business to tell a clock manufacturer that he must make a million clocks or I would not consider it proper utilization of my patent. I wouldn't dream of pulling that kind of argument with a manufacturer. Either you give him a license and get the heck out of it or you don't give him

a license. All the other hangover clauses, like if he doesn't do enough in 5 years you can force him to abandon the patent and he says 5 years wasn't enough, so you take him to court and you end up with a tremendous administrative problem which is not justified at all.

Senator SCHMITT. As I understand it, some agencies that have a waiver authority such as NASA also have a march-in right.

Mr. RABINOW. Yes, sir.

Senator SCHMITT. It's also my understanding that march-in rights have never been exercised. Do you think it's because they realize the difficulty of exercising it?

Mr. RABINOW. The difficulty is tremendous. You're dealing usually with a group of patents, not one. You're dealing with portfolio of patents when you have an important patent and I don't know how you exercise this. This is like the mandatory licensing laws of Germany. Germany has a law on the books and has had it for many, many years that if another company wants a license and a patent he can go to court and demand the license be sublicensed to him. It's never been exercised in Germany, not in the whole history of Germany has that ever gone to court. They have such laws in Israel. They have never been exercised. There's this business of secondary rights, not of the basic patent or basic license, but some fringe rights which are very difficult to enforce even between industry, and I don't think the Government should get involved in litigation on march-in rights and I don't think they are ever exercised and I don't think they ever will be. I think if the case is strong enough that you want some of the patent rights, I think deals can be made for the secondary rights without having to have lawsuits. In other words, if you build a nuclear submarine and—by the way, Admiral Rickover doesn't seem to realize that the Government can always—he mentioned at the end of his testimony that to insure that the Government is not subsequently barred from using an idea of somebody else's patent—this is nonsense. You cannot bar the Government from using my patent. The Government has an absolute right to use any patent in the United States and I can only sue for reasonable royalties. In most countries of the world—England, for example, you do not have a patent against the government. In the United States you do not have a patent against the Government. The Government is always free to use any patent, private or public, by just using it, and all the inventor or the company can do is demand a reasonable royalty and get it settled in court, but he cannot bar the Government. Where Admiral Rickover gets the idea that you can bar Government from using a patent, I don't know. It's simply not so.

Senator SCHMITT. Mr. Chairman, I have a few more questions, but I would yield.

Senator STEVENSON. Go ahead.

Senator SCHMITT. Mr. Rabinow, let me ask if you think that an organization within the Government could effectively market, if you will, the 28,000 or so patents presently under Government jurisdiction?

Mr. RABINOW. It's been trying. The NTIS, that's the group that now tries to sell patent rights. It's very difficult as I can tell you from my own experience in trying to sell patents. I'm now trying to

market, for example, a pick-proof lock and some other patents. Marketing a patent is a very difficult thing. You have to convince a manufacturer to start a new line. He doesn't want to change the line. You come to him with a new venetian blind and he says, "I make $16 million in blinds a year, why should I make your design? It's clever but I don't want to bother." I went to the president of the Hamilton Watch Co. with an invention many, many years ago and he said, "It's brilliant. It's very clever. It will improve the watch, but we don't want to bother." So selling a patent is not just coming in with a patent and saying here's an idea. They'll say, "Why should I buy it? I make a lot of stuff now." You say, "You'll make another $100,000." When you go to a company who has sales of $4 or $5 billion a year and say you have a new gadget that will really make $1 million a year—"$1 million out of $4 billion, doesn't interest me." So selling patents is a very personal business. It's not done on a business basis. It's done by throwing stardust in the buyer's eye. You have to convince the manufacturer that he is a leader. Money doesn't interest him as much as prestige. You have to convince him that he's going to be able to brag to the people with whom he plays golf that he's just got something new and different. You have to make him feel like a leader in the industry. You have to build his ego that the patent is a new toy. You don't sell patents strictly on $1 basis. You don't sell anything else on $1 basis. You have to appeal to his ego. If you just make Government patents free or simply say here's a patent, buy it; it won't sell. It wouldn't even sell if the inventor comes in and is all excited and he knows the business backwards and forwards and even if the prospective customer tells him how brilliant it is.

Senator SCHMITT. What about the National Research Development Corp. in England? Has it been effective?

Mr. RABINOW. Yes. As a matter of fact, it supported the British computer industry. It takes stock in corporations. It promotes patents, but it also spends money. It isn't just a selling agency that just supports development of inventions. In other words, it's a working corporation and it does succeed and it has done quite well. There's some real question whether it's a good thing for the United States to set up a thing that really produces inventions in the sense of a research lab. We do this only for the needs of the Government. Agriculture laboratories do it for agriculture; military laboratories for the military, and the Bureau of Standards does it for Standards and Commerce. I don't believe Government should, as a matter of policy, set up development laboratories, but I think the Government should as a matter of policy support small business with risk capital, which is not happening in the United States, and this is not the subject we were supposed to discuss today. Unless we support small business, the big businesses will undoubtedly become stronger; they will probably get stronger anyway, but unless we support small businesses to keep the big boys honest, the big boys will do less innovating and the management will get more conservative, more of the bookkeeping types, more business types who don't really care about inventions, and I think in this respect Admiral Rickover is correct. If you want to promote inventions in the United States you have to support small business. Don't worry about who gets the patents. Small business will get their share. But

small business simply cannot raise money. At 15 percent prime rate, I couldn't hope to raise money for an invention. Why should anybody with money support a risky thing when he can get 15 percent without risk?

Senator SCHMITT. Well, that kind of support can come in two different directions, either through reform of tax laws and regulatory law, or through direct support, the former being preferable.

Mr. RABINOW. Tax laws will not help. One of the curious things, when I get patents, is that the last thing I worry about is taxes. I have good tax attorneys and my attorneys can always help me later when I make money. But when I invent something, that's the last thing I worry about. You worry first about the technology and then if the technology and the patent looks good, you worry about whether you should make it yourself or sell it to somebody.

Senator SCHMITT. It's been our understanding that just the change in the capital gains tax law last year has increased the venture capital for small business.

Mr. RABINOW. That's right, because the very rich man paying 25 percent in taxes is different from paying 50 percent in taxes. Today you have the terrible problem that you can get Government bonds that pay you 12 percent and you can get very good bonds at 16 percent or 15 percent. You can get real estate that pays you 30 percent. That's the real trouble.

Senator SCHMITT. So you're saying we have negated the results?

Mr. RABINOW. That's right. When I went to Wall Street the second time—I received money from them very easily in the 1950's. When I came to them in the late 1960's they said that investment in inventions doesn't pay anymore. We're not interested. The same people who gave money to me the first time. I think today's interest rates are essentially killing the possibility of raising money for small business and unless small business can get 2- or 3-percent money it will simply not be able to exist and this is going to kill American innovation. The number of patents to small businesses is dropping, the number to the individuals is falling very rapidly. Our competitors in other countries are doing much better and I think that unless risk capital is available from the Government or from industry at reasonable terms, small businesses will not start. The number of starts now has essentially gone to zero. In the old days there would be three or four companies started each day. Today it's one or two per year. It fell gradually and the National Science Foundation reports that by 1974 or 1975 the number of starts went to zero and this is tragic because it's the small companies that do the great innovations, not the big ones.

The stories that the laboratories of large corporations produce great innovations is simply not true. Computer, atomic energy, laser, guided missile work, all of these things did not come from the large laboratories. Xerox did not come from large laboratories. The exception is the transistor which did come from a laboratory, Bell Labs, and RCA did produce television as we know it today because David Sarnoff liked it. Today's management will not do that sort of thing.

Senator SCHMITT. Should Federal policy distinguish between large and small businesses?

Mr. RABINOW. Yes, it should.

Senator SCHMITT. In patent policy?

Mr. RABINOW. Yes, it should distinguish in patent policy. I think it's time to codify the thing that's happened with the antitrust law decisions for many years. I think it's silly to talk about patents to me and to IBM in the same way. I think one could very well propose that any corporation that does half the business of an industry and whose sales exceed $1½ billion, whatever number you like, should not get exclusive patents. They don't now, in fact. They do license others because of the antitrust agreements and my feeling is it should be made a law not be a case of court decisions.

Senator SCHMITT. So in that case you would disagree with S. 1215?

Mr. RABINOW. Yes, I would disagree. If you give a contract to a company like General Motors, I think in practice they would license anybody else but I would make that specific. The Government would give a nonexclusive license. But this is only true for very large corporations, those that have, say, half the industry or a quarter of the industry, and there are very few of those.

Senator SCHMITT. So you wouldn't use the traditional distinction of small business?

Mr. RABINOW. No, sir. You mean the Small Business Administration legal decision? I think that is a very curious—for instance, American Motors is considered small business by them because legally it is in that industry. I have no objection if you have to use that because it's a readymade formula that's available, but the philosophy should be that the large corporations really don't need exclusive licenses. Their power depends on other things. But small companies must get exclusive licenses; otherwise they can't exist. You can't start a small company today in technology unless you have a patent. I would not have been able to start a phonograph company unless I had patents. It would be unthinkable to do so.

Senator SCHMITT. Thank you, Mr. Chairman.

Senator STEVENSON. Thank you, sir. We appreciate it.

Our next witness is Dale W. Church, Deputy Under Secretary of Defense for Acquisition Policy, and he is accompanied by Walter Henderson, staff assistant, Office of the Deputy Under Secretary. I will invite all of our witnesses today to summarize their statements. The full statements will be entered in the record.

STATEMENT OF DALE W. CHURCH, DEPUTY UNDER SECRETARY OF DEFENSE FOR ACQUISITION POLICY, DEPARTMENT OF DEFENSE; ACCOMPANIED BY WALTER HENDERSON, STAFF ASSISTANT, OFFICE OF THE DEPUTY UNDER SECRETARY

Mr. CHURCH. Good morning, Mr. Chairman. I will summarize the statement, although I have presented a full statement for the record to be entered in the record.

Senator STEVENSON. It will be entered in the record.

Mr. CHURCH. Over the years the patent policy of the Department of Defense has been driven by the mainspring of incentive. Our policy, we believe, should maximize the incentive to both the large and small companies to seek out and compete for defense contracts. We want to bring forth the best privately developed background, their most promising ideas, the most talented people, and to report

freely and readily the full results of their work without fear of losing commercial rights. If we can accomplish this and still retain our ability to utilize freely the technology that we have sponsored, then we have acquired what we bargained for and the public interest has been served.

Prior to 1963, we had rather a straight forward policy that said we left title to the contract inventions in the contractor, reserving a royalty-free license in the Government. With the advent of President Kennedy's policy in 1963 we modified the earlier policy somewhat. It recognized a single presumption of ownership was not appropriate in all situations in which the Government contracts were R. & D. So by virtue of that policy change wherein 99 percent of such contracts had title going to the contractor, it was reversed to about 25 to 30 percent. That is, after the advent of the 1963 policy, the split became about 3 to 1 or 4 to 1, depending on the particular year, wherein the majority share still left title with the contractor. The smaller percentage is where the Government retained the title giving a royalty-free license back to the contractor.

In the statement you will see some statistics of how those changed and how those oscillated through the years for which we have records. At the present time we only have records for 1976. We are now compiling records for 1977 and 1978. We have found this to be a most workable policy for the DOD and we would support any kind of legislation which in fact codified this kind of policy.

We think it does serve the interest of providing incentive to our contractors. It fulfills our objectives and still protects our interest to be able to use the intellectual properties developed in this manner for whatever purpose we need.

That's a quick capsule summary of my statement. I will be prepared to answer any questions.

Senator STEVENSON. Thank you, sir.

Have you reviewed S. 1215 and, if so, does it codify the DOD policy?

Mr. CHURCH. Yes, it generally does. We might have a few minor editorial corrections, for example, involving classified information. We believe there is an adequate procedure for handling classified information. We have managed under this system for some years.

I think the committee staff is better aware now of how classified matters are handled than when the bill was offered and I think we would like some change in this area.

But in general, I believe we can endorse the bill.

Senator SCHMITT. Have you provided the specific suggestions to the staff?

Mr. CHURCH. We are now reviewing the bill for the official position of the DOD to be coordinated through the administration. That review is not yet complete.

Senator STEVENSON. In the DOD policy do you distinguish between large and small corporations to determine whether there should be exclusive licenses or nonexclusive licenses as Mr. Rabinow suggested?

Mr. CHURCH. No, we do not differentiate between large and small with respect to patent policy. We find often the lines between small and large are very arbitrarily drawn and I don't know for the

purpose of patent policies how you would effectively differentiate between the two. The Small Business criteria of the Small Business Administration are again set by the number of employees, so if you have more employees you suddenly become a large business. To me, that doesn't relate at all to the incentive or the protection of the rights of business.

Senator STEVENSON. Has the Department exercised march-in rights?

Mr. CHURCH. Only once can I recall there was a case where we exercised march-in rights. It was a case involving two patents held by MIT. There was a complainant who felt as though the patents were not being utilized. As to one of the patents, it was found that MIT was using it and was allowed to retain exclusive title. In the case of the other, we found that MIT was not effectively using it, and they did provide for the complainant to use the patent.

Senator STEVENSON. Are you aware of complaints against contractors for their refusal to license or their monopolization of patents to which they hold title?

Mr. CHURCH. I am aware of no specific complaints. None have been addressed to our office and I have not heard rumors of any either.

Senator STEVENSON. Mr. Rabinow said that all patents are available to the Government for a reasonable royalty with or without expressed licenses. If that's so, why do we need to worry about march-in rights or about licenses back to the Government if patents deriving from Government-financed work and all other patents are subject to such a right in the Government? Isn't that enough to protect the Government's interest?

Mr. CHURCH. The power you speak of that Mr. Rabinow referenced is in fact a statute, 28 U.S.C. 1498, which flows from the doctrine of eminent domain. This allows the Government in fact to go in and take for its own use any patent and then follow the Court of Claims proceedings to decide what is the appropriate compensation if the Government and the aggrieved contractor cannot agree on equitable compensation.

The difference between the above provision and march-in rights is that the former is strictly for Government use. In the march-in rights situation there might be some lack of adequate and aggressive pursuit of exploitation of the patent. This might be a little more subtle than simply the march-in for the specific use of the Government as is now codified under the statute I just mentioned. So I think we need a march-in provision and I think it would be administratively a little more simple if in fact it was included in the bill.

The only suggestion I would have is that there should be a complaint by someone who has a legitimate cause to do a march-in. It shouldn't be just an arbitrary march-in unless there was a complainant who felt aggrieved by the process as there was in MIT.

Senator STEVENSON. Senator Schmitt.

Senator SCHMITT. Following up on the chairman's question, in spite of the fact that DOD has only exercised march-in rights on one occasion to your knowledge, you still think it's an important incentive to have built into a Federal patent policy?

Mr. CHURCH. I think it hangs in the back of the contractor's mind perhaps that such a procedure could be utilized in certain cases and it might provide a kind of incentive, although we would want to use it very judiciously. The reservation provided in the statute is also a useful one.

Senator SCHMITT. S. 1215 specifies criteria under which the Government would take title to any inventions developed under a Federal contract. Have you studied those criteria and how do they compare with current DOD policy?

Mr. CHURCH. They are very much in line with DOD practice and we find them totally acceptable; again, with the exception of the classified one which I mentioned earlier, and I think we have already had some discussions with the staff and it will be corrected.

Senator SCHMITT. In your opinion, would it ultimately benefit the public interest to change the DOD policy to title in Government approach?

Mr. CHURCH. We believe it would be adverse to the Government's interest, as I commented earlier, on the incentives aspects for the Government to take title in all cases. We think the present policy of splitting it in certain circumstances as prescribed in the bill to take title is adequate to protect the interest when the Government needs to take title, but otherwise the incentive should lay with the contractor in taking title.

Senator SCHMITT. So you basically are saying there would be an adverse impact on contractor participation in DOD contracting activity if the policy was changed to a title in Government policy?

Mr. CHURCH. That may be a little strong to say there would be an adverse impact in participation. I think the adverse impact would come in the quality of the staff and the resources that the contractor would apply in this situation. We may not have fewer contractors bidding for Government work but they may devote resources which would otherwise be devoted to Government work to commercial work and thus we would lose an opportunity to get their very best staff and very best facilities and assets. So I think it's more subtle than just saying they won't accept contracts. I think we won't get the very best effort put forward in our particular contracts.

Senator SCHMITT. So you would basically agree with Mr. Rabinow's discussion earlier that the contractors would tend when it's title in Government to apply different resources to the Government, different quality of resources to the Government side of their business versus the commercial side?

Mr. CHURCH. That would be clearly a concern, although as I say, I don't think we'd see any real diminution of the contractors bidding on the contract.

Senator SCHMITT. Now when I was directing NASA's energy research and development programs, we did run into a problem with the Department of Interior, which has basically a title in Government policy including some background right, when we were trying to negotiate an interagency agreement with them on underground coal mining. We discussed this with a number of major contractors, some of whom did DOD business, and they indicated that they would be very reluctant to bid on contracts administered under the Department of Interior provisions.

Mr. CHURCH. Clearly, if you bring in background rights, I think you would have a serious problem.

Senator SCHMITT. Do you collect statistics on the success of transfer of inventions developed under Government contract to commercial use?

Mr. CHURCH. There have been some studies but to my knowledge there's no data that specifically gives you any percentages as to that kind of exploitation.

Senator SCHMITT. What's your gut feeling? You obviously have been in the business for a while. Do you have any personal information on the transfer of these technologies into the private sector?

Mr. CHURCH. I have found when I was in industry examining these, the cost of prosecuting a patent was so high you certainly make an affirmative decision that you're going to utilize a patent before you invest those kind of resources. So most contractors who do go through the cost of obtaining a patent from the Patent Office certainly, at least at the time they pursue that course, have the intention of exploiting it and usually do.

Senator SCHMITT. I realize percentages can be misleading, but NASA has conducted a study of the relative success rate of the commercial use of patents, those to which NASA has title versus those to which they have waived title. For those that they have waived title I believe the figure is 20 percent that have been commercialized in some way, whereas overall only 2 percent of NASA patents have been commercialized. Do you have a gut feeling that that may be comparable to DOD's experience?

Mr. CHURCH. I really have no data and a gut feeling— I can only base it on as I say, if a private individual goes out and spends the money to develop a patent, he certainly intends to use it. And so if the contractors do proceed, which they would in the case of a title in contractor-patent situation, I would say there would be a much higher utilization than if the Government went out to simply do it for the Government's interest.

Senator SCHMITT. Are you aware of any instances where the implementation of a DOD policy has had an adverse anticompetitive effect within the industry?

Mr. CHURCH. None.

Senator SCHMITT. It's been suggested that a legitimate distinction can be made to applying a different patent policy approach, depending on the end use of the technology receiving Government support. For example, it was argued that where the end use is for the Government, as is typically the case with DOD activities, the patent should be given to the contractor; whereas if the subject of the contract is for general public use, the Government should have the option of obtaining the title. What would be your view of this policy distinction?

Mr. CHURCH. I think that would be an even more difficult situation to administer than small versus large business. Defining end use—I don't know how you do that. As you well know, Senator, in the process of high-technology businesses the many multitude of uses to which it can be put are so diverse—particularly in the space field where you saw them. We've got them anywhere now from frying pans to so on and so forth. So it really is a very diverse

sort of thing even within the context of the Government and the uses we may decide in DOD to apply throughout. So I don't know how you adequately define that and there would likely be a tendency to create a bureaucracy to try to define it, which would rival the Small Business Administration's attempt to differentiate large and small businesses.

Senator SCHMITT. So you're saying that at the time of the development of materials, such as the insulation on the holddown arms of the Saturn V, it would be difficult to have anticipated that it might be used to rebuild human bone structures?

Mr. CHURCH. That's right.

Senator SCHMITT. Thank you, Mr. Chairman.

Senator STEVENSON. Thank you very much.

Senator SCHMITT. Mr. Chairman, I have one more question, just to make sure that the record is clear. You would then say that it would be very difficult to determine a bounded use, exclusive license policy that is?

Mr. CHURCH. Difficult, if not impossible.

Senator SCHMITT. Certainly difficult. You could define it, but you might not be able to administer it?

Mr. CHURCH. That's right.

Senator SCHMITT. Thank you.

Senator STEVENSON. Thank you, gentlemen. Your testimony is very helpful.

[The statement follows:]

STATEMENT OF DALE W. CHURCH, DEPUTY UNDER SECRETARY OF DEFENSE (ACQUISITION POLICY), DEPARTMENT OF DEFENSE

Mr. Chairman and members of the committee, it is a pleasure to present to you today the views of the Department of Defense concerning government policies for acquiring patent rights under research and development contracts.

Over the years, the patent policy of the Department of Defense has been driven by the mainspring of incentive. The patent system was established to encourage invention, disclosure, and exploitation of new ideas. It is a fundamental part of the economic framework within which American industry thrives. In contracting for R&D, the Department of Defense has sought to take advantage of the incentives implicit in this system. Our policy, we feel, should maximize the incentive to both large and small companies to seek out and compete for Defense work, to bring forth their best privately developed background, their most promising ideas, their most talented people, and to report freely and readily the full results of their work, without fear of losing commercial rights. If we can do this and still retain our ability to utilize freely the technology that our contracts have sponsored, then we have acquired what we bargained for, and the public interest has been best served.

In the years prior to 1963, the Department of Defense pursued a general policy of leaving title to contract inventions in the contractor, reserving a royalty-free license in the Government. In this way, DOD sought to preserve the Government's interest in inventions arising under Defense contracts, while providing an incentive for the contractor to seek commercial applications of these inventions, and their wider availability to the public.

We hasten to say that the Department of Defense has always recognized that a general policy of seeking only a license to use its contractors' inventions is not necessarily the only appropriate policy for the entire Government. Other agencies have different missions and roles to play in the national economy, and these different missions and roles may require a different patent policy. Early legislative mandates on the Atomic Energy Commission and the National Aeronautics and Space Administration are illustrative of special patent policy following the perception at that time of special public interest in the missions of such agencies:

A monumental step toward resolving the many disparate factors in the patent policy equation was the issuance, on October 10, 1963, of the Presidential Memorandum and Statement of Government Patent Policy. The President's Patent Policy recognized that a single presumption of ownership was not appropriate to all

situations in which the Government contracts for R&D. The basic objectives of the President's Policy recognize that inventions arising from Federally financed research and development are an important and valuable national resource; that these inventions should be developed, and used, and thus contribute to the growth of the civilian economy.

The 1963 President's Policy, amended somewhat in 1971, was immediately adopted by the Department of Defense, and has remained in effect since. The Policy itself in incorporated practically verbatim in the Defense Acquisition Regulation (DAR), which goes on to implement that policy by prescribing clauses for use in contracts. An appropriate clause is prescribed when the purpose and circumstances of the contract fall within one of three categories:

The first, or so-called "title" category, calls for the Government to retain the principle or exclusive rights to inventions made in the course of or under the contract.

In the second, usually referred to as the "license" category, the contractor normally retains the principal or exclusive rights, subject to a nonexclusive paid-up license in the Government.

The third category is a "deferred" approach, in which the allocation of rights is decided on a case-by-base basis after each invention is identified, and under guidelines set forth in the policy.

With regard to the last category, the Government, under our clause in this situation, takes title to all contract inventions pending disposition otherwise as to any particular case. In effect, then, the deferred approach is tantamount to a title approach.

The criteria for use of a title clause were mainly drawn to cover R&D for which the public is to be the user. Contracts in this category have as their purpose, for example, the creation of products or processes intended for commercial use by the general public; or for public health, safety, or welfare; or in fields where the Government has been the principal developer, and we seek to insure access to and use of it by the public. While Government research does at times fall into this category, it is not the general rule in the case of DoD.

Defense R&D is, of course, most often aimed at producing military systems and equipment for use by the Armed Services. The public is not the principal intended user of military technology, and so would not be likely to benefit by Government ownership of an invention emanating from it. Moreover, whereas the military application of such an invention is manifest, coming as it does from a military project, its commercial application, if it has any, is less obvious, especially to the military agency. The Department of Defense has no expertise in the commercial marketing of inventions. Indeed, if any one is likely to recognize commercial potential of an invention, and thus to move it into the economy, it is the contractor.

Thus, the majority of our R&D contracts utilize a license clause, leaving the principal rights to the contractor with a paid-up license in the Government.

Beyond the benefits of this approach to the Government and to the public which we have already described, there is a dividend which often goes unnoticed. The DoD has a very limited capability of prosecuting patent applications. And yet we have a need, and indeed a duty, to assure that we can move freely through technology which we have sponsored out of the public treasury. We accomplish this beyond the Government's capability through the instrumentality of our contractors. Motivated by the commercial potential, contractors file a number of patent applications on inventions made under our R&D contracts which otherwise would go unprotected; and the Government receives a paid-up license to those applications and the patents which issue on them. By way of illustration, in FY 1976, the last year for which statistics have been published, the DoD was able to file 1,523 patent applications on its inventions made both in-house and under contract. But we received licenses to an additional 739 patent applications filed by our contractors. These additional inventions represent technology over which, due to the limitations on our capability, third parties could have secured patent protection, to the exclusion of the Government.

However, our experience with the license clause is far from the complete picture. It is perhaps well to emphasize at this point that there is a common misconception that DoD is entirely, or almost entirely, dedicated to the use of the license clause. This simply is not supported by the facts. When the criteria for the title clause applies, we use it. Likewise, if the criteria for the license clause does not apply, we use the deferred clause, which, as we have said, is tantamount to a title approach.

It is interesting to note the shift in DoD contract practice which followed the introduction of the President's Policy. Prior to that time, 99 percent of Defense R&D contracts contained the license clause. But the years following the implementation

of the 1963 policy saw a definite swing away from strict use by DoD of the license clause. In the years from 1965 through 1970, the number of R&D contract actions containing either the title or deferred clause varied from 20 to 27 percent—on the average, about one in every four contracts. Again using FY 1976 as an example, the same measurement of contract actions amounted to 34 percent, or about one in every three. In other words, for every two or three DoD contracts in which we leave title in the contractor, there is one in which we retain for the Government either title or the presumption of title.

In summary, we have found the President's Patent Policy to be sound and workable. The amendments which were made in 1971, we believe, strengthened it.

We are aware that several bills have been introduced in Congress recently, and some may be under active consideration in the current session. We would hope that legislation enacted by Congress would capture the best features of the present system. It has served us well for sixteen years. Perhaps the thoughts shared with you today will help in that regard.

Thank you.

Senator STEVENSON. Our next witness is Marshall J. Armstrong, assistant general manager, Energy and Instruments Group, Thermo Electron Corp., Waltham, Mass.

STATEMENT OF MARSHALL J. ARMSTRONG, ASSISTANT GENERAL MANAGER, ENERGY AND INSTRUMENTS GROUP, THERMO ELECTRON CORP., WALTHAM, MASS.; ACCOMPANIED BY JAMES NEAL, CORPORATE COUNSEL

Mr. ARMSTRONG. Good morning. I appreciate the opportunity to be here. I am accompanied by James Neal who is the corporate counsel for Themo Electron Corp. Previous to this position, Mr. Neal was our patent attorney, so he has good experience in this area.

I would like to simply make a few points regarding the bill. We have submitted written testimony.

Senator STEVENSON. Your full statement will be entered in the record.

Mr. ARMSTRONG. Following my making a few points, I'd like to ask Mr. Neal to relate to the committee one or two specific experiences of our company with regard to the patent provisions that we have worked with.

To give you a feel for where we are relative to some of the other witnesses, I think it's accurate in saying we represent a medium-sized company. Our sales are approximately $125 million per year. We are considered a high technology company, though our major source of revenue is the sale of industrial products such as heat treating furnaces and equipment for paper mills. Approximately 10 percent of our company's sales is research and development dollars. Of this 10 percent, roughly $3 million is our own company-sponsored work; $7 million comes from the Federal Government. Of the $7 million, our largest source of R. & D. revenue is the Department of Energy—about $5 million. This is followed by the National Institutes of Health, which is about $1 million; EPA, NASA, and the National Science Foundation, about $300,000 each; and finally the Department of Defense, about $100,000. These are annual revenues.

I feel that the important thing any patent policy must do is recognize the equities of the various parties involved, and I feel that your proposed legislation, S. 1215, deals with this very fairly, and we are in favor of the bill. The best aspect of the bill from my experience is that it reduces uncertainty. My experience has been

that we have spent countless hours of management time—and this includes legal counsel, contracting officers, both on the Government side and on the industrial side—simply haggling and negotiating over present patent provisions in R. & D. contracts. In many instances, all of this in the long run proves to be of very little value since only about 10 percent of R. & D. projects ever result in what you might call a commercial success.

And this figure of mine of 10 percent is not simply to be applied to R. & D. contracts sponsored by the Federal Government or carried out in Government laboratories, but it applies just as well to R. & D. projects that are sponsored by private industry. The success rate is not very great.

So just to summarize that point, the reduction of uncertainty to the parties involved and the saving of time of important people, both on the Government side and the industrial side, are two things that can be greatly improved by passage of S. 1215.

At this time I'd like to ask Mr. Neal to give us perhaps two examples that might better help you to understand what I have just said.

Mr. NEAL. In the beginning, at the time of contracting, and at the time of requesting a waiver, the administrative burden is heavy. Also the results, at best, in our limited experience, have left us in an uncertain situation.

We have had only two occasions in which we have proceeded with a waiver request or a waiver petition far enough to bear any discussion here.

In one case, Thermo Electron was addressing the issue of how can we better use coal as a fuel. It determined that a slow-speed diesel engine manufactured by Sulzer Brothers in Switzerland was a particularly good engine for the use of coal derived fuels and that it might even, with some small adaptation, be capable of burning coal in the powdered form. We wanted to test the fuels in this engine and carry out a development project for whatever adaptations might be necessary if the first stage was successful.

DOE was contacted with regard to funding and all parties involved were interested and the funding negotiations went very well, and there was no snag until we hit patent policy. At this time it developed that Sulzer had been in this business—I think since the turn of the century—and their engine is indeed unique. To our knowledge, nobody else produces an engine exactly like this.

Sulzer has had an aggressive patent policy over the years and they also license extensively. They choose to license others in various parts of the world to manufacture their engine and they also manufacture themselves. They absolutely could not afford, with this kind of long-standing business policy, to vary it for our project.

Even under this circumstance, where you might think it would be a clear case for a waiver, we still found the going was rather difficult. The end result was that Thermo Electron was granted an irrevocable nonexclusive license, that being an upgraded revocable license that we would have had by virtue of the patent policy. It was determined that since Sulzer, in the first stage, was merely going to be testing fuels in an existing engine, it was not actually conducting research and development and therefore the patent

policy did not apply to it at all and the question of a waiver for Sulzer was moot.

The result of the waiver petition, therefore, was to grant the absolute minimum that could be given to secure participation of the contractor. It didn't solve any of the ultimate issues. So far, this program has been of significant interest, and Jack can correct me but I think we could characterize it at this point as successful. If we go on beyond the initial state, we still have to face the question of how to handle patents. We have simply sidestepped the issue because that was necessary to get to the first stage. Down the road we are faced with complete uncertainty as to whether we will be able to continue the research, to say nothing of whether we would ever have meaningful rights under which the results of this research could be commercialized.

Under the existing patent policy, commercialization of Government patent rights is not prohibited. If all parties involved really work at it and are really and truly interested enough and persistent enough, a way can be found. Nevertheless, by no stretch of the imagination, can this be considered an encouragement to commercialization. I don't think it can even be considered neutral. I think it discourages. But if you want to encourage consumer use of the fruits of Government research, the present policy under no circumstances in our experience could be construed as an encouragement.

Focusing again on uncertainty, I would like to address the other waiver, which goes back a few more years than the one I just mentioned. Thermo Electron has over many years conducted Government-funded research and development for a heart-assist device. This is funded by HEW. There have been occasional patents which were assigned to the Government, but there's not been an aggressive patent program in this area because Thermo Electron's view was that the Government owned the patent rights and therefore we had no incentive to file. For reasons of its own, the Government had chosen not to file any patent applications also.

The results of the research had, of course, been published as we went along. At one point HEW determined that it would be good if there was patent protection covering some inventions that were coming out of the program and the result was—well, Thermo Electron indicated it didn't have any interest in filing applications unless it could obtain a waiver. There were some preliminary discussions. In the meantime, HEW filed one patent application and then decided that this would be an appropriate case for a waiver. This was in informal conversation and Thermo Electron filed—I believe the number of applications was five—on a group of inventions that came out during a certain period of time in this work.

Then we started to negotiate the license. We got to the point where the complete agreement was agreed upon, as between Thermo Electron and the contracting officers who were negotiating this matter. It was ready to be presented for signature. This was done, and then there was a delay.

Then after some time we received a call informing us that notice of the agency's decision to grant this license to Thermo Electron was going to be published in the Federal Register with invitations for other people to comment, object, or apply for licenses them-

selves. This was done and, interestingly enough, on the same day there was another person in the same circumstance. The name of this company was American Science and Engineering and they had invented an improvement for CT scanners. CT scanners are X-ray devices which in effect give you a picture of a cross-section of the human body. I believe just recently the people who did the fundamental work, not the people who invented the improvement but the basic work, received the Nobel Prize.

Charles Hieken, an attorney in Waltham, Mass., not far from where we are, called me shortly after that. He represented A.S. & E. and we discussed our common problems. In a nutshell, to look to the end and then come back to where I now am, the status is that Thermo Electron has been informally advised that its waiver request cannot be granted and it's just now shelved on that basis. A.S. & E. problems are now in the courts and neither of us have any benefit flowing from this.

Just to give you an idea of how difficult this can be and how difficulties can come from quarters that you would never expect, I would like to relate some of the understanding I have of the A.S. & E. situation as explained to me by Mr. Hieken. I understand that all of this is on the public record in the court documents.

A.S. & E. had requested a limited exclusive license. I believe the term was for 5 years. They got to the point we did. Just before the Federal Register notice their contract was ready to sign and it was before the Assistant Secretary. After the publications in the Federal Register, there were objections to the grant to both their license and ours. After the objections to the grant of American Science and Engineering they continued their negotiations and the objectors continued to make their views known. Nevertheless, after some, I understand, rather protracted and difficult negotiations, it was determined that the license would be granted to American Science and Engineering. I believe the term was shortened to 3 years. This was done. The license was signed. They were all-go, and they began to focus on their efforts to sell the improved scanner.

Then there was a change in personnel in the agency. I think this happened rather quickly after the license was granted. I'm not sure of the time, but I think it was just a matter of a few months. Anyway, there was a change in personnel and meanwhile, apparently, there was still some discussion of the merits of this case.

An Assistant Secretary who just had come in to office unilaterally revoked the license that had been granted to A.S. & E. and granted nonexclusive licenses to several other parties. A.S. & E. sued and asked for a temporary injunction. It was given. There was an appeal. On appeal, A.S. & E. was told the injunction was not proper and my understanding is that their remedy was to go to the Court of Claims and sue for damages. According to my understanding, that's where the situation now stands.

This is just how uncertain and how dangerous a situation can be. I don't portray this as typical by any means, but certainly this puts you on notice that you proceed at your peril. When the question was asked earlier today, do you favor a license policy or a title policy, I thought of this situation. This would provide a good justification for having a title-in-the-contractor policy rather than a license-in-the-contractor policy because the title could not be unilat-

erally snatched back. The contractor would be in a position to know that he had what he had, and not to feel that he had it perhaps by leave and approval.

These things, Government decisions, are always subject to political pressures, and I don't use that in any derogatory sense. They respond to the input that comes from the public. This is a proper function. But when you're trying to commercialize technology, there comes a time when you have to say the decision has been made and we have to give the contractor a position which he understands and in which he's secure.

Just to recap this situation, two events occurred which didn't have to occur and in my opinion should not have occurred. To my knowledge, there was not and never has been and still is not a requirement that, upon request for a waiver, the decision to grant a license under a waiver should be published in the Federal Register. If an invention has real commercial advantage there will always be people who will object, and I would point out that this product was already on the market. This was not a question of whether or not a product would be marketed, but it was a question of exactly how it would be handled and what incentives would be given for adapting this particular improvement.

The unilateral revocation of the license to me just—I'm at a complete loss to explain that. It seems to me self-evident that that should not have happened.

Mr. ARMSTRONG. I might add with regard to the first example—the slow speed diesel engine—to examine the possibility of ultimately burning pulverized coal. You might say, well, perhaps because there was a European company involved there was some reason to go very slow and cautiously; but that was examined thoroughly and there is no such engine available in the United States by a U.S. manufacturer. We had thoroughly gone through that prior to our contract negotiations.

We would be happy now to discuss or answer any questions.

Senator STEVENSON. Thank you, gentlemen. Senator Schmitt.

Senator SCHMITT. Thank you. I would just say that that's very similar to the experience I had with the Department of Interior on underground coal mining. We eventually found a way to go around it to do very little compared to what could have been done.

Title II of S. 1215 establishes a review entity to monitor agency compliance with the policy given by the act and to assure uniform implementation of its provisions. This review entity would have the authority to determine with administrative finality any dispute between a Federal agency and a contractor. In your view, is this a worthwhile provision?

Mr. NEAL. In my view, it's a worthwhile provision. I think this would be necessary to establish uniformity of agencies' application of the patent policy. It would provide a single place from which appeals could be taken to the courts rather than perhaps having multiple sites from which appeals could be taken.

Senator SCHMITT. You then feel it's consistent with a uniform policy to have a single point of review?

Mr. NEAL. Yes, probably necessary.

Senator SCHMITT. Well, one could leave it up to each agency to interpret the uniform policy in their own way.

Mr. ARMSTRONG. I think if that were the case you might have more of what you hear now. The man on the street saying, "I'd rather work with DOE and EPA because they have better patent provisions."

Senator SCHMITT. Would the decision by the Government agency not to grant a license to your company cause you to consider not to commercialize a product or technology?

Mr. ARMSTRONG. It certainly would cause us to go cautiously because if we do not have a license then we are very open to being bothered by competition. The whole purpose of the patent policies or patent provisions is to protect the individual or the company during the early years of developing and promoting a new product. I feel that if I understood your question correctly, we as a company could not feel that we had that protection.

Senator SCHMITT. Do you have any examples of where you may have proceeded cautiously in such a way?

Mr. NEAL. Well, we were discussing this just a few days ago. Actually, as we look at the new products that Thermo Electron has developed over the past 10 years, we found that the products we have introduced to the market have been products that were funded by private funds and not by Government funds. This is largely because the Government-funded work has been long term, that which we have been involved in has been a long-term effort, and we are just now getting to the point where we face the prospects of introducing products to the market.

So this is now, I think for the first time, really beginning to be something which can bear on market decisions at Thermo Electron.

Senator SCHMITT. Do you see any distinction within your company between an exclusive license and a title?

Mr. ARMSTRONG. Do we see a distinction between those?

Senator SCHMITT. If you did work for the Government and they gave you an exclusive license, would you see any difference between that and a title?

Mr. ARMSTRONG. Certainly title to the patent would be better than an exclusive license.

Senator SCHMITT. Why?

Mr. ARMSTRONG. Well, exclusive license would imply there would be a royalty due—for financial reasons.

Mr. NEAL. There's also, as I pointed out in connection with my discussion of our waiver experiences, a title I think is—ultimately an exclusive license allows you to do, when you have it, the same kind of thing that a title would allow you to do. I think that having title would at least give you a sense of security, in that title would not as quickly—could not as quickly be retracted as an exclusive license could. It would not be subject to the same kinds of actions. So while I think the differences are probably subtle from a contractor's point of view, I think the subtleties weigh in favor of title rather than exclusive license, but the differences are subtle and not basic.

Senator SCHMITT. Do they become less subtle if the field-of-use restriction is added to the restriction?

Mr. NEAL. If the field-of-use restriction is added, particularly if it's added at the beginning so the contractor knows from the beginning what the ground rules are, it can be worked out. I think this

is something that might be difficult to negotiate at the time and it would involve time-consuming effort; but the contractor knows what his areas of interest are and what they are expected to be. If the field of use was broad enough to encompass the contractor's area of interest, once that was established, I think it would probably be workable.

The thing that disturbs me about that is, I wonder how easy it would be to establish a field of use on which the contractor and the agency could agree. I wonder if in a sense you couldn't very easily on that very issue in the negotiation turn the whole process back to where it's roughly the equivalent of the one that now exists in agencies like DOE simply because the agency, on the one hand, would have a tendency to make it as narrow s possible; and the contractor would want it as broad as possible. Who could determine where the proper limits are?

The other question I ask is what would the Government do with that part of the patent rights which it retained lying outside of the license? With respect to those rights, the position would be essentially the same as it is under the current patent policy.

If you look at it from the standpoint of promoting public utilization of the technology and if you accept the proposition that the current patent policy does not have a positive effect in that direction, then I think the net effect of doing that is negative all around, although it's certainly not something with which we couldn't live. I just ask what is the positive benefit in doing it?

Senator SCHMITT. Well, of course, I asked the same question, but the advocates of the field-of-use exclusive license policy would add to that a marketing agency, so to speak, within the Federal Government that would try to get other uses identified and underway.

Mr. NEAL. That's interesting. In my written statement I thought of that and I wondered if it was even worth saying, but it seems to me that to create a marketing agency inside the Federal Government, using—here again you're using, in addition to funding the research, you're using the taxpayers' money to set up a marketing agency inside the Federal Government, which is going to be susceptible to the political type of pressures as well as the market type of pressures, it seems to me to be a real waste of the tax revenue. It just doesn't seem reasonable to me to believe that an agency of the Federal Government can be more effective in introducing new products on the market than commercial businesses which are established for the purpose of marketing products.

Senator SCHMITT. But the argument is that once corporations have title to commercialize a particular product or invention, they are not aggressive in marketing licenses to that invention.

Mr. NEAL. Well, in some cases they will be and in some cases they won't. As Jack Armstrong pointed out a few minutes ago, we found, from whatever source, the success rate is about 10 percent. I think that figure adjusted up or down a little bit is it.

What happens is we are focusing on patents here. I think we lose sight of the fact that patents, patent policy and all of this is only one consideration in introducing new products to the market. With respect to some types of products, it's much more important than it is with others. In some products it's crucial. In some products it's just not at all crucial. It's just that if you have it it's nice, but you

can go without it. There will always be plenty of instances under any patent policy at all where products are not commercialized regardless of who holds the title to the patents.

Speaking from Thermo Electron's point of view, I don't see why we wouldn't act on any right we had which we thought had any potential at all for profitable commmercialization. That is a principal part of our business. We have many patents which are not commercialized; not because we don't want to. Everybody knows what they are if they care to look, and they are there. Nobody is asking us for them. It's very unusual when someone comes to you knocking on your door and says, "I see you have a patent. I want it." In my experience we have had that happen once and it was astounding that it even happened once.

Senator SCHMITT. In S. 1215 we outlined five criteria under which it would be presumed that the Government would retain title subject, of course, to final arbitration by the Board of Review. Do you think that this is a workable procedure, particularly if there's a determination made at the time of contracting and, if so, would you comment on the appropriateness of the five criteria?

Mr. ARMSTRONG. I think that the five criteria are very appropriate. I would like to emphasize that I would want each of these determinations to be made at the outset so there's no uncertainty during the contract period.

The only one that I would have any hesitation with is the last one. I believe it deals with items being developed which would be necessary for use by the public to meet Government regulations, or words to that effect.

I think there's a bit of vagueness there as to just what is it that determines whether or not something is needed to meet Government regulations. I see some haziness there.

However, if each of those five items are examined at the outset of the contract and all determinations are made then and everybody will live with them, I see no problem.

Senator SCHMITT. In your opinion, should the Government have the authority to negotiate for background rights in exceptional cases?

Mr. ARMSTRONG. In exceptional cases, yes.

Senator SCHMITT. Can you give me an idea of what an exceptional case might be?

Mr. ARMSTRONG. I was just trying to think in my mind.

Senator SCHMITT. So was I as I read the question.

Mr. ARMSTRONG. I think things that are referenced in the bill such as classified activities or something that is absolutely in the interest of public welfare and the public can't do without it. Maybe defense items and classified items.

Senator SCHMITT. Do you think there needs to be a distinction between large, medium, or small business in the bill?

Mr. ARMSTRONG. No.

Mr. NEAL. Let me elaborate on that just a little bit. I think it's a mistake to fail to view patents and patent policy except as a part of a much larger whole. It seems to me that the Government is basically in control of who performs Government research and development. I don't think it's a proper use of the patent policy to, in a sense, indirectly achieve a bias in the favor of one segment of

business, be that small business or otherwise, by use of the patent policy.

Assistance to small business, the things to advance the interest of small business and create a commercial climate in which small business can develop and grow, is crucial. There are many ways in which this can be done, ways involving the allocation of funds and others. But I think to use the patent policy to do this is rather an indirect way of accomplishing it. If you view it from the perspective of using the patent policy as a tool to promote commercial use or public availability of the fruits of Government research and development, there is no justification for excluding a large or a major portion of the American industry which can be very effective in introducing the fruits of the research to the public.

[The statement follows:]

STATEMENT OF MARSHALL J. ARMSTRONG, ASSISTANT MANAGER, ENERGY AND INSTRUMENTS GROUP THERMO ELECTRON CORP. AND JAMES L. NEAL, CORPORATE COUNSEL

Thermo Electron is pleased to testify in support of S. 1215 "Science and Technology Research and Development Utilization Policy Act".

Founded in 1956 by Dr. George N. Hatsopoulos, then a professor at the Massachusetts Institute of Technology, Thermo Electron Corporation has become a company with sales of over $128 million. The Corporation provides process equipment, monitoring instruments and manufacturing services for energy-intensive industries. Customers include producers of basic materials such as steel. aluminum and paper as well as manufacturers of automobiles, aircraft, industrial equipment, farm and construction machinery and oil and gas drilling tools.

The Company is organized into four functional groups: Papermaking Products, Energy and Instruments, Metallurgical Services and Metallurgical Furnaces. Within these groups are nineteen divisions which sell to specific markets.

The original Company was formed as a research and development organization. In the late 1950's this group performed government funded research in the science of thermionics. As the Company grew other research contracts from government and private industry developed and an aggressive acquisition program expanded the Corporation's markets to their present scope.

Because of the high priorities being accorded to the development of new energy conserving technologies and the Corporation's expertise in these areas, the Research and Development/New Business Division's sponsored research sales rose this year to over $10 million dollars. Work is funded mainly by government agencies and gas utilities and is augmented by corporate and divisional support.

Overall, Thermo Electron's research and development accounts for about 10 cents of each sales dollar, a figure that exceeds the average for United States manufacturing industries by about 5 to 1. The Corporation is currently conducting over 100 individual research projects.

Thermo Electron's technology efforts are directed towards three main ojectives: developing new products to support the growth of the Company's present businesses; providing technical support to the marketing, engineering and business planning functions; and exploring new opportunities for applying the Company's technology and know-how to new market sectors.

The basic long-range technical efforts, directed towards exploring new opportunities for the Company's technology, are carried out at its research and development facility in Waltham, Massachusetts. There are ongoing basic and applied research programs in thermodynamics, instrumentation, and materials technologies. Engineering, economic planning studies in energy productivity, environmental policy and health systems research are being conducted as well as conceptual design, engineering development, laboratory testing, and analysis of prototype hardware and devices for energy systems.

Specific programs include organic Rankine cycle systems, stationary coal fired diesel engines, thermionics, solar energy, environmental carcinogen detection and biomedical research. Research at the Corporation's divisional level is in the areas of industrial furnaces, and paper forming and drying.

The primary sponsors for this work include federal, state and local government agencies; gas and electric utilities; private research institutes; and foreign and domestic producers of manufactured products.

The growth of Thermo Electron can be traced to its ability in applying basic energy technologies to its products and services. This application of energy technologies is achieved in some cases through building and internal manufacturing and marketing capability and in other cases through acquisition of an existing company which has manufacturing and marketing capability in areas where Thermo Electron already has technical expertise.

This focus of the company has given it a particularly good view of the interface between technology and the marketplace. This interface is dominated by a variety of uncertainties. Any uncertainty regarding proprietary rights clearly acts as a deterrent to commercialization. Experience indicates that potential licensees are usually not interested in introducing new products unless an area of exclusivity can be provided.

Viewed from the standpoint of the investor at the time the decision to invest is made, the product faces lack of customer acceptance and failure on one hand and on the other hand customer acceptance and early competition from those who may copy or essentially copy the product. The early competition places the one who develops the product at a distinct competitive disadvantage. The developer bears the costs of innovation (if privately funded), product development and market development. These costs are very large by the time a product is actually offered for sale to the public. Any investor supplying investment realizes that while the produce is in its infancy it is extremely vulnerable. As is well understood, the fundamental purpose of the patent laws is to stimulate innovation by providing to the innovator limited and temporary market protection. This provides an environment in which a new product has a better chance to mature before facing the full force of the competitive marketplace.

The "Science and Technology Research and Development Utilization Policy Act", S.1215, assures that title to patentable inventions will be available to the contractor at the time the contract is signed. This effectively applies the positive incentive of the patent system to the contractor. Under present contracting provisions which place title in the government, the non-exclusive license initially reserved to the contractor typically does not provide positive incentive either to the contractor or to other parties who might also be eligible for non-exclusive licenses. None of them are afforded the exclusivity of the patent system. Additionally, the prospect that an exclusive license might be awarded to someone other than the contractor is certainly not an incentive or an inducement to the contractor.

Under current government patent policy the opportunity for the contactor to obtain greater rights than a non-exclusive license by waiver may have been intended to apply the incentives of the patent system to the contractor but its effect is unnecessarily limited. Our experience has been that the agencies do not readily grant waivers of patent rights. The criteria for obtaining a waiver are stringent. The contractor has little incentive to develop a market at its own expense before being assured that the rights will be available if it is successful. On the other hand, the rights are not available until the contractor demonstrates a reasonably high probability of success. It is somewhat like not being allowed in the water until you learn how to swim.

If the goal is to stimulate the introduction of innovative ideas to the marketplace, why not go ahead and let incentives operate without becoming unduly concerned. Senate Bill 414 "University and Small Business Patent Procedures Act", from the standpoint of assisting small business, is a worthy bill. However, I believe S.1215 provides essentially the same advantages for small business as does S.414. From the standpoint of putting new developments to practical application, S.414 excludes some of those who can be very effective.

The greatest stimulant to technical innovation is a climate where innovation is rewarded and therefore encouraged and where advances in one technology can spill over into another. Each innovative step sets the stage for new innovation. New products, especially those involving a significant scientific or technological advance, involve a multitude of innovative steps which are typically taken by different people at different times. The steps may be seemingly unrelated. For example, Leonardo DeVinci's "aeroplane" is impressive but was of no practical use until the advent of a lightweight internal combustion engine. Edison's invention of the light bulb was made possible by the advent of a new vacuum pump from Germany. Celluloid set the stage for still photography, and so it goes. Scientific and technological advancement is sometimes commercially motivated and sometimes motivated by a zest for finding the unknown. Translation of the scientific or technological development to products for the consumer is commercially motivated. The contractor normally has a distinct commercial advantage because of its background and the work performed under the government contract. It should not be disregarded.

Thermo Electron, in conducting Research and Development under government funding looks forward either to commercialization by Thermo Electron or by licensing third parties under technology and patents. It hopes the incentive will be there when the time for commercialization comes. As said before, our experience has shown that potential licensees are interested only if some degree of exclusivity is available.

The patent system has been in operation for a long time. I see no reason to believe that the public would fare any differently from a contractor operating under patents which were obtained through government sponsored research than from a business operating under patent obtained through privately sponsored research. The present bill does not propose a move from a presently known condition to an unknown condition, but proposes a move from a presently known condition toward another known condition. There is a potential for public benefit and I do not see a corresponding potential for public harm.

I would like to comment on several other issues which have been raised in connection with this bill.

Question 1. What have been the effects of federal agency patent policies and practices on the development and commercialization of government sponsored invention?

Answer. In implementation, if not by design, the federal agency patent policies appear to provide to the contractor the minimum right under the federally owned patent which would be sufficient to enable him to enter the market. The contractor appears too often viewed as one whose actions are likely to be contrary to the public interest rather than being viewed as one through whom economic benefits can flow to the public. The present policy does not stand as a bar to commercialization but it does not encourage commercialization and I believe it tends to discourage or impede commercialization.

Question 2. Is there justification for maintaining a title-in-Government policy with respect to research and development for civilian purposes and a policy which provides substantial rights to the contractor for military and other Government research and development?

Answer. I see no reason for a distinction. Commercialization of Government sponsored inventions and commercialization of products which are spin-offs from government sponsored research can be facilitated by granting to both categories of contractors rights under patents which permit the incentive of the patent system to be available to the contractor.

Question 3. Should the government try to recoup some of its research and development funding from a contractor who commercializes a product using a government sponsored invention?

Answer. No. If introduction of new technology to the marketplace is a primary objective we should not be concerned with recoupment of government research and development funding. This requirement will blunt profitability and therefore blunt incentive and will detract from the primary objective. The public benefits through increased employment and increased tax revenue.

Question 4. Would you favor a self-enforcing licensing requirement whereby the contractors exclusive rights to an invention would expire after a reasonable time, unless the contractor demonstrated a need for an extension?

Answer. No. The shorter the time available to the contractor, the smaller will be the incentive.

Question 5. When should the government retain title to government-sponsored inventions?

Answer. When the primary benefit to be obtained from the research is not intended to be achieved through commercial application of the resulting technology. For example, if a product resulting from the research is to be purchased principally or exclusively by the government, ordinary market incentives are not needed to get the product into practical application. The government could retain title in these cases and still achieve its ultimate objective, if these contractors will agree to these terms. Even if the contractors were agreeable, I would expect title in the government to inhibit commercial spin-offs from such government-sponsored research. The spinoffs from this research accounted for significant technical advances.

Question 6. Are field of use restrictions appropriate?

Answer. As long as the field provided to the contractor is that in which he wants and needs to operate, the field of use restriction would probably have less effect on any commercial activity than any other of those mentioned. The difficulty might be in determining how broad or how narrow the field of use restrictions should be. I expect that the contractor and the contracting officer for the agency would frequently find this a most important question on which agreement was difficult.

Additionally, I doubt that a substantial public benefit would result from the rights retained by from government. I believe a private contractor is inherently better equipped and more likely to find a commercial market than is a government agency. At present the government agencies are not equipped to perform this marketing function. I do not believe that public funds would be well spent if they were directed to staffing agencies or an agency to perform such a marketing function.

COMMENTS ON SPECIFIC SECTIONS OF S. 1215

S. 1215 strikes a reasonable balance between incentive to bring scientific and technological developments to practical application on the one hand and legitimate government concerns on the other hand. We can support this Bill in its present form. However we offer the following for your consideration:

Section 201(b)4

A central review entity is essential if the Act is to have uniform application across agency lines. This would hopefully provide a single body from which appeals to the judiciary could be taken.

Section 301

The agency determination should be at or before the time of entering into the contract. Otherwise, the contractor continues to operate under a cloud of Federal rights competing with his own. The determination statement required by Subsection B should also be filed with the contractor.

Section 302(b)

The non-exclusive royalty-free license retained by the contractor when the government obtains title to an invention should be applicable to those inventions to which the government obtained title pursuant to Subsection 302(A) as well as those to which it obtained title under Section 301. Additionally, as long as the contractor is actively promoting practical application of an invention under circumstances which are expected to be effective within a reasonable time, the non-exclusive license retained by the Contractor under Subsection 302(B) should not be revoked to the extent that such a license is important to the commercialization of an invention to which title has been retained by the contractor.

Section 304(a)

It should be expressly clear that reasonable terms include payment of a reasonable royalty. It should generally be clear that if the contractor has mounted an effort to achieve practical application of the invention it can't be compelled to relinguish its right except upon reasonable terms.

Section 305(a)(3)

It should be made clear that the Federal Agencies may agree at the time of entering into the contract that they will withhold from public disclosure information for a reasonable time in order to permit patent applications to be filed. During this period the information should not be obtainable under the Freedom of Information Act. If the determination to withhold from public disclosure is made during work under the contract on a case-by-case basis, it increases the administrative burden and could put the contractor in the position of having to jeopardize its patent rights to comply with its contractual obligation to submit information to the funding agency promptly. If the information is submitted without assurances of confidentiality and exemption from FOIA, it might be construed as publicly available and therefor subject to statutory bars under the patent law as of the time of its submission.

Section 307

Under the authority of Section 307, the government should not revoke a non-exclusive license already granted to the contractor where that non-exclusive license is relevant to achieving practical application of an invention to which the contractor has retained title. The non-exclusive license left to the contractor could be limited in scope to that which is necessary for the practice of inventions to which the contractor has title.

Senator STEVENSON. Thank you, sir.

Senator SCHMITT. Our next witness and our final witness this morning is Admiral Rickover, the Deputy Commander for Nuclear Propulsion, Naval Sea Systems Command. Thank you, Admiral, for

joining us. Your name has been mentioned. I don't know if you have had a chance to hear all of the testimony, but most of it has not been very suportive of your views.

Admiral RICKOVER. Well, my first view is that you have a very lovely hearing room and one in which you cannot hear in the back. Outside of that, it's a very fine hearing room.

Senator STEVENSON. Well, I'm sorry about that, but maybe it's just as well.

STATEMENT OF ADM. H. G. RICKOVER, DEPUTY COMMANDER FOR NUCLEAR PROPULSION, NAVAL SEA SYSTEMS COMMAND, DEPARTMENT OF THE NAVY

Admiral RICKOVER. I think you're probably right because I believe that this whole patent situation has gotten way out of hand. Before I start my statement, if you care to, I will tell you my feeling about the patent system in general.

Back in the Age of Mercantilism, monopolies, called letters patent, were granted by the king. Finally, Parliament passed a law abolishing all monopolies with one exception, and that was if an individual got an idea he could patent it. That was the one exception they made.

Now the whole patent situation has gotten out of hand because of patent lawyers. If we did away with the patent lawyers, we would simplify the system.

Senator STEVENSON. Are you confining it to patent lawyers?

Admiral RICKOVER. That's right, sir. Patent lawyers are responsible for the fouled up mess we have in patents. If you go back to the origin of the patent system, it was intended to protect the individual, who with his own money and his own time, developed a new idea. That was the one exception made by Parliament.

Senator STEVENSON. We heard this morning—Admiral, I'm sorry you didn't hear it—that all nations with the exception of the People's Republic of China have patent laws and presumably they have patent fraternities, and not in England but this system originated in Venice in the 17th century, and apparently since then it has moved to all countries, including all Communist countries with the exception of that one. Are they all wrong?

Admiral RICKOVER. I'm going back to the English laws. In England, as I said, they had a mercantile system and they had monopolies. But in 1624 Parliament abolished the system with one exception. The exception was monopoly rights granted to inventors. Parliament made that one exception. That is the origin of our patent system. This system has now grown into a vast complex issue.

The issue before us today is a simple one—if a man invents something on his own time and with his own money, he should get a patent. However, the issue becomes complicated when corporations enter the scene and introduce with all kinds of nuances on this patent issue which takes up the time of many people. I believe if you go back to the original principle, it will simplify the problem before you.

Senator STEVENSON. The original principle being?

Admiral RICKOVER. The original principle being that, if a man has an idea and on his own time and with his own money develops something, he should get certain rights. They made exceptions

even to that for medical purposes. It was felt until very recently in all European countries that if a man developed something that had connotations of public health it was not patentable. One of the reasons for the exception was that the Chamberlen family, who invented obstetric forceps, did not release information about their discovery for 100 years. Therefor, over a 100-year period, many children died unnecessarily during childbirth and it was very difficult for mothers. And all that time the Chamberlens knew this and kept the forceps to themselves. When it became known, it aroused a great deal of public opinion which forced people who had ideas to make them known. That's another reason for the patent system.

The basic idea was for the public welfare and not for the welfare of corporations. Now patents primarily benefit big business, like almost everything else in this country. That is not in my written statement. But I think you should know my feelings, since this issue comes up annually. I believe it's a big waste of time over a simple thing. I believe this committee could accomplish something by taking a definite stand and making up some simple rules.

If I tried to do my technical work the way patents are handled in this country, we would never have any nuclear ships. We would constantly be arguing about things that have no real moment. How's that for a statement, sir?

Senator STEVENSON. I don't think so far the witnesses would disagree with you entirely.

Admiral RICKOVER. Well, that's wonderful. I'm glad to see that somebody is finally in agreement with me on the patent situation. I applaud that very much. I was thinking of another example I could give about patents. Let's take the case of Arizona—I believe that's the State that Senator Schmitt comes from——

Senator SCHMITT. New Mexico.

Admiral RICKOVER. OK. They're both about the same. They happened to come into the union at about the same time.

Senator SCHMITT. We both have very fine battleships. Unfortunately, our sister State's battleship disappeared in Pearl Harbor.

Admiral RICKOVER. I served on the New Mexico, so I know something about that ship, sir.

Suppose you own a plot of land, let's say 1,000 acres. Because you think there might be minerals on that land you hire a group of prospectors to go out and dig holes in the ground. They come back and report to you they found gold or uranium. Who owns that gold or uranium? The guy who did the prospecting or the owner of the land? You're the owner. Who owns the rights to that, sir?

Senator SCHMITT. I own the mineral rights. I own whatever is under it, but I probably would have gone out and found it myself.

Admiral RICKOVER. Well, you could, because you are a geologist. But supposing you hired someone else to do it. Who would own the minerals? You paid the man for digging holes and he reported to you that there's gold in that ground. Who owns that gold?

Senator SCHMITT. I would own it.

Admiral RICKOVER. Let's say adjacent to your land is another 1,000 acre, plot that belongs to the Government. The Government hires the very same prospectors who search the land and come up with the same results. Who should own the gold? The man who did

the prospecting or the Government, the 220 million people who own the land? Who should own the rights?

Senator SCHMITT. It depends on whether it's to the advantage of the Government to let the people who found it market it.

Admiral RICKOVER. But that is up to the owner, sir. You could also do that in your case. It belongs to the Government to dispose of it as it wishes.

Senator SCHMITT. The issue before us today is just how is the Government going to dispose of the valuable products developed under its auspices.

Admiral RICKOVER. That's right, sir. But the Government has the right to decide, not the man who did the prospecting. The prospector does not have any rights except as the Government gives him. That's the point, sir.

Senator SCHMITT. Well, the purpose of S. 1215 is for the government to make that decision. We are part of the government.

Admiral RICKOVER. Fine. We'll leave it up to the Government. But the way it is now, as I see it, the people who do the prospecting say they have a right. That's what I'm getting at, sir.

Senator SCHMITT. They only have title if we give it to them, Admiral.

Admiral RICKOVER. That's right.

Senator SCHMITT. The purpose is to try to determine those areas where giving away of title will accelerate the introduction of a technology into the private sector for commercialization.

Admiral RICKOVER. That should be a decision the Government makes without any threats or lobbying or anything else by the guy who did the digging. It should be entirely up to the Government. I thoroughly agree with that, sir.

Senator SCHMITT. That's consistent with what we're trying to do with S. 1215.

Admiral RICKOVER. In that case, I applaud this committee. Now, with your permission, I'd like to read my statement.

Thank you for inviting me to testify on S. 1215, the, "Science and Technology Research and Development Policy Act." My comments on this bill are based on my dealings with various segments of American industry both as head of the Naval Nuclear Propulsion Program for the past 30 years and as head of the Bureau of Ships Electrical Branch during World War II. That was for a period of about 6 years.

The basic principle in most current laws concerning government patents is that the government should retain title to patents developed at public expense. The proposed bill would reverse this principle so that, except in unusual cases, government contractors would be able to take title to any inventions arising under their contracts with the Government. Government agencies could retain title to inventions only in the limited circumstances prescribed by the bill and only if retention could be justified to the satisfaction of the Secretary of Commerce.

I would like to repeat what I've said a number of times about the Department of Commerce in the issue of patents and others. The Department of Commerce, in my opinion, is about as useful to the government as a lighthouse without a light.

Under the proposed bill, each Federal agency would be required to establish a technology utilization program to promote the development and use of technology. The goals of the program would be to shorten the time from conception of an idea to commercialization; to encourage multiple secondary uses of technology in all areas of the private and Government sector and to understand the process by which technology is transferred from the government to the private sector.

In the event the Government determines that a firm has failed to introduce the technology to the private sector within a reasonable time period, the bill provides that the Government retains the right to claim the patent.

In my opinion, the proposed bill would impede, not enhance, the development and dissemination of technology; would hurt small business; would inhibit competition; would promote greater concentration of economic power in the hands of large corporations; and would be costly to the taxpayer.

In private industry, the company that pays for the work generally receives the patent rights. Similarly, companies generally claim title to the inventions of their employees on the basis that the company pays their wages. In doing business with the Government, however, these same companies reverse the standard, contending that the patent rights should belong to the one who comes up with the idea, not the one who foots the bill.

The patent interests have been working behind the scenes for many years to promote, in one way or another, policies and legislation along the lines of S. 1215.

May I interrupt, Mr. Chairman, and say I'm very grateful that Senator Long has arrived. My first testimony on patents was about 20 years ago before Senator Long and his committee. Some people complain about him because he's involved in income taxes. That's a very unfortunate situation to be in because that's a field that people don't like. He gets the blame for income taxes. But knowing Senator Long, I know as far as he's concerned it's like water off a duck's back. He apparently has enough popularity with the people in his State that he keeps on getting elected in spite of what some newspaper people think about him. As a matter of fact, Senator, if I lived in your State, I'd vote for you, too. But anyhow, I do thank you for coming here and for all the previous support you have given to protecting the people's rights. This fact is not known about you and I'd like to get it advertised. I know you and your father shared one thing—you both tried to protect the people. You don't mind my bringing your father in, do you sir?

Senator LONG. No, I don't mind at all.

Admiral RICKOVER. I will continue now from my prepared statement.

Some people claim that by retaining title to publicly funded inventions the Government stifles technology; that the results of the Government's large research and development expenditures are reflected in the approximately 25,000 patents the Government presently owns; that the public is not receiving the benefit of this technology because only a small percentage of these patents are in use. The patent lobby contends that in the absence of patent protection individuals and companies will not invest in the develop-

ment and marketing of this technology, but that this could be resolved by giving contractors the exclusive rights to inventions developed at Government expense.

As I see it, those who would benefit most from the proposed legislation are patent lawyers and large corporations who, year after year, receive the lion's share of Government research and development expenditures.

In my view, the importance of patents has been greatly exaggerated. Truly good ideas tend to be used. Even without a patent, many of the worthwhile inventions would be discovered and adopted in the marketplace based on their merits. If one company did not generate the idea, another firm would have because of the nature of the work being done. Often, identical ideas crop up almost simultaneously in different companies, and different countries. Further, many good ideas can be implemented or commercialized without special investment in R. & D. or new facilities. Or, they are sufficiently promising that companies will invest in them without patent protection. In such cases, rather than promoting technology, the patent system becomes a process for determining whether or not someone is entitled to exact a royalty for use of the idea.

It is nonsense to think that our technological growth will suffer unless contractors receive title to patents generated under Government contracts. From what I have seen over many years, the majority of patents are of little or no significance. Many companies seem to file patents defensively; meaning that they file numerous patents for minor details primarily to keep someone else from getting a patent in that area or to discourage potential competitors. Some file patents as status symbols; others simply misjudge the attractiveness of their ideas. The Patent Office itself, when in doubt, tends to patent questionable items on the assumption that, if the patent becomes important, the validity of the patent can be tested in court.

The important factor for an industrial organization is the know-how developed by it—the trade secrets and the techniques; these are not patentable qualities. They are things which are inherent in a company, in its methods, in its management and trained employees, in the kind of machine tools it has, how it uses these tools, and so on.

It is often said that unless the Government gives away its patent rights, companies will refuse Government contracts. While many contractors would like to obtain exclusive rights to patents developed under their Government contracts, few value patent rights to the point they are willing to forego Government business.

I have never seen one Government contractor in the many years I have been in this field that has ever refused to take a contract because it wasn't able to get patent rights.

From what I have seen, Government patent policy is rarely the dominant factor in company decisions to accept or reject work. The tangible benefits of profits and technical know-how from Government orders are far more valuable to most contractors than the speculative benefits of patent rights. For more than 30 years I have been able to obtain the R. & D. and manufacturing work needed

for the Naval Nuclear Propulsion Program without having to give away Government patent rights.

Patents are generally incidental to Government research and development work, not its primary purpose. The patents that arise under a Government R. & D. program are not at all indicative of the technology developed. When I place an R. & D. contract for a new design reactor, it is principally to work out the details of a design and to identify and resolve the problems of design, manufacture, and operation. If patentable inventions arise in the course of this work, they generally involve only small design features, not entirely new concepts.

The existence of a large number of Government-owned patents which apparently are not being used does not present an accurate representation of Government-owned patent utilization. It is almost impossible to tell the extent to which patented inventions are being used, particularly in the case of Government-owned patents. Government agencies do not have a reason to search for patent infringement. The Government, unlike private parties, generally has no desire to prevent others from using its inventions.

The proposed bill would place upon each Government agency an obligation to promote the use of patents the Government already owns—as if they were predominantly good ideas. Such efforts would tend to divert attention and resources of the Government agencies away from their main functions. Under the proposed bill, Government agencies would be expected to actively promote patents currently held by the Government.

Most agencies have enough trouble doing the job they were established to do; they should not be required to spend their time and resources trying to promote patents, the majority of which are of dubious value. I believe that the decision to use or not use Government financed inventions is one best left for the private sector.

In many areas today, the Government is in the forefront of technological development. The public is actually financing development of entire new technologies. The U.S. Government intends to spend in fiscal year 1980 nearly $32 billion for research and development.

The majority of these Federal research and development dollars will go to large contractors. For example, in fiscal year 1978, 64 percent of the total dollar value of research and development contracts placed by the Department of Defense went to only 19 large contractors.

If the rights to publicly financed inventions are given to contractors, the Government itself will be promoting the concentration of economic power in the hands of a few large corporations, mainly conglomerates. As the corporations expand, the problem is exacerbated.

Currently, the President and many members of Congress are calling for the expenditure of unprecedented sums to develop new sources of energy and more efficient ways of using it. By far, the vast majority of these funds will be spent under contracts with large corporations.

Imagine the public furor that would ensue if, under the terms of this bill, a contractor, either large or small, developed at public expense a major breakthrough in energy technology. Is it proper

for that company to be able to exercise monopoly rights over the distribution, use, and pricing of the results for 17 years? I think no. In my view, the rights to inventions developed at public expense should be vested in the Government and made available for use by any U.S. citizen.

Many large corporations patent minor improvements or design features simply to discourage competitors or potential competitors—particularly small firms—from trying to enter the market. To challenge the validity of any of these patents can take hundreds of thousands of dollars and years of litigation. Although a high percentage of patents contested in court are ruled invalid, not many firms can afford the lengthy litigation that is required to challenge a patent. Thus, if the Government were to give its contractors title to inventions developed at public expense, it would be discouraging competition and making it easier for large businesses to freeze out their smaller competitors.

In apparent anticipation of concerns that a contractor might obtain title to publicly financed inventions then not use it, the bill contains a march-in rights provision. Under this provision, the Government retains the right to force widespread licensing if it determines that the contractor who has title to the invention is not satisfactorily developing and promoting it.

This safeguard would be cumbersome, ineffective, and largely cosmetic. The Government has had march-in rights since 1963, but to my knowledge has never, or very, very rarely ever used them. To be in a position to exercise these rights the Government would have to stay involved in the plans and actions of patent holders and check up on them. If the Government ever decided to exercise its march-in rights and the patent holder contested the action, no doubt the dispute could be litigated for years.

This proposed bill is but one of many patent bill introduced in Congress in recent years aimed at giving contractors title or exclusive rights to inventions developed under their Government contracts. The rationale for such legislative proposals has varied over the years. In the past, the proponents have stressed the possibility that companies would not accept Government contracts unless they were guaranteed exclusive patent rights. The issue being promoted today is that innovation will decline unless the Government gives away patent rights to publicly financed inventions.

I have testified numerous times during the last 20 years in opposition to proposals that would give away the Government's patent rights. In recent years, I testified before the Senate Small Business Committee and before the Senate Judiciary Committee. With your permission, Mr. Chairman, I would like to include those statements as part of my testimony today. I would like to include, for the sake of the historical record and to show the part that you and I played, the original testimony to you when you were chairman.

Senator LONG. We would be happy to have that in the record.[1]

Admiral RICKOVER. In summary, I believe that inventions paid for by the Government should belong to the public, and all citizens should have an equal opportunity to use these inventions. Private firms, particularly large companies, should not be able to get a 17-

[1] The National Patent Policy hearing of June 2, 1961 has been placed in the committee files.

year monopoly on inventions they develop with tax dollars. In my opinion, the effects of Government patent policy are continually exaggerated and overemphasized by the patent lawyers and contractors who have a vested interest in the matter. Proposed changes regarding ownership and use of patents developed at Government expense are always presented under the banner of high sounding principles and purposes. Having observed this issue for many years, I am thoroughly convinced that almost all of such proposed changes are contrary to the best interests of the United States.

In my view, Congress should require the Government to retain title to all inventions developed at public expense and make these inventions freely available for use by the public. In this regard, the Commerce Department should be required to publicize for a period of 6 months the availability of each patent to which the Government has title and to grant nonexclusive licenses to those who express an interest in using the invention on this basis. If during this period no one requests a nonexclusive license, the patent rights would be thrown open to competitive bidding with an exclusive license granted to the highest bidder, but not for the entire 17-year period for which a patent is valid. At the end of this period, the invention would fall in the public domain. To avoid circumvention of these procedures Government agencies should be prohibited from waiving Government patent rights.

The basic principle embodied in present laws is that the Government should have title to inventions developed with Government funds. The reasons the Government should take title to these inventions are primarily to preclude the establishment of a private monopoly for a publicly financed invention; to insure the public has equal access to these inventions; and to insure the Government is not subsequently barred from using the idea by someone else's patent. These are sound reasons that I fully support. The basic principle of title in Government should be modified, waived, or otherwise tampered with only for compelling reasons—and even then with great care and in the most limited way needed to accomplish the purpose.

That is the end of my statement.

Senator LONG. Admiral Rickover, I appreciate your appearance here today and may I say you have been a compelling witness from my point of view on this subject.

Now you made a point some years ago in testifying on this subject when I was chairman of the Small Business Subcommittee which until now I had forgotten. You said that most of these people who do this research are sophisticated enough to know that their ultimate employer is the U.S. Government. For example, here's some fellow who's working for some company, let's say Westinghouse for lack of a better name, and so the Government pays Westinghouse and Westinghouse hires a scientist. Now the scientist is the fellow who makes the breakthrough. Well, he has a contract with Westinghouse so he's not privileged to have a private monopoly on his brainchild. Westinghouse gets that because Westinghouse hired him. But the Government hired Westinghouse.

Admiral RICKOVER. You know what's wrong with your statement, Senator? You're just talking some ordinary commonsense that any

citizen can understand. But apparently the patent lawyers can't—you're not a lawyer, I hope, sir.

Senator LONG. I am a lawyer by profession.

Senator SCHMITT. But I'm not, Admiral. The author of the bill before you is not. He's a geologist.

Admiral RICKOVER. I'm sorry to learn you're a lawyer, Senator. You are a rare breed—a lawyer who can also see the truth. I don't mind if you use that in your campaign if you wish, sir.

Many of the problems we have today are fomented by lawyers. If we didn't have so many lawyers, we wouldn't have these problems. Many of them create the problems and then make money by proposing solutions.

Of course, what you said makes sense, Senator Long. When the Westinghouse engineer develops something, he doesn't get anything for it. He's paid by Westinghouse and, as you say, Westinghouse is paid by the Government. Why isn't the Government treated exactly the same way? That's all there is to it. I could testify for months on this subject, but you have said it all very succinctly.

Senator LONG. Well, basically, isn't this about the same thing, as though the Government pays a highway contractor to build a highway; then after he builds a highway you say, "Now all right; you can keep the highway and you can either charge the public to use the highway if you want to or deny them the right to use it entirely," even though the public paid the whole cost of it.

Admiral RICKOVER. Yes, sir. It is the equivalent of the man who built the highway saying, "Now that I have built the highway it belongs to me and I'm going to charge the Government to put vehicles on this road."

Senator LONG. Wouldn't it be about the same principle as if we said for our new Senate building, "We'll pay for it. Go ahead and build the Senate office building," and after he gets through building it he owns the building and we have to pay rent if we want to use it?

Admiral RICKOVER. The unfortunate thing is that you and I think alike, Senator Long. Perhaps I could run for the Senate on that basis. The patent system is that simple. I don't understand why Congress have these hearings every year to cover the same ground. The same points are brought up and yet the same legislation is introduced every year which will give these rights away.

Senator LONG. We hear the argument that if you're going to get somebody to use one of these patents that he's going to have to have a monopoly. Now basically, what you're talking about with a patent is somebody has an idea. It's a way of doing something. It works and he's the fellow who puts the idea to work. Now if it's in the public domain, can you explain to me why people wouldn't use it? It's just like saying if you can develop a better mousetrap and if people want to trap mice, why wouldn't they go ahead and make a better mousetrap?

Admiral RICKOVER. The reason is because most patents aren't worth much. Those that are worth something are used. One of the things I mentioned in my statement was that the Government could put out for competitive bidding the patent rights to those Government-owned patents which are not being used.

Senator LONG. It's also suggested that somebody might not be interested in doing research for the Government if he can't get a private patent.

Admiral RICKOVER. I have not found that to be the case in my experience with contractors. I hear that argument all the time. In my career, I have not found one single instance of a company refusing Government work because it could not receive patent rights.

Senator LONG. It seems to me one simple answer—I would have no objection to saying, all right, if we want some type research done let's open it up and let those who would like to participate make their proposition and some fellow says, "I'm the best man to do it but I'm only going to do it if I have a patent monopoly," and then let that fellow make the offer on that basis and see if we are so hard up for contractors in that case to consider his proposition.

Admiral RICKOVER. I thoroughly agree, sir.

Senator LONG. It occurs to me there might be some situation like that, but I think he ought to bear the burden of proof. If he's the only fellow who's qualified and he had all sorts of proprietary information he could start with so he is the best, and if he could make a case, I wouldn't object. But to take the kind of thing where you have plenty of competent contractors who would like to have the business and let the public fully have the benefit——

Admiral RICKOVER. And as I said, Senator, I have not found one single case where the issue of patents was the determining factor of whether a company accepted a Government contract, and I'm talking about thousands of different contractors over a period of many, many years. I haven't found this to be true.

Senator LONG. Is this bill providing a limitation on just how much the successful contractor can charge the public for what the public has already paid for?

Admiral RICKOVER. No, sir, it does not.

Senator LONG. In other words, if some fellow found a much better light bulb that provided at one-quarter of the energy twice as much light, conceivably a patent and a monopoly to such an invention might be worth $500 million. Goodness knows what it might be worth. Is there any limitation in this proposal as to how much he could charge the public to have the benefit of what the public had already paid for when they paid for the research?

Admiral RICKOVER. I don't believe there is. I might say, in this connection that I have been in the atomic energy field now for many years and I have been able to get the large companies to work together on these things and to exchange information with no patents involved at all. The patents all belong to the people. I have never once given anybody the right to patents. In fact, I have developed some things myself. I turned the rights—which I could have patented and made money on, over to the Government.

Senator LONG. Suppose, Admiral Rickover, somebody working in atomic research could show up with a brilliant idea. Say, he actually found a way whereby instead of using this atomic power to heat water and then use the water to turn a turbine and the turbine to generate electricity, suppose he found a way where you could put that atomic power directly into that copper wire and just transmit it right on to the public and reduce the cost of delivering that

power to the public down to 1 percent of what it costs today. And that is conceivable, is it not?

Admiral RICKOVER. The idea that you mentioned has been considered, Senator. But here's the answer to your question. If you were employed by the Government or by a contractor working for the Government, the right to that invention inheres in the Government.

Senator LONG. But here's the point I'm getting at, because a person who once served on the Atomic Energy Commission—incidentally, he was a general manager or had an important position. He mentioned to me that some day we would learn how to put the power directly into the conductor rather than have to use it to produce heat and then use the heat to heat water and the water to turn the turbine and so forth. Then he said, "Such a breakthrough would mean atomic power would just displace much of the power we use today when you heat water as you do in an ordinary generating plant."

Now let's say a brilliant scientist over there should actually develop such an idea and show you how it could be made to work. Well, if such a proposal was implemented as suggested in this bill, that fellow wouldn't get it, would he? He would be an employee.

Admiral RICKOVER. No, sir, he would not get it. You see, this is another common misconception. The misconception is that the man who gets an idea should get the credit for it. It just isn't so. It's the man who develops it. The idea is easy. For instance, a man has an idea that he should run for Senator. But the idea is not what gets him elected. It's the campaign that does it. Who should receive credit: the man who only has an idea he ought to be a Senator or the man who actually runs for the Senate? That's the analogy I make.

Senator LONG. Here's the point I had in mind. The people who actually did the work would not be the ones who would get the monopoly advantage. They just get their salary.

Admiral RICKOVER. That's right, sir.

Senator LONG. It's the employer who gets the Government contract who gets all this and it's the public who has to pay the price for it—one time for the research and development, and a second time for the next 17 years to have the benefit of what they have already paid for.

Admiral RICKOVER. You're absolutely right, the public would pay the price and the contractor would benefit. Generally, the most an inventor, who is an employee, would receive is an award—not the patent rights.

The basis for Government patent policy should be very simple. A patent to an invention developed under a Government contract should belong to the Government. To refer back to what I mentioned at the very beginning of my testimony, the basis of the present patent laws was to encourage the individual, who, on his own time, with his own money, developed an idea, and even then to limit that monopoly to 17 years. It was not intended to protect large corporations.

If an employee of a Government contractor invents something on his own time that is not connected with his job, that person should receive the patent rights. But any invention developed in connec-

tion with his job should belong to the Government and be freely available to the public.

Senator LONG. Senator Schmitt.

Senator SCHMITT. Well, Mr. Chairman and Admiral Rickover, my rebuttal is contained in the testimony of all those who have come before you in now 3 days of hearings—small business, large business, medium-sized business, academia, Government patent lawyers, geologists—almost all the witnesses have felt differently than you do, but I do respect your opinion.

Admiral RICKOVER. Don't you think there's a good reason for that, Senator? They want something for themselves. That's the reason. I don't want anything for myself.

Senator SCHMITT. That's the best motivation there——

Admiral RICKOVER. Senator, I want it for the people of this country. That's the difference between me and those people.

Senator SCHMITT. That's the best motivation there is, that is, to see that these inventions produced by the taxpayer in a direct sense in fact benefit the taxpayer, not only because they are consumers and can have access to these inventions which they do not have access to now in any real sense, but also as the chairman well knows, any profits that are made are taxed and the Federal coffers receive the benefits of those taxes.

Admiral RICKOVER. Well, how about any workman who gets paid? He's taxed too. So what's the difference?

Senator SCHMITT. That's absolutely correct, but at the present time these patents that the Government holds are not being utilized. The testimony is extremely precise that they are just not being utilized and we have to ask ourselves why aren't they being utilized.

Admiral RICKOVER. Senator, I addressed the issue of why they aren't being utilized. The reason is probably because they're not worth much. I suggested that if no interest is expressed in a patent after publicly advertising it, the patent could be put up for public bid. I'm all for that.

Senator SCHMITT. The testimony and the facts that we have been presented with in this committee are I think very persuasive that without the exclusive license, or without title more appropriately, the private sector is just not going to do that.

Admiral RICKOVER. There is a possibility of getting the exclusive rights. If after advertising the availability of nonexclusive licenses to a patent, no interest is expressed, the rights to the patent could be thrown open to competitive bidding. I'm not against that, not at all, sir.

Senator SCHMITT. Well, Admiral, I certainly respect your long involvement in this business and I just think that those of us who are coming along behind you feel that the present system has not worked. The evidence is becoming clearer and clearer there ought to be a system in which both the rights of the public and the Government are protected but at the same time we reap the benefits of the technology.

Admiral RICKOVER. What is the evidence that it's not working, Senator? I would like to see the evidence.

Senator SCHMITT. Well, the evidence, sir, is in 3 days of hearings before this committee.

Admiral RICKOVER. I would very much like to see it.

Senator SCHMITT. And I would strongly recommend that you read it.

Admiral RICKOVER. I would like to see the facts supporting the position that a patent is not being used because the Government owns it, sir.

Senator SCHMITT. The facts are clear and they are in the testimony before this committee even today.

Admiral RICKOVER. I have not had the opportunity, but I would like very much to comment on that testimony, sir.

Senator SCHMITT. I hope you will. As a matter of fact, Senator Long had to leave, but he has a set of questions that he would like very much to have you answer for the record, and I would add to those a few more.

Admiral RICKOVER. Yes, sir.

Senator SCHMITT. Plus clearly draw your attention to our record because there is, in my opinion, very persuasive evidence.

Admiral RICKOVER. You made a very provocative remark, sir. I think I owe it to you and to your committee to reply to that.

Senator SCHMITT. I certainly would draw your attention to all of the testimony and particularly that of Mr. Rabinow today and his previous testimony, but also those of the business community, the Government, the Department of Defense who testified earlier today. Almost all of the witnesses have indicated the present system is not working and inventions and ideas that should be in the private sector are not there. As a result, the consumer is not benefiting, as well as the taxpayers aren't benefiting.

Admiral RICKOVER. I agree that I'd like to look at that and comment, because I cannot answer these issues unless I know what they are.

I would like to make the point about the relative reduction in the number of patents. After World War II there were more patents filed made in this country than other countries because they were war weary. But you've got to understand that as the industrialized countries reestablished themselves more foreign patents would be filed. One of the reasons is that taking Europe collectively there are more scientists and engineers. Futhermore, Europeans are better educated. Their top schools are better than most of ours. For instance, the French École Polytechnique turns out some very good people. There are good schools now in all the continental European countries, and since they have a larger number of engineers collectively, you should expect a greater number of patents. The United States turned out more engineers and scientists for a certain period of time because Europe was war weary and beaten. We should have expected an increase in foreign patents.

Senator SCHMITT. Well, thank you, Admiral. I'm sorry that we cannot agree on this because I'm sure we agree on most of the issues that you're directly concerned with in your great efforts with respect to naval nuclear power.

Admiral RICKOVER. Mr. Chairman, you earlier asked if I could look at the volumes of testimony. I would appreciate it if your staff would point out the specific parts that they want my comments on because you know we have our regular work to do. This is not part of my proper work. I do it as a public service.

Senator SCHMITT. We appreciate that. I do not feel it is irrelevant to the ultimate realization of all the benefits of all your work which has been considerable and that, in fact, what the questions we will present will do will present the facts and ask for your comment.

Admiral RICKOVER. Thank you very much for the opportunity for being here and also for permitting me to present quite a frank discussion, because you know I can't do otherwise.

Senator SCHMITT. Nor can I, and I appreciate it very much.

Admiral RICKOVER. That's why I posed that issue about the plot of land that you owned and the Government owned and I wondered why they should be treated different, because I'm sure you're going to look out for the Government's land as much as your own.

Senator SCHMITT. If there weren't Government regulations, the Government land would be physically utilized and the people would be benefiting from the minerals and everything on it, the same as with our present patent law.

Admiral RICKOVER. I hope to persuade you otherwise, sir, although I doubt it because most of us by the time we reach even your age have our minds made up.

Senator SCHMITT. I hope I don't. I have changed it a couple of times in the last few years.

Admiral RICKOVER. You can't stop me from trying.

Senator SCHMITT. No, sir. I wouldn't want you to stop. Thank you.

Admiral RICKOVER. I have always felt people can think anything they please as long as they don't say it.

Senator SCHMITT. That's particularly true in politics.

Admiral RICKOVER. It's particularly true when you're a junior member of a committee.

Senator SCHMITT. Yes, sir.

Admiral RICKOVER. I know something about this political game. That's why I have never run for office.

Senator SCHMITT. Well, I'm glad you didn't run in New Mexico. I might have had problems.

Admiral RICKOVER. Senator, I have been asked whether I would ever run for office, and I have said, no, because I don't think I could be elected dogcatcher in a small community.

Senator SCHMITT. I think you underestimate your persuasive powers.

Admiral RICKOVER. Well, then, I have another answer. I have the same charisma that a recent Secretary of Defense had, one whose name starts with Mc, McNamara. We both have the political charisma of a chipmunk.

Senator SCHMITT. With that, we will recess the hearings.

[The statements referred to follow:]

STATEMENT OF ADM. H. G. RICKOVER, U.S. NAVY, TO THE MONOPOLY SUBCOMMITTEE OF THE SENATE SMALL BUSINESS COMMITTEE ON DECEMBER 19, 1977

1977

GOVERNMENT PATENT POLICY

Thank you for inviting me to testify. For the past thirty years I have been responsible for the research, development, procurement, production, operation, and maintenance of the nuclear propulsion plants in U.S. Navy warships. During World War II, I was responsible for the design, procurement, and operation of the Navy's

shipboard electrical equipment. My comments today with respect to Government patent policy are, therefore, based on extensive dealings with various segments of American industry for about forty years.

The basic presumption in most laws concerning Government patents is that the Government retains title to patents developed at public expense. But, today, many Government agencies routinely grant contractors exclusive rights to these patents. I do not believe this practice is in the public interest. It promotes greater concentration of economic power in the hands of large corporations; it impedes the development and dissemination of technology; it is costly to the taxpayer; and it hurts small business. In my view, the rights to inventions developed at public expense should be vested in the Government and made available for use by any U.S. citizen.

Under our patent laws, the holder of a patent enjoys a 17-year monopoly. During this time, he can prevent others from using the invention; he can license the invention and charge royalties; or he can manufacture and market the invention as a sole source supplier. If the invention is worthwhile, he is in a position to make exorbitant profits.

Patents are a survival of so-called letters patent which were issued in large numbers during the Middle Ages and through the Age of Mercantilism. These were open—hence the word "patent"—royal letters announcing to one and all that the possessor had been given exclusive rights by the monarch to some specified office, privilege, or commercial monopoly.

Originally, the purpose of letters patent granting industrial or trade monopolies was to promote the public interest; that is, to expand the nation's industry and trade—its national economy. It was then believed that the best, if not the only way, to induce people to invest large capital sums in new industries or trading ventures was to guarantee them freedom from competition, that is, to grant them a monopoly.

In time, the public interest came to be disregarded by monarchs. They granted letters patent to court favorites or sold them to the highest bidder in order to enrich themselves. In the reign of James I, the English Parliament finally put an end to the whole system of private monopolies and privileges through the 1624 Statute of Monopolies.

One type of letters patent was allowed to survive, the patent granted to inventors. For a limited time, a monopoly under the patent was allowed in order to encourage inventors to invest their brains, time, and money in research. It was believed that this was the best, if not the only, way to induce people to produce inventions. These basic ideas were subsequently incorporated into our own first patent law of 1790.

While there are flaws in our patent system, I can see why the Government grants patent protection to private interests who invest their own time and money in making inventions. But the patent situation today is quite different from what it was in 1790. At that time, a patent was a matter that concerned the individual primarily; individuals in a preindustrial age were developing single items. Today, the development of patents generally involves large organizations and corporations.

The U.S. Government alone is currently spending—in fiscal year 1978—nearly $26 billion for research and development. To grasp the significance of this sum, bear in mind that the total expenditures of the U.S. Government for the 11-year period, 1789 to 1800, was less than $6 million. It was not until 1917 that the entire Federal budget reached $1 billion.

Over the years I have frequently wondered whether, in this modern industrial age, patents are as important to industrial organizations as would appear from the statements made by the patent lawyers. It is probable that they are overemphasizing the present-day value of patents and it is quite possible our industry might not be hurt much if we restricted the items that could be patented.

I believe that today the important factor for an industrial organization is the know-how developed by it—the trade secrets and the techniques; these are not patentable qualities. They are things which are inherent in a company, in its methods; in its management and trained employees; in the kind of machine tools it has; how it uses these tools; and so on.

Up to the advent of the Atomic Energy Commission in 1946, and the Space Agency in 1958, most Government research and development consisted essentially of adaptations to existing technology. That is, an industrial organization would be called upon by the Government to take an item that it had already developed over a period of many years and modify it. But today, in many areas, the Government is in the forefront to technological development. As a result, it is actually the public that is financing development of entire new technologies. It is wrong, in my opinion, for the Government to grant a contractor exclusive rights for 17 years to inventions developed with public funds.

There are those, notably Government contractors, and patent lawyers in a out of Government, who have argued the opposite—that the Government should grant to contractors exclusive rights to publicly financed inventions. From what I have seen the patent lobby consists primarily of a body of shrewd, so-called experts who have been needlessly confusing the simple principles on which the patent law rests. They have been successful to the point that today many Government agencies are giving away Government patent rights.

The Department of Energy continues to operate under patent regulations which were inherited from the Energy Research and Development Administration (ERDA). The ERDA regulations are a good example of how the obvious intent of a Federal law can be stood on its head by a Government agency. ERDA's responsibilities were set forth in the Atomic Energy Act of 1954 and in the Non-Nuclear Energy Act of 1974. Both of these laws remain in effect and applicable to the Department of Energy.

Under the Atomic Energy Act, the Government, historically, retained patent rights to publicly-financed inventions. That also seemed to be the legislative intent behind enactment of the Non-Nuclear Energy Act of 1974. The Congressional Conference report for that Act, states:

"Government patent policy carried out under the NASA and AEC Acts and regulations, and the Presidential Patent Policy statement with respect to energy technology, has resulted in relatively few waivers or exclusive licenses in comparison with the number of inventions involved. The conference committee expect that similar results will be obtained under Section 9 (of the Non-Nuclear Energy Act)."

However, under the Atomic Energy Act and the Non-Nuclear Energy Act, the Department of Energy has authority to waive the Government's patent rights. The Government patent lawyers have prepared a regulation which actually invites contractors to request waivers, and urges the agency to approve them. The regulation states:

" * * * To accomplish its mission, ERDA must work in cooperation with industry in the development of new energy sources and in achieving the ultimate goal of widespread commercial use. * * * An important incentive in commercializing technology is that provided by the patent system. As set forth in these Regulations, patent incentives, including ERDA's authority to waive the Government's patent rights to the extent provided for by statute, will be utilized in appropriate situations at the time of contracting to encourage industrial participation, foster commercial utilization and competition and make the benefits of ERDA's activities widely available to the public."

This regulations also states that each potential contractor should be notified at the time of bid solicitation that he may request the Government to waive its patent rights, and that a request for waiver will not be considered as an adverse factor in evaluating bids.

With these new regulations the number of waiver requests in the energy field has increased dramatically. In Fiscal Year 1975, the Energy Research and Development Administration reported receiving two waiver requests; in Fiscal Year 1976, the number increased to 106. No doubt the number will continue to grow geometrically as the patent lobby pushes this policy.

To the extent a Government agency is not bound to the contrary by the provisions of a statute, it is supposed to be guided by the Presidential patent policy memorandum issued by President Nixon in 1971. This policy memorandum attempts in broad terms to strike a middle ground between giving away and retaining Government patent rights. However, like most attempts to reconcile irreconcilable positions, it has failed. The wording is so broad and so vague that agencies can construe what they wish from the memorandum. The Department of Defense routinely gives patents away. The General Services Administration has published procurement regulations, for most other Government agencies, which do the same.

The patent lobby would have us believe that if companies are not guaranteed exclusive patent rights, they will not accept Government contracts. Obviously, if given a choice, most contractors would like the Government to give them exclusive rights to all patents that might result from Government contracts. But very few firms would, in my opinion and from my experience, reject Government business if they were not given patent rights.

These rights are not all that important to most firms. The Atomic Energy Commission operated successfully for more than 25 years under a policy whereby the Government retained title to inventions developed under AEC contracts. That agency had little trouble finding contractors and did an excellent job of developing technology. Likewise, I have no trouble finding contractors even though they know they will not receive patent rights on my Nuclear Propulsion Program contracts.

From what I have seen, most of the people who actually run the companies are interested primarily in profits and in the technology, experience, and know-how that comes from performing the contracts. This technology, experience, and know-how is what helps the company get future Government and commercial contracts. Several studies, including a 1968 study by the Committee on Government Patent Policy, confirm that ownership of patents is usually not a major factor when companies decide what work to accept; that companies are interested primarily in how much money they can expect to make, and what they can learn.

Contractor lobby groups typically use the threat of refusing to take Government work when they try to persuade Congress to eliminate procurement safeguards or to take other actions that will benefit industry. The Defense contractor lobby, for example, has made similar threats year after year in relation to the Truth-in-Negotiations Act, the Cost Accounting Standards Board, the Renegotiation Board, and so on. They say that defense contractors will leave the business unless the Defense Department increases profits or relaxes regulations. Yet, year after year, these very same defense contractors lobby Congress and the Defense Department for more business. Their actions belie their words; and this is also the case with respect to patents.

While companies contend that they should have the right to the inventions they make at Government expense, they apply an exactly opposite principle in dealing with their own employees and subcontractors. Employees are required to give their employer the rights to any inventions that they conceive on the job. Toward their employees and subcontractors, the companies' practice is that the one who pays for an invention should own it. But in dealing with the Government, they contend that the one who actually made the invention should own it, not the one who paid for it. This is a classic example of "Heads, I win. Tails, you lose." It is also an example of the double-talk which has caused the public to hold business in such low esteem.

The patent lobby contends that contractors must be given exclusive patent rights to inventions developed under Government contracts or they will not invest in production facilities or in the future research and development work needed to commercialize an invention. This is one of the main arguments being used in promoting a giveaway patent policy.

It is nonsense to think that our technological growth will suffer unless contractors get exclusive rights to patents generated under Government contracts. From what I have seen over many years, the vast majority of patents both in and out of the nuclear industry are of little or no significance. Some individuals obtain patents as evidence of achievement, much as Boy Scouts collect merit badges. Their ideas might be patentable, but nothing worth pursuing.

Large corporations file numerous patents that are not great new developments, but minor improvements or design features. Often they file these patents simply to discourage competitors or potential competitors—particularly small firms—from trying to enter the market. And if someone wants to challenge the validity of any of these patents, it can take hundreds of thousands of dollars and years of litigation. A high percentage of patents contested in court are ruled invalid. But not many firms are willing or able to sustain such a challenge. Thus, these patents tend to discourage competition.

Obviously, there are patents that do represent useful ideas. However, even without a patent, many of these inventions would be discovered and adopted in the marketplace based on their merits. In such cases, rather than motivating individuals or companies to come up with new ideas, the patent system has actually become a process for determining which of many firms first conceived an idea, and is therefore entitled to the royalty. If one company did not generate the idea another firm would have because of the nature of the work being done. Often, identical ideas crop up almost simultaneously in different companies. Further, many good ideas can be implemented or "commercialized," without special investment in R. & D. or new facilities. Or, they are sufficiently promising that companies will invest in them without patent protection.

There may be a few inventions arising under Government contracts which, in the absence of exclusive patent rights given to the contractor, might not be disseminated and used. The question then arises: Is it really worthwhile for the Government to promote the invention? Perhaps the idea is not all that good. Moreover, if the Government should decide it is in the public interest to promote or "commercialize" a particular invention, it might be better if the Government itself paid for further development, and made the results available to all citizens instead of granting to one contractor exclusive rights to the invention. And who is to say, in cases where the Government patents are waived, that the company performing the contract should automatically and exclusively get these rights. Since large corporations get

the major share of government contracts, they would be the ones to benefit most from such a practice.

The concept of granting a patent—a legal monopoly—is to encourage inventors to conceive new inventions, not to guarantee a market for already existing inventions. But companies now want to have their marketing development costs guaranteed by having a patent monopoly on Government-financed inventions. Since the public has paid for the development of the invention, the risks of marketing it should be no different in principle from other risks that are inherent in a true free enterprise system. How is the risk of marketing a publicly-financed invention different from the risk a man takes when he opens a new grocery or hardware store on a corner where none existed before? We would be going still further in abandoning our so-called free competitive enterprise system if we guaranteed legal monopolies for what are essentially normal business risks.

The patent lobby contends that, under a giveaway patent policy, the public is protected because the Government would have "march-in" rights. Under this concept, contractors who have been given exclusive patent rights to inventions developed under Government contracts would be required to submit reports explaining their efforts to commercialize the inventions. If a contractor did not commercialize the invention to the Government's satisfaction, the Government would then exercise its "march-in" rights and take the patent rights back or license it to others.

This concept sounds good in principle. But, the patent lawyers well know that this is a cosmetic safeguard; it offers no real protection for the public. To administer such a program would require a large Government bureaucracy to receive, review, audit, and act upon contractor reports throughout the life of each patent. Currently, the Government would have to track contractor activity on about 30,000 unexpired patents. If the Government ever tried to reclaim its patent rights, more administrative effort, and probably much litigation would be involved..

In the real world, no one in Government would ever undertake this task; nor should they. Government agencies should concentrate on their proper functions rather than wasting time trying to keep track of how well contractors are promoting and commercializing patents.

It is relevant to note that, although Presidential patent policies since 1963 have required the Government to retain "march-in" rights where the principal or exclusive rights to a patent remain with the contractor, the Federal Council on Science and Technology reports that, as of December 1975, the Government has never exercised these rights.

The patent lawyers have observed that the number of patented inventions resulting from Federal funding is very small compared with the number generated by industry with their own funds. They attribute this, in part, to "the small incentive provided by present Federal patent policy."

I believe the lower number of inventions reported under Government contracts does not show a stifling of inventions under Government contracts. In fact, most of the major advancements in technology in the past 20 years have come in areas where the Government invested heavily, such as space, defense, and nuclear energy.

The lower number of Government-owned patents results from other factors, such as failure of contractors to report the inventions they develop under Government contracts; the patent rights giveaway policy followed by various Government agencies; and the Government's "Independent Research and Development" program.

I have found cases where contractors filed patent applications for themselves on items that were conceived and developed under Government contracts. These come to light only because, by law, patent applications in the field of atomic energy must be reviewed by the Department of Energy and because in my area I insist on having them reviewed. In areas outside the field of atomic energy, there is no way for Government agencies to determine whether contractors are claiming, as their own, patents which rightfully belong to the Government.

The relatively small number of Government patents stems from the very fact that the Government has been giving them away; they have been patented by the contractors. The Defense Department, for example, does not acquire patent rights under production contracts. It retains patent rights only under contracts characterized as "research." Even under R&D contracts, the Defense Department has criteria for giving away Government patent rights.

In my opinion, the Government's rights to patents developed at public expense should not depend on some arbitrary distinction between "research" and "production." Often the best ideas and technology come during manufacture of a product, rather than from the research and development work that preceded it. The Government should retain patent rights on Government contracts, regardless of the nature of the work, whenever the invention was developed at Government expense.

Another reason for the small number of Government patents is that contractors automatically get title to patents developed under the Government's so-called "Independent Research and Development" (IR&D) programs—even though all or nearly all of these costs are paid for by the Government. The Defense Department alone spends about $1 billion annually on this program, but the patents developed do not have to be reported to the Government.

Under present rules, any U.S. citizen, for a nominal fee, can get a non-exclusive license to use a Government-owned patent. There has been little demand for these non-exclusive licenses; but that does not mean the invention is not being used, as members of the patent lobby contend.

The reasons for the Government to patent its inventions are primarily defensive: to ensure that the Government is not subsequently barred by a private patent from using an invention whose development the Government itself paid for; to prevent the establishment of a private monopoly for an invention developed at Government expense; and to make the invention freely available to the public. If these same ends could be achieved by "defensive publication"—that is, by publishing information in a manner that would preclude others from patenting it—the public interest would be served as well as if the Government actually patented the invention.

This Committee will, I am sure, be lobbied to death by contractors and patent lawyers—both in and out of Government. There will be speeches extolling the virtues of a giveaway patent policy in relation to the patent system; the free enterprise system; the nation's declining technological growth; and the problems of small business. These are the standard speeches which lobbyists tailor to fit special occasions.

But here, the policy they advocate is contrary to the principles of free enterprise and competition. Rather than giving everyone in the marketplace equal access to publicly-financed inventions, they are advocating that the Government restrict the use of an invention to one company.

Small business, for its own advantage, should be against a giveaway patent policy. The vast proportion of Government business goes to large contractors. In Fiscal Year 1976, 50 percent of the total dollar value of research and development contracts placed by the Department of Defense went to only ten large corporations. In Fiscal Year 1977, two-thirds of the $35–$40 billion defense procurement budget went to the top 100 contractors. As conglomerates expand, this concentration continues to increase. If the rights to Government-financed inventions are given away to contractors, the Government itself will be promoting the concentration of economic power in the hands of a few large conglomerates.

To appreciate fully the implications of a giveaway Government patent policy, one need only consider a hypothetical case. Suppose, with the vast sums of Government money that will be spent in efforts to find solutions to the energy problems, a contractor, at public expense, develops a technological breakthrough. What would an ordinary taxpayer think when he learned that this company could, for 17 years, legally control the dissemination, use, and pricing of this invention?

For the reasons I have stated, I believe that the Government should have a strict policy of retaining, for all citizens, the rights to patents developed at taxpayer expense. Specifically, I recommend the following:

1. All Government agencies should be required by law to retain patent rights, except in exceptional circumstances, to all inventions developed at Government expense.

2. Prior to a Government agency waiving the Government's rights to any patent, the Attorney General should be required to make a written determination that the waiver is required to obtain performance of work essential to the mission of the agency and that granting the waiver will not adversely affect competition or small business.

3. All inventors should be required to certify on their patent applications that the invention was developed under a Government contract and duly reported; or that the invention was not developed under Government contracts. Criminal penalties should be provided for individuals or contractors who file, as their own, patents that have been developed at Government expense.

STATEMENT OF ADM. H. G. RICKOVER, U.S. NAVY, TO THE SUBCOMMITTEE ON THE CONSTITUTION OF THE SENATE COMMITTEE ON THE JUDICIARY, JUNE 6, 1979

UNIVERSITY AND SMALL BUSINESS PATENT PROCEDURES ACT

Thank you for inviting me to testify on "The University and Small Business Patent Procedures Act."

One stated purpose of the bill is to establish a uniform Federal patent procedure for small businesses and universities. As I understand it, the bill provides that, in almost all cases, small businesses and universities may elect to retain title to inventions developed under their Government contracts; the Government keeps a nonexclusive license to use the invention for Government purposes.

If the Government subsequently determines that the contractor is not effectively taking steps to achieve practical application of the invention within a reasonable time, the Government would have so-called "march-in rights", under which the Government can require the patent holder to license the invention to others.

If in 10 years a small business or university makes more than $250,000 in after-tax profits from licensing the invention, or $2,000,000 on sales of products incorporating the invention, the Government is entitled to a share of all additional proceeds up to the amount of Government funds spent in making the invention.

In my opinion, Government contractors—including small businesses and universities—should not be given title to inventions developed at Government expense. These inventions are paid for by the public and therefore should be available for any citizen to use or not as he sees fit.

In private industry, the company that pays for the work generally gets the patent rights. Similarly, companies generally claim title to the inventions of their employees on the basis that the company pays their wages. In doing business with the Government, however, these same companies reverse the standard, contending that the patent rights should belong to the one who comes up with the idea, not the one who foots the bill.

In rationalizing their claim for title or exclusive rights to Government financed inventions, contractors often use the age old arguments of the patent lobby; they claim that the Government is stifling technology by retaining title to approximately 25,000 patents; that these patents reflect worthwhile ideas that are not being used; that without patent protection companies will not commercialize these inventions; and that the public therefore does not get the benefit of the Government's R&D expenditures.

Generally, these are the arguments of patent lawyers, contractors, and those unable to find sponsors for their inventions. Truly good ideas tend to be used. The reason so many Government-owned and privately-owned patents are not used stems from considerations other than the need for monopoly patent rights.

A vast majority of patents are of little or no significance. Many companies seem to file patents defensively; meaning that they file numerous patents for minor details primarily to keep someone else from getting a patent in that area or to discourage potential competitors. Some people file patents as status symbols; others simply misjudge the attractiveness of their ideas. The Patent Office itself, when in doubt, tends to patent questionable items on the assumption that, if the patent becomes important, the validity of the patent can be tested in court.

Finally, it is almost impossible to tell the extent to which patented inventions are being used, particularly in the case of Government-owned patents. Government agencies do not have a reason to search for patent infringement. The Government, unlike private parties, generally has no desire to prevent others from using its inventions. The reasons the Government should take title to these inventions are primarily to ensure the Government is not subsequently barred by someone else's patent from using the idea; to preclude the establishment of a private monopoly for a publicly financed invention; and to ensure the public has equal access to these inventions.

Patents are generally incidental to Government research and development work, not its primary purpose. When I place an R. & D. contract for a new design reactor, it is principally to work out the details of a design and to identify and resolve the problems of design, manufacture, and operation. If patentable inventions arise in the course of this work, they generally involve only small design features, not entirely new concepts. The bill however seems to be based on the notion that the Government-owned patents are predominantly good ideas which Government agencies should try to force out into the market place. The bill states "It is the policy and objective of the Congress to use the patent system to promote the utilization of inventions arising from Federally supported research or development . . ." and to "Protect the public against non-use or unreasonable use of inventions." (emphasis added)

Under this bill, Government agencies would be expected to promote actively the inventions that it now owns and those that arise under new contracts. The bill further requires that the General Accounting Office audit these agencies annually and report to the Congress on their progress in this effort.

In my opinion, the bill overemphasizes the importance of patents and, if enacted, would tend to divert attention and resources of the Government agencies away from their main functions. Most agencies have enough trouble doing the job they were established to do; they should not be required to spend their time and resources trying to promote patents of dubious value. I believe that the decision to use or not use Government financed inventions is one best left for the private sector.

The bill includes some safeguards which I believe would be cumbersome and ineffective. The first involves the Government's ability to force wide spread licensing under its so-called "march-in" rights, if a contractor who holds title to a Government financed invention were not satisfactorily developing and promoting it. The Government has had march-in rights since 1963, but to my knowledge has never used them. To be in a position to exercise these rights a Government agency would have to stay involved in the plans and actions of its patent holders and check up on them. If a Government agency ever decided to exercise its march-in rights and the patent holder contested the action, no doubt the dispute could be litigated for years. For this reason I believe this safeguard is largely cosmetic. It would result in much additional paperwork but would probably be used no more than in the past.

A second cumbersome and probably ineffective safeguard involves the provisions for return of Government investment. The proposed procedure involves keeping track of how much the Government invested in the invention and what after-tax profits a contractor has made over a ten year period from licensing agreements or direct manufacturing associated with the invention. Since there are no firm standards for calculating these figures, the likelihood of manipulation and disputes is great. To comply with provisions of this bill, Government agencies would have to set up organizations; issue and implement regulations; promote patents; review and audit contractor patent development and utilization plans; intervene when these plans are not carried out; negotiate agreements; audit books and records. I believe that these requirements will be effective only in adding much unnecessary paperwork.

Contractors and patent lawyers often claim that contractors will decline Government work if they are not given title to patents they develop under the Government contract. My experience has been that Government patent policy is rarely the dominent factor in company decisions to accept or reject work. Businessmen tend to value the tangible benefits of profits and technical know-how from Government orders more than the speculative benefits of patent rights. For more than 30 years I have been able to obtain the R&D and manufacturing work needed for the Naval Nuclear Propulsion Program without having to give away Government patent rights.

Although S.414 is supposed to be about universities and small businesses, there is another part of the bill, Section 208, which would establish patent licensing procedures applicable to all contractors, both large and small. Under this Section, Government agencies would be specifically authorized to grant exclusive licenses to use Government-owned inventions. Under the bill, the General Services Administration is authorized to prescribe the regulations governing such licensing. In the past, questions have arisen as to the legal authority of various Government agencies to grant exclusive licenses to Government owned inventions or to waive the Government's rights to title in such inventions. This bill would resolve these questions in favor of being able to give away Government patent rights.

Judging from the past performance of many Government agencies, the attitude of the Department of Commerce, and the influence of large contractors in individual Government agencies, there is no doubt in my mind that the regulations would be written to encourage the granting of exclusive patent rights to Government contractors. The bill requires Government officials to make certain formal determinations prior to granting exclusive licenses. However, the bill provides a framework under which Government agencies could rationalize the granting of exclusive licenses to large contractors. Either by getting Government agencies to waive its patent rights, as authorized under some of the present laws, or under the licensing regulations that would evolve under the proposed bill, many large contractors would be able to obtain—perhaps at the outset of the contract—title or exclusive licenses to inventions developed under their contracts with the Government. This should be prohibited.

These licensing provisions of this bill are identical to the language proposed to the House Science and Technology Committee during the previous session of Congress as part of a bill to promote technology. That bill and a similar one that was reintroduced recently are aimed at giving both large and small contractors exclusive rights to inventions developed under their Government contracts. It appears that these same interests are trying to take advantage of the small business and Univer-

sity title of S.414 to achieve what they so far have failed to achieve in these other bills.

In summary, I believe that inventions paid for by the Government should belong to the public, and all citizens should have an equal opportunity to use the inventions, private firms, particularly large companies, should not be able to get a 17-year monopoly on inventions they develop with tax dollars. When Government agencies routinely grant contractors exclusive rights to use such inventions, it promotes greater concentration of economic power in the hands of large corporations; it impedes the development and dissemination of technology; it is costly to the taxpayer; and it hurts small business.

I testified in more detail on the general subject of Government patent policy as it affects small business before the Senate Small Business Committee on December 19, 1977. With your permission, Mr. Chairman, I would appeciate having that statement included as part of my testimony today.

I recognize that despite my convictions on this subject, there often is strong sentiment in the Congress to do something special for small businesses or Universities. If you do decide to provide more favorable treatment for them, I recommend that you do so in a manner which ensures that small businesses and Universities, rather than large contractors, in fact have priority or at least equal access to inventions developed at Government expense. To accomplish this, I recommend that S.414 be modified as follows:

(1) Require that the Government retain title to all inventions developed at Government expense.

(2) Give small businesses and Universities an automatic 5-year exclusive license to inventions they develop under their Government contracts. At the end of this period the invention would fall in the public domain. This would provide limited protection but not a 17-year monopoly. It would also obviate the need for the cumbersome safeguard provisions of the present bill, e.g. "March-in rights," "return of Government investment," and the vast administrative effort associated with them.

(3) Revise the preamble to eliminate any implication that Government agencies should (a) actively and indiscriminately promote all inventions arising from Federally supported research or development, and (b) "protect the public against nonuse . . . of inventions." Only a small portion of the inventions patented by Government or industry turn out to be worthwhile.

(4) Prohibit agencies from waiving the Government's rights to take title to patents development at Government expense. Whenever such waivers are granted, small businesses or other firms are foreclosed from the opportunity to use the invention.

(5) Prohibit contracts which automatically provide to the contractor exclusive licenses to any inventions developed under the contract, except as indicated in paragraph (2) above. Other firms should at least have an equal opportunity to use the invention non-exclusively or bid for the exclusive right to use it.

(6) Require that the Commerce Department publicize the availability of patents to which the Government has title for a period of six months. If no one requests a non-exclusive license, the rights to an exclusive license could be granted to the highest bidder with small businesses having priority in the bidding.

(7) Eliminate the statutory requirement for the GAO to conduct an annual review of agency performance in the area of patents. It does not seem appropriate to include this as a permanent requirement of the law.

In my opinion the effects of Government patent policy are continually exaggerated and overplayed by the patent lawyers and contractors who have a vested interest in the matter. Proposed changes regarding ownership and use of patents developed at Government expense are always presented under the banner of high sounding principles and purposes. Having observed this issue for many years, I am thoroughly convinced that almost all of such proposed changes are contrary to the best interests of the United States.

The basic principle embodied in present laws is that the Government should have title to inventions developed with Government funds. That is a sound principle I fully support. It should be modified, waived, or otherwise tampered with only for compelling reasons—and even then with great care and in the most limited way needed to accomplish the purpose.

[The following information was subsequently received for the record:]

QUESTIONS OF SENATOR SCHMITT AND THE ANSWERS THERETO

Question. As you are undoubtedly aware, there has been a growing concern over what is an apparent decline in the rate of American innovation and productivity.

Numerous indicators point to a slowing down of U.S. productivity gains relative to our major foreign competitors. For example, the difference between foreign patents granted to Americans and American patents granted to foreigners has dropped 47% between 1966 and 1975. Moreover, from the mid-1950's to the mid-1960's, the U.S. share of major innovations dropped from 80% to 54%. Do you agree there is a need to stimulate innovation and productivity growth, and, if so, what role does the Federal Government's patent policy play in this process?

Answer. The statistics reflect the growing technological sophistication of other industrial nations and is not necessarily indicative of declining U.S. technology. I believe the concept of public ownership and free availability of publicly-funded inventions as embodied in existing U.S. laws leads to the widest dissemination and use of new technology.

From an historical perspective, increased R&D competition should have been anticipated. The U.S. created and nurtured its own competition. At the conclusion of World War II, the economies of the industrialized nations, with the exception of the U.S., were essentially destroyed. The U.S. had a large, intact industrial base and extensive R&D programs. It provided technical and economic aid to other countries and helped them build modern industrial facilities. It should not be surprising that these nations are now competitive with the U.S. in the world marketplace.

Question. Current Federal patent policy is reflected in more than 20 different statutory provisions, two executive orders, and innumberable regulations. Oftentime, a single agency operates under several different patent policies. Delays in processing normal waiver applications can take up to several years. Witnesses before our Subcommittee have complained that this situation is confusing, costly, and counterproductive. In your view, are the Government's current patent policies effective and do they operate in the "public interest"? If not, what changes would you suggest?

Answer. I agree that current Federal patent policy is complicated, disjointed, and in many cases does not benefit the public. I have recommended a uniform Federal patent policy under which the Government would retain title to all inventions developed at public expense; Government agencies would be prohibited from waiving Government patent rights; and the Commerce Department would be required to publicize the availability of each Government patent and to grant non-exclusive licenses to those who express an interest in using the invention on this basis. Exclusive license could be granted on a competitive bidding basis in the event no one requests a non-exclusive license.

Question. In your statement, you express the opinion that the Government should take title to inventions to preclude the establishment of a private monopoly for a publicly financed invention. Can you provide the Committee with any data, statistics, or other evidence which would substantiate your belief?

Answer. The Government creates a monopoly any time it grants a contractor exclusive rights to a publicly funded invention. From that point on, the contractor can prevent others from using the invention except on terms the contractor dictates. Sound public policy dictates that inventions developed at Government expense should be freely available for use by any citizen. In cases where the Government concludes the public interest would be best served by granting exclusive rights, every citizen should be given an equal opportunity to bid on them.

Question. A recently released Report on Government Patent Policy prepared by the Federal Council for Science and Technology concluded that there has been a steady decline in the rate of inventive activity for both Government contractors and Federal employees. The number of invention disclosures reported as a result of the Government's R&D effort has dropped nearly 50% from 12,869 in FY 1968 to a low of 6,839 in FY 1975. What significance would you attach to these figures? To what would you attribute this apparent decline in domestic inventive activity.

Answer. There is no way to know why Government patent disclosures declined through 1975. However, the decline in patent disclosures is not necessarily indicative of a loss in creativity. There are several reasons that could account for the decline.

It can reflect the fact that many Federal agencies are lax in seeing that their contractors disclose inventions developed under their Government contracts. The technical people in charge of individual programs must be encouraged to have an interest in, and a sense of responsibility for invention disclosures.

It can also reflect selective disclosure by contractors. Contractors involved in Government and commercial work may be taking credit on commercial work for inventions that actually had their origin under Government contracts. For example, contractors participating in Government-funded Independent Research and Development programs are able to claim inventions as their own that are developed in this

program and to slide inventions originating in other Government work under this umbrella.

Question. As you know, Senators Bayh and Dole have introduced a bill, S. 414, the Small Business and Universities Patent Procedures Act, which, with certain exceptions, would permit small business and university contractors to retain patent rights to inventions made in the course of Federal contracts. Would you give the Subcommittee your views on this legislation?

Answer. I testified before Senator Bayh's subcommittee on the Constitution regarding S. 414 on June 6, 1979. I testified that while I believed Government funded inventions should be freely made available to the public, I recognized that Congress sometimes felt the need to provide special assistance to small businesses. Under the guse of helping small businesses however, S. 414 included provisions which instead give large contractors the advantage. If that is not the intent, and the purpose of S. 414 is to help small businesses, it should be revised as follows:

(1) require that the Government retain title to all inventions developed at Government expense.

(2) give small businesses and universities an automatic 5-year exclusive license to inventions they develop under their Government contracts. At the end of this period the invention would fall in the public domain. This would provide limited protection, but not a 17 year monopoly. It would also obviate the need for the cumbersome safeguard provisions of the present bill, e.t. "march-in rights," "return of Government investment," and the vast administrative effort associated with them.

(3) revise the preamble to eliminate any implication that Government agencies should (a) actively and indiscriminately promote all inventions arising from Federally supported research or development, and (b) "protect the public against non-use . . . of inventions." Only a small portion of the inventions patented by Government or industry turn out to be worthwhile.

(4) prohibit agencies from waiving the Government's rights to take title to patents developed at Government expense. Whenever such waivers are granted, small businesses or other firms are foreclosed from the opportunity to use the inventions.

(5) prohibit contracts which automatically provide to the contractor exclusive licenses to any inventions developed under the contract, except as indicated in paragraph (2) above. Other firms should at least have an equal opportunity to use the invention non-exclusively or bid for the exclusive right to use it.

(6) require that the Commerce Department publicize the availability of patents to which the Government has title for a period of six months. If no one requests a non-exclusive license, the rights to an exclusive license could be granted to the highest bidder with small businesses having priority in the bidding.

(7) eliminate the statutory requirement for the GAO to conduct an annual review of agency performance in the area of patents. It does not seem appropriate to include this as a permanent requirement of the law.

Question. In your statement you expressed the opinion that most patents are of little or no significance. If this is so, what is the justification for the costly programs which are currently needed to administer the present patent policies? Also, if the inventions are worthless, why are you so concerned about the rights which the contractor might acquire in these supposedly worthless inventions?

Answer. My experience has been that most patents have little or no significance. However, it does not follow that all patents under government contracts are, or will be, worthless.

For those that are worthwhile, it would be wrong to give one contractor exclusive control over that invention simply because the contractor was fortunate enough to have obtained a Government contract to do the work. Another important consideration is that if contractors were allowed to retain patent rights under Government contracts, many contractors would patent trivial ideas not because they thought the concept important but to further encumber other companies from being able to enter into that line of business.

If the Government were to adopt a policy of giving its contractors exclusive rights to inventions developed under their government contracts, those contractors with the largest amount of Government-funded R&D work would undoubtedly end up with the most patents. In effect, the government would be helping to limit competition rather than enhance it. Such a policy would encourage even greater concentration of economic power in the hands of large corporations.

Question. The President's recently announced proposal for Government patent policy would, as you have suggested, give title to the Government but it would also give the contractor an automatic exclusive license for the life of the patents in the "field of use" of the contractor. What is your personal view of that policy approach?

Answer. For all the reasons outlined in my statement and in the answers to the prior questions, I do not agree that contractors should be given an automatic exclusive license for the life of a government owned patent in the "field of use." The proposal to retain public ownership of a patent's title while granting exclusive use to a contractor is a facade. I do not think that it is wise for the government to get in the position where it invests billions of dollars in research and development programs—which are supposedly aimed at the nation's foremost problem areas—only to give contractors sole control over the application of the results for the next 17 years.

"March-in rights" are once again advanced in the proposal as the means to protect the public. As I have noted before, march-in rights have been in existence since 1963 and have not been used. This lack of use speaks stronger than any theoretical argument over the protection they provide. Furthermore, concern has been expressed over the administrative system currently required to oversee Government patents, yet no consideration has been given to the far larger system that would be necessary for the Government to adequately police publicly owned patents controlled by Government contractors.

Question. In the United States the typical employment contract requires the employee to assign his or her rights to the company pursuant to the a pre-employment agreement. As presently drafted, S. 1215 would not affect the existing contractual relationship between the Government contractor and the employee-inventor. In your view, is there a need to provide greater incentives to the employee-inventor who has assigned his rights to the company? Is this a matter which should be dealt with by Federal legislation?

Answer. I do not believe there is a need for the federal government to provide greater incentive to the employee-inventor who has assigned his rights to the company. My experience has been that good ideas will come to the surface without the need for special incentives.

In any event, most companies have incentive programs for their employees. Moreover, any company concerned about increasing its size or enhancing its profitability will encourage and aggressively pursue ideas generated by its employees. Often overlooked in the continuing debate over Government patent policy is the need for any R&D contractor to demonstrate its ability to originate new processes and to make improvements to existing processes in order to justify follow-on contracts. This alone requires a contractor to encourage its employees to be innovative.

It is worth noting the double standard that pertains in this area. The patent lobby creates the impression that companies cannot be creative unless they can get exclusive rights to patents developed under government contracts. Yet, they apparently find no difficulty in reconciling this position with the fact that companies require their employees to assign patent rights without any apparent concern over employee creativity.

Questions of Senator Long and the Answers Thereto

Question. As I understand it, contractors who do research for the Government get a share of their research overhead paid for by the Government. Often they can train a staff of research workers and hold them in reserve for the time when they use them on their own private research projects. In addition, the research staff and the records of the contractor constitute a body of "know-how" which inevitably remains the property of the contractor and may be a very valuable asset.

Am I correct in this understanding?

Answer. Yes, sir. Government contractors receive funds, primarily through the DOD, for Independent Research and Development. These funds are given to the contractors to do any R&D they wish with only a broad requirement that there be some potential application to Government programs.

Contractors consistently abuse this concept. I have testified many times concerning these abuses.

Question. It is also riskless: is it not?

Answer. Yes, sir. There is no risk involved because no product is required from the contractor.

Question. Then, the contractor has a substantial competitive edge on possible competitors both in the commercialization of an invention or in securing future research contracts. Isn't that so?

Answer. There is no doubt that the Independent Research and Development payments give Government contractors advantages over companies without Government contracts.

Question. Do you have any specific or concrete examples of business firms that have withheld their research services from the Government because of their inability to receive patents on Government research?

Answer. No, sir. In fact, for my program contractors are constantly urging me to give them more work. Contractors know that I will not waive Government ownership of patent rights. Therefore, they do not attempt to scare me by stating they will not take my work unless they get the patent rights.

Question. Do you know of any case of an important product or process which people need and for which there is a demand, not being commercialized because of absence of monopoly rights?

Answer. I personally do not know of any valuable inventions that have not been marketed because of the Government's patent policy.

Question. So you would not give the patent away just to commercialize a product? If it is important, if it is needed, it will be produced. Is that right?

Answer. Yes, sir.

Question. One of the arguments used to justify giving away patent monopolies on Government-financed research is that exclusive rights; that is, patent monopolies, will bring about maximum utilization of the invention.

How can you maximize utilization if the contractor is put in a position to exclude other citizens, other members of the public, from practicing the invention?

In other words, the patent, which is a restrictive device, will do just the opposite, will it not?

Answer. Yes, sir. I believe it will. The purpose of a patent is to reward and give incentive to inventor who must fund their own work. The inventor is rewarded with a monopoly. This is a tradeoff by the public—eliminating competition for a set period in return for the inventor having assumed the risk of devising the invention. When the Government finances the work this is no longer necessary. The public has paid for the invention and should not be penalized.

When the Government finances an invention, I believe free dissemination of technical information is the best way to promote technology.

Question. Small business gets only a very small amount of research and development dollars—perhaps only 3 to 5 percent.

If the Government were to give contractors patent monopolies on publicly financed research and development, is not the Government actually shutting small businesses out of some of the most dynamic areas of our economy?

And would this policy not increase economic concentration and monopoly and ultimately destroy competition in many areas?

Answer. Yes, sir. The bulk of Government R&D work goes to large corporations. This increases economic concentration and hurts small business. The proposed bill would exacerbate this problem by giving these large corporations patent rights to Government financed inventions.

I testified to Senator Bayh's Subcommittee on the Constitution that, if Congress believes small business should be aided, small businesses should be allowed to retain an exclusive 5-year license to inventions they conceive under Government contracts. This would give them a shelter to develop a market without creating a long term monopoly.

Question. S. 1215 provides that when patents are given to the contractor—and in most cases it will be very large firms—information about what the contractor is doing with the Government research and development will be withheld from the public.

Would you care to comment on this provision?

Answer. The proposed bill provides that the Government withhold information until the contractor files for a patent. This is wrong and is part of the giveaway of publicly funded inventions. In effect, the Government would not only give the contractor the patent rights to these inventions but would aid and protect them while they obtained patents.

Question. The very distinguished economist Dr. Wassily Leontief (now retired frm Harvard University), the developer of the input-output techniques and analysis, testified before my monopoly subcommittee in 1963 that:

"A high license fee charged by the holder of a patent for its use causes some of the potential users of the new idea to spend time and money on research aimed at circumventing it. Such "inventing around" the patent is exactly like choosing a country road when there is a highway, just because you cannot afford to pay a toll. When this happens, the cost of technological advance are raised and its speed is slowed down."

Do you see this as a possible danger if patents ar given away to the contractor?

Answer. Yes, sir. I see no reason why anyone should have to "invent around" a patent that has been developed at public expense. Anyone should be able to use publicly funded ideas.

Question. Would you agree with Dr. Leontief that an open-door policy in respect to inventions resulting from work done under Governmental contract would speed our technological progress considerably?

Answer. Yes, sir. I believe the best way to facilitate the dissemination of technology developed under Government contracts is by making this technology freely available to the public rather than giving a single contractor monopoly rights over the invention.

[Whereupon, at 1:20 p.m., the hearing was adjourned.]

ADDITIONAL ARTICLES, LETTERS, AND STATEMENTS

DRAFT REPORT ON PATENT POLICY

A Draft Report of the Advisory Subcommittee on Patent and Information Policy of the Advisory Committee on Industrial Innovation established as part of the Domestic Policy Review, December 20, 1978.

Notice.—This report represents the views of the Subcommittee on Patent and Information Policy of the Advisory Committee on Industrial Innovation, an advisory committee convened by and reporting to the Secretary of Commerce. The views of the Subcommittee do not necessarily represent those of the Department of Commerce or any other agency of the Federal Government.

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SUMMARY

In general, the patent system has served the country well. Major overhaul of the patent system is not recommended. Nevertheless, some modification to the system could have a beneficial effect on innovation. The most serious problems with the patent system are the uncertainty about the reliability of patents and the long time and high costs associated with resolving such uncertainty through litigation. When proper consideration is given to these problems as they relate to those independent inventors and small businesses whose success—and indeed very existence—depends upon the innovation process, it becomes clear some changes must occur. These problems deter investment of the money required to commercialize an invention (a necessary and expensive step in the innovative process). It is here that modifications to the patent system can have their most beneficial impact. Steps should be taken to increase the assurance that a patent is a valuable piece of property, something that offers protection to subsequent investment.

The committee has identified four major goals to which attention must be addressed to enhance the innovation process through improvement of the present patent system:

1. Enhancement of the reliability of the patent grant to the inventor and those investing in the commercialization of his invention;

*Member of the Working Group on Patent Policy.

2. Reduction in the cost—both in time and money—of judicial enforcement of the rights derived from the patent;

3. Extension of the availability of commercial exclusivity derived from patents to technological advances presently denied patentability; and

4. Development of systems transferring the commercial rights to government supported inventions to those in the private sector capable of their innovation.

We have three major recommendations to improve the reliability of the patent grant.

(1) Upgrade the Patent Office by:

(*a*) Providing an adequate examining staff to assure a rigorous high quality examination. This would increase confidence in the patents that are issued.

(*b*) Providing modern search tools that increase the probability of finding the relevant prior art. This would be a cost-effective investment by reducing search time per examiner, as well as reducing the frequency of subsequent proceedings to argue the prior art.

(2) Provide a reexamination process—available to all interested parties—in order to ensure that the patentability of the invention described in the patent has been considered by the Patent Office in the light of all relevant prior printed publications.

(3) Provide a central court to hear patent appeals. This would provide greater consistency in judicial decisions, thus reducing uncertainty.

To reduce the present cost of judicial enforcement of the patent grant, a request should be directed to the Supreme Court, and the Judicial Conference, to require each federal court to exercise a high degree of control over the conduct of patent litigation, with particular concern for the time and expense of discovery.

To foster commercialization of inventions made in governmental laboratories, under government research contracts and in university laboratories supported with federal funds, the subcommittee recommends that the commercial rights in such inventions be structured in a manner capable of being transferred to industry—small or large—to insure capital investment in their development. Such transfers should be subject to a license right reserved to the government to insure no further payment for governmental use of the invention.

The subcommittee also recommends clarifying the statutory standard of patentability and permitting licensees to agree not to attack the validity of licensed patents. An adequate extension of the patent term should be provided when commercialization of patented inventions is delayed due to federal regulations.

The subcommittee recommends establishment of foreign policy which encourages other countries to provide United States innovators the right to obtain enforceable patent rights, thus extending the incentive to commercialize United States innovations in international markets.

Further, study should begin of the appropriate extension of patent rights to presently unpatentable technological advances, with consideration to be given to patentability of new life forms for industrial applications, use-specific chemical formulations based upon unpatentable biologically active ingredients and computer software.

SECTION 1

BACKGROUND

The United States has been the leading innovative nation in modern times and has created many new industries. One need only look at the major new industries started within the last fifty years, such as those involving electronics, laser, antibiotics, synthetic fibers, instant photography and xerography. There is still room for further innovation and it will continue if provided with a proper environment. Such an environment existed for years and produced outstanding results. Our patent system contributed significantly to an environment which promotes innovation. [1] Unfortunately, there have been disturbing recent indications that there has been a decrease in the rate of innovation and in that portion of the R&D investment devoted to new product lines and basic research.

Capital investment is growing more slowly in the U.S. than it is elsewhere: 14 percent in the U.S., 30 percent in Japan, 20 percent in Germany, and the U.S. trading position, even in high technology products, has deteriorated.

An even more dramatic indicator of the innovation decline is evidenced by the recent decrease in investment capital obtained by businesses. This decline can be readily seen from the following table that shows the capital acquired by firms with less than $5 million in net worth from public offerings since 1969:

Year and number of offerings:	*Millions*
1969—548	$1,457.7
1970—209	383.7
1971—224	551.5
1972—418	918.2
1973—69	137.5
1974—8	13.1
1975—4	16.2

The catastrophic decline in capital obtained by small businesses is apparent, and the trend extends to other sources of small business financing, including professionally managed venture capital sources and high-risk investments by individuals.

There has been a net decline in total United States expenditures for R&D, as measured in constant dollars, since about 1970. [2], [3] That decline was the result of a significant cutback on R&D spending by the federal government in the last ten years, particularly in aerospace research. Industrial R&D has shown an average real growth rate of about 2 to 3 percent annually. The data do not suggest a decrease in resources applied to R&D by the private sector. However, some analysts support the idea that there has been a shift in the emphasis of R&D from a search for new technology to upgrading existing technology and compliance with government regulations.

The high technology industries have the largest concentration of R&D effort. The ratio of R&D expenditure as a percent of sales has remained fairly constant, the ratio being higher for high technology corporations than low technology corporations.

Despite the fact that U.S. industrial R&D has not declined, in high technology areas there has been a substantial increase in the number of patents granted to foreign companies. Of the patents granted to United States residents in high technology areas, the large majority are owned by corporations and very few by individuals. In certain high technology fields, such as drugs and chemicals, about 90 percent of the patents are assigned to corporations, rather than individuals. [4] Individuals tend to own relatively more patents in less technical areas. At least in part, this is explained by the high cost and complexities of doing research in high technology areas, again underlining the need for effective patent support in these innovative businesses.

The total number of patents issued annually has declined since 1971 [5] suggesting a decline in innovation; however, when considered on the basis of filing dates, the changes are small, with only a slight downward trend. There has been an increase in the number of patents granted annually to foreign residents and a decrease in the number of patents granted to United States residents. The share of U.S. patents issued to foreign applicants has doubled in the last 14 years. These data suggest that inventors in other countries are becoming more active, rather than a sharp decline in the rate of United States invention. Further, the data suggest that United States innovators are facing increased competition from innovators in other countries.

Individuals and the full range of firm sizes, from small to large, are important to the innovation process. An adequate patent system is important to all, and is often critically important to individuals and small firms.

Some studies have shown that small firms produce major innovations at a higher rate than large firms, [6] although it has been suggested that larger firms may have fewer major innovations per R&D dollar because they produce more expensive innovations. [7]

Small firms tend to put to commercial use a higher percentage of their patented inventions than larger firms, [8] although both large and small firms report about the same percentage of patented inventions as being useful when, in addition to commercial use, licensing and other purposes are considered. [9] Patented inventions appear to have a greater effect on reducing costs of commercial production in large firms, [10] but a greater effect on increasing sales in smaller firms. [11] Both large and small firms report that the net return on patented inventions varies over an extremely wide range, [12] which is some evidence that the number of patents, as such, fails to meaningfully measure the worth of patented inventions. [13] Large and small firms which have a higher utilization of patents tend to experience greater sales growth than firms with a lesser utilization of patents. [14]

Eighty-five percent of United States exports are made by only one percent of United States companies. [15] There is a strong correlation between exporting and R&D in the United States. There is a positive trade balance in R&D intensive products and a negative trade balance in non-R&D intensive products. [16] There is also a positive trade balance in technology transfer. [17] A positive relationship appears between increased exports to foreign countries and patent filing in respec-

tive countries of export; i.e., the more patents, the more subsequent exports. [18] Improvements in our ability to innovate could have a significant impact on our balance of trade.

About fifty percent of all litigated patents are held invalid, which is virtually the same outcome as in many other fields of litigation, such as wills, land titles and contracts; [19] however, a higher percentage (about sixty-five to seventy percent) of appealed patent cases result in holdings of patent invalidity.[20][21] Patent litigation is extremely expensive; members of the committee who handle patent litigation report that they advise clients to be prepared to spend at least $250,000 for patent litigation.

Stimulation of innovation by the patent system

Our subcommittee concludes that the patent system is an essential element in our free enterprise system and has made a significant contribution to the economic development of our country.[22] This is so well accepted by the members of our subcommittee, who have worked for many years directly with the patent system, that we tend to take it for granted. Studies have concluded that the patent system has performed well its Constitutional mandate to promote the progress of . . . useful arts." [23][24][25] These and other studies set out many well-known examples which illustrate how the patent system has stimulated the decision to commercialize inventions, resulting in large financial gains for individuals, firms, and the country (e.g., taxes and jobs). Many less well known examples of important inventions commercialized at least in part as a result of the patent system, and which have resulted in more modest financial rewards, appear in reported tax rules. [26]

Several qualitative studies [27][28] including recent studies by the United States Patent and Trademark Office and the Industrial Research Institute [29][30] have concluded that the patent system, while fundamentally sound, could be strengthened so that it does a better job in promoting decisions to commercialize inventions. While the subcommittee can cite no rigorous evidence which establishes that changes in the patent system would have a major impact on the rate of R&D, there is a consensus among the members of the subcommittee that the availability of reliable patents has an impact on the focus of R&D and on decisions to invest in the commercialization of patented products.

Continuing efforts by governmental spokesmen within the Department of Justice and the Federal Trade Commission to limit the available methods of commercially using patent rights has had the effect of reducing the usefulness of patents in raising capital, especially for the purpose of completing the innovation process by commercializing an invention.

One of the ways to encourage investment to complete the innovation process by commercializing inventions is by reducing the risks involved in decisions to commercialize. The risks of commercializing inventions can be reduced if the inventions are the subject of reliable patents [31] and if uncertainties relating to the utilization of patent rights can be resolved quickly and inexpensively. Also, the availability of reliable patents encourages decisions to disclose inventions through the patent system; and, disclosure of inventions to patents appears to exert a stimulative effect on competitive R&D. [32]

The subcommittee has identified four major goals to which attention must be addressed to enhance the innovation process through improvement of the present patent system.

(1) Enhancement of the reliability of the patent grant to the inventor and those investing in the commercialization of his invention;

(2) Reduction in the cost—both in time and money—of judicial enforcement of the rights derived from the patent;

(3) Extension of the availability of commercial exclusivity derived from patents to new technological advances; and

(4) Development of systems transferring the commercial rights to government supported inventions to those in the private sector capable of their innovation.

Sections 2 and 3 of this report set out the subcommittee's recommendations to enhance the innovation process by improving the patent system in the above-identified areas.

NOTES

1. Robert F. Dale and James K. Huntoon, "A Cost-Benefit Study of the Domestic and International Patent Systems", "Idea," Volume 3, No. 3, Fall 1967, page 351, used several different methods to approximate the benefits of the United States patent system, which resulted in benefit-cost ratios ranging from 5:1 to 50:1, with monetary benefits in the range of $2 to $15 billion annually (page 405).

See also Robert B. Benson, "Patents In Our Free Enterprise System", presented at the John Marshall Law School, February 20, 1976, attached as Appendix C.

2. "Science Indicators," National Science Board, 1976, pages 108 through 115.

3. Business Week, July 3, 1978, page 58.

4. Supra, Footnote (2), page 112, Table 4-22.

5. Supra, Footnote (2), pages 95 through 105.

6. "Science Indicators," National Science Board, 1976, pages 35 through 41.

7. Supra, Footnote (6), page 118.

8. B. S. Sanders, "Patterns of Commercial Exploitation of Patented Inventions by Large and Small Corporations" "PTC J. Res. & Ed.," Volume 8, No. 1, Spring 1964, page 51, at page 53.

9. Ibid., page 74.

10. Ibid., page 79.

11. Ibid., page 77.

12. Ibid., page 89; see Appendix B.

13. Richard L. Sandor, "The Commerial Value of Patented Inventions", "Idea," 15:557, Winter 1971-1972, at page 562: "* * * it is not really the total number of patents which a firm has assigned to it which increases profit but only those which are used. The aggregate number of patents may over- or underestimate the effect of inventive activity on profits."

14. Supra, Footnote (1), at page 352. There is a slight, but not statistically significant, tendency for small firms with a high propensity to patent to experience greater percentage sales years than large firms with a high propensity to patent. See pages 366 and 367. Dale and Huntoon also observe that firms with high R&D tend to show more sales growth than firms with low R&D; and, firms with both high R&D and a high propensity to patent tend to experience greater sales growth than other firms.

15. Business Week, April 10, 1978, pages 60 through 66.

16. Supra, Footnote (6), page 116.

17. Ibid., page 31.

18. Supra, Footnote (1) at page 352.

19. Howard T. Markey, Chief Judge, U.S. Court of Customs and Patent Appeals, "The Status of the U.S. Patent System—Sans Myth, Sans Fiction", address before the European Study Conference, London, England, January 25, 1977, reprinted in "J. Patent Office Society," Volume 59, No. 3, March, 1977, page 164 at page 169. Chief Judge Markey notes that many more holdings of invalidity are reported than holdings of validity; he also suggests that the number of appellate patent decisions does not represents a statistically valid sample of United States Patents: "The fundamental error which has caused so many from other nations to join those Americans looking askance at the U.S. patent system, is the employment of statistics to gauge court attitudes. The number of appellate patent decisions is simply too small to justify the drawing of any conclusions, as some of the reporters of statistics have themselves cautioned in their reports. The number of patents adjudicated by the appellate courts between 1968 and 1972, for example, was less than one-third of those adjudicated in the district courts, only 11 percent of those on which suit was filed, and less than two-tenths of 1 percent of those issued. Between 1953 and 1971 over 1,000,000 patents were issued. Only 1,080 were litigated or 0.1 percent. The total number of patents subject to litigation, i.e., those issued up to 17 years prior to 1953, is even greater and further reduces the statistical sample to far less than 0.1 percent. Conclusions drawn from such a de minimis sample in any other field would be laughed off the stage by trained statisticians." (page 167)

20. Ibid., page 171.

21. In Germany, in 1975, 90 patents were challenged for invalidity. Twenty-two percent were found invalid, and another nineteen percent were found partially invalid. See Bernard Nash, "Remarks Before the Industrial Research Institute", Philadelphia, Pennsylvania, October 18, 1876, reprinted in "J. Patent Office Society," Volume 59, No. 3, page 143 at page 147.

22. Memorandum for Jordan J. Baruch, Assistant Secretary for Science and Technology from Donald W. Banner, United States Department of Commerce, Patent and Trademark Office, dated October 13, 1978.

23. "Industrial Research Instituted Position Statement on the U.S. Patent System", 1978. See Appendix D.

24. "Study of the Subcommittee on Patents, Trademarks and Copyrights of the Committee on the Judiciary", United States Senate, Study No. 1, United States Government Printing Office, 1956. See, for example, page 12, footnote 26, and page 15.

25. David Rines. "Do We Need a Patent System", "J. Patent Office Society," Volume 51, No. 8, August, 1969.
26. See D. C. Richards and G. E. Lester, "A Patent Harvest", "1975 Patent Law Annual," pages 1 through 12, for several representative case histories.
27. "Report of the President's Commission on the Patent System", United States Government Printing Office, 1966.
28. E. A. Gee and C. Tyler, "Managing Innovation," pages 222 through 234.
29. Supra, Footnote (22).
30. Supra, Footnote (23).
31. Supra, Footnote (24).
32. Ibid.

SECTION 2

PROPOSALS WITH MAJOR IMPACT ON INNOVATION

This Section contains those proposals which the subcommittee feels would have a major impact on stimulating innovation. All members of the subcommittee urge prompt implementation of the substance of these proposals.

PROPOSAL I

Upgrade the Patent and Trademark Office

The subcommittee strongly recommends that the Patent and Trademark Office (PTO) be given sufficient funds and resources to thoroughly and carefully process patent applications so that the reliability of resulting patents is greatly improved and the enforceability of such patents is enhanced.

PTO patent examiners presently spend an average of 15 hours in examining each patent application, including reviewing and understanding the disclosure and the claims; conducting a search of the prior art, including U.S. and foreign patents and the literature; writing an action either allowing or rejecting some or all of the claims, and giving reasons why the claims are believed to be unpatentable; reviewing the response filed by the applicant or his attorney to such action; conducting a further search and either granting or refusing the patent. In the latter event, another action is prepared again setting forth the reasons for rejection so that the applicant can decide whether an appeal should be taken.

The most important part of the examination procedure is the search of the prior art by the examiner. This is done manually by him. Because of time pressures placed on the examiner and the inherent limitation of the examiner's search file, he cannot search all of the literature published throughout the world which may contain pertinent references.

Failure by the U.S. examiner to find and cite pertinent prior art results in the issuance of patents which contain claims that do not accurately define the scope of protection to which the invention is entitled, and thus are not given a high degree of acceptance in practice and are more vulnerable to attack in the courts. Infringers involved in patent litigation and who cite prior art not cited by the examiner (even art that is not more pertinent than the cited art) have greater success in convincing courts to invalidate the patents over such new prior art.

The PTO handles approximately 103,000 new patent applications per year with a staff of 3,000 people (approximately 1,000 examiners) and a budget of $93 million. By contrast, the European Patent Office (EPO) is projecting an annual load of 40,000 patent application filings with a staff of 3,000 people and a budget of $115 million. Such an EPO budget, if scaled up to handle the load handled by the PTO, would be two and a half times the current PTO budget.

In light of the foregoing, the subcommittee submits that the PTO should be given the funds [1] and resources to improve its examination procedure and thereby to enhace the validity and enforceability of U.S. patents. Such improvement should include expansion of the PTO examining corps to permit more thorough searching of the prior art without increased application pendency. Emphasis should be placed on the quality of the patent examination and not on quantity of applications examined. The PTO should expand its quality control program to review a greater

[1] If the PTO is given increased funding, consideration should be given to raising at least a portion of such funding through higher fees. The Government Accounting Office has proposed that the PTO recover in fees 55 percent of its costs (it now recovers 32 percent of its costs; see Chemical and Engineering News, November 27, 1978). The subcommittee feels, however, that excessively high fees could constitute a disincentive to innovate on the part of individual inventors and small firms. Any steps taken to raise additional income from PTO operations should, accordingly, give special consideration to providing relief for individuals and small firms.

sampling of allowed patent applications, thus ensuring more uniformity in the quality of the issued patents. furthermore, the PTO should improve the integrity and completeness of the PTO's primary search tools, i.e. the patent search file and its scientific library.

The subcommittee further recommends that the PTO develop, have developed or use an available computerized patent and prior art search system to better assure the finding and consideration of the closest prior art by the examiner. By developing such a system, eventually containing all U.S. and foreign patents and publications and constantly updating it as new references are received, the PTO not only will assure that substantially complete prior art searches can be done by examiners but, if such data base was made available to inventors and their patent attorneys, many patent applications would never be filed because of art located in such search. Those that were filed would more readily distinguish the invention over the closest prior art, leading to less protracted prosecution in the PTO. The value of such a data base to inventors and industry should not be overlooked. By locating and obtaining copies of references in a particular area, there would no longer be any occasion to reinvent the wheel and that time and energy could be spent in further innovations over those already known.

This subcommittee also recommends legislation which would obligate the Treasury to earmark certain patent and trademark fees for use by the Patent and Trademark Office, such as H.R. 13628, introduced on July 27, 1978 by Representative Peter Rodino (D-NJ). Under the proposed legislation, certain patent and trademark fees would be credited to the PTO appropriation and would be used to pay the costs of PTO products (e.g., copies) and services (e.g., examination and registration). In the past, the fee monies have not been earmarked for PTO use.

The bill would also give the Commissioner greater authority to set the fees for PTO products and services. Under current law, many fees must be set by Congress.

PROPOSAL II

Provide for reexamination of patents

One of the fundamental problems of the existing patent system is that pertinent prior art is very often found after the patent has issued and has become commercially important. At this point in time, additional prior art, not considered by the PTO, is often found which creates uncertainty concerning the enforceability of the patent. Such uncertainty often deters the patent owner or licensee from commercializing the invention. Such uncertainty can also deter commercialization by an interested party who cannot quickly and cheaply assess the value of the patent. Litigation is slow and very expensive. Such uncertainty coupled with such expense can be utilized by infringers to avoid respecting the patent property, especially those owned by independent inventors and small businesses, which in turn reduced the value of patents as an incentive to innovate. Therefore, a need exists for a fast, inexpensive method for increasing the certainty as to the enforceability and scope of a patent.

Accordingly, the subcommittee proposes that the PTO initiate a system for the reexamination of U.S. patents by any party requesting such reexamination during the life of the patent. The reexamination system should provide for submission of written arguments by the patentee and other interested persons concerning patentability over prior patents or printed publications. Such reexamination should be handled on an expedited basis by the PTO so that a prompt decision can be rendered. If the claims are held to be patentable over the cited art, the p.esumption of validity of the patent is enhanced and patentees and interested parties would have a clearer idea about the strength of the patent, without resorting to litigation. In some instances, the reexamination procedure should help avoid litigation costs.

If the patent claims where held to be invalid over the cited art, the patentee would have the right to amend his claims and to define his invention more accurately or assert his position to the Board of Appeals and, on appeal, to the Court of Customs and Patent Appeals or the U.S. District Court for the District of Columbia.

This reexamination system would be available whether or not the patent to be reexamined was already involved in litigation. In such case, however, it would be solely within the court's discretion as to whether the litigation should be stayed pending the reexaminaiton, so as to avoid undue delays in obtaining a final court adjudication.

The importance of having prior art relied upon to invalidate a patent reviewed in the first instance by the PTO, when obtainable without delay of infringement litigation, cannot be too highly emphasized. Indeed, reliable statistics suggest that a significantly higher percentage of litigated patents are held invalid where prior art

relied on in court was not previously considered by the PTO than was the case where the prior art had been so considered.[1]

The subcommittee recommends enactment of suitable legislation [2] to fully implement the reexamination system; in the interim, the subcommittee encourages the Commissioner to use his rule-making authority to institute reexamination to the fullest extent possible.

The net effect of this subcommittee's proposal for reexaminaiton would be to provide a simple, inexpensive method of greatly improving the quality and reliability of those U.S. patents which have demonstrated commercial value and to avoid expensive and wasteful procedures with resepct to non-commercial developments. It would also provide a system whereby competitors of the patentee can request a more accurate definition of the invention (claims) as guidance in their efforts to legitimately compete with the patentee.[3]

PROPOSAL III

Provide a specilized appellate court for patent cases

This subcommittee favors a centralized national court with exclusive appellate jurisdiction (subject to Supreme Court review) over patent-related cases as a vehicle for insuring a more uniform interpretation of the patent laws and thus contributing meaningfully and positively to predicting the strength of patents.

The present judicial system for reviewing patent disputes has generated extensive differences in the various circuits' application of the patent law which has inordinately increased litigation expenses (by encouraging forum shopping) and made it extremely difficult for patent lawyers to advise their clients as to the likelihood of success in a given case.

It is the view of this subcommittee that the uniformity and reliability made possible by a centralized patent court would contribute meaningfully to decisions to file patent applications and to commercialize inventions, thereby improving industrial innovation in the United States. Consistent decisions in patent cases would greatly aid attorneys in advising their clients as to the strength of patents, thus reducing uncertainty was to the strength of patents.

This subcommittee favors the general concept of a special national court to hear patent appeals, such as the court proposed by the Department of Justice which would be formed by merging the Court of Customs and Patent Appeals with the Court of Claims, plus a few new judges. The new court would retain the present jurisdictions of these courts and acquire additional jurisidiction now exercised by Circuit Courts of Appeal over patent, civil tax and other cases. In the view of the proponents of the DoJ plan, the new court would overcome many of the perceived deficiencies of a specialized patent court while, inter alia, providing advantages such as the following: "This proposal would also resolve the myriad evils caused by fragmented review in tax, patent, and environmental litigation. The rampant lack of uniformity between the Tax Court, the district courts, the Court of Claims, and the regional courts of appeals would be cured. The forum-shopping common to all three areas of litigation would be cured. Business planning would be made easier as more stable law is introduced in all three critical areas. Concentration of this litigation would help develop expertise in handling the cases. The background and training of most of the members of the CCPA, some of the members of the Court of Claims, some of the Trial Commissioners, and the CCPA's technical advisors would materially aid the resolution of patent and environmental cases, but the court having 15 members would not be dominated by specialized judges." [4]

For the foregoing reasons, this subcommittee supports the concept of a national court having exclusive patent jurisdiction.

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[1] See Koenig, "Patent Invalidity—A Statistical and Substantive Analysis" (Clark Boardman Co., Ltd. 1976).

[2] Such as H.R. 14632, 94th Congress, January 30, 1976, as modified by Resolutions, Two and Three of the August, 1977 annual meeting of the Patent, Trademark And Copyright Law Section of the American Bar Association, the effect of which is to (1) give the courts discretion to stay litigation for determination of the issue by the PTO, and (2) provide third parties who have initiated a reexamination proceeding to have an opportunity to submit a written response to the statements filed by the patentee.

[3] See Appendix H.

[4] The DoJ has modified the proposal, so that the new court would not have jurisdiction over environmental litigation.

PROPOSAL IV

Reduce cost of patent litigation

One of the major problems which, to some, makes the patent system not nearly as effective as it should be is the cost and time involved in resolving patent infringement disputes through litigation. This is particularly serious for the indiviudal inventor and small company because they can neither spend the time nor the substantial expense, which frequently exceeds $250,000 per party in a patent infringement suit.

In order to encourage innovation through the patent system, ways must be found to reduce the cost of patent litigation, and a decision on patent disputes must be available within a reasonable time.

The subcommittee recommends that the Supreme Court, through the Judicial Conference, require each federal court to exercise a high degree of control over the conduct of patent litigation, with particular concern for the time and expense of discovery. The subcommittee specifically recommends the approach to patent litigation proposed by Howard T. Markey, Chief Judge, United States Court of Customs and Patent Appeals. Those proposals are reproduced in Appendix E.

PROPOSAL V

Transfer commerical rights to Government-supported research to private sector

The United States patent system is designed to stimulate the progress of the useful arts by encouraging the public disclosure of new technology and making available to the public new products and processes utilizing this technology. It is not necessary to go through the expensive, time-consuming procedure of obtaining a patent to fulfill the function of disclosing information to the public. This can be accomplished by a simple publication. On the other hand, the patent grant has played an important part in commercializing inventions, making new products available to the public. The Federal Government does not normally participate in this function.

The theory of the patent grant is to give the inventor or his assignee the exclusive rights to his invention for a period of time so that he can invest the time and money necessary, commercialize the invention and develop a market for the product or process incorporating the invention. Since the government is not in the business of developing inventions for commercial use, it has no need to own patents. On the other hand, the government is a substantial user of products and services and in that context needs, or at least can benefit from, a license to use patents.

Experience has shown that the government, as a purchaser or consumer of goods and services, is not in a position to take advantage of its ownership of patents to promote enterprise. Private companies, on the other hand, who are in a position to utilize the patent grant are ordinarily unwilling to take a nonexclusive license under a government-owned patent and commit the necessary funds to develop the invention, since it has no protection from competition. This is a major reason that over 90 percent of all government patents are not used. Another important reason is that the government obtains patents on technology which, in the opinion of the private sector, does not provide an attractive business opportunity.

Several years ago, the Federal Council for Science and Technology supported the most thorough study ever conducted on the issue of governement patents, commonly referred to as the Harbridge House Report. The following findings were included in the report:

"Government ownership of patents with an offer of free public use does not alone result in commercialization of research results.

"A low, overall commerical utilization rate of government-generated inventions has been achieved; that rate doubled, however, when contractors with commercial background positions were allowed to keep exclusive commercial rights to the inventions.

"Windfall profits' do not result from contractors retaining title to such inventions.

"Little or no anti-competitive effect resulted from contractor ownership of inventions because contractors normally licensed such technology, and where they did not, alternative technologies were available."

The idea that what the government pays for belongs to the people is not only appealing, it is true. The question is: What instrumentalities can be brought to bear to maximize the possiblities that the people will indeed have available the fruits of their government's expenditures? Nonexclusive licenses to undeveloped inventions, offered by the government or anyone, have few takers, where as patent ownership or exclusive licenses of sufficient duration are much more likely to attract the

money and talent needed to make and market real products to meet consumer needs.

If the results of federally sponsored R&D do not reach the consumer in the form of tangible benefits, the government has not completed its job and has not been a good steward of the taxpayer' money. The right to exclude others conferred by a patent, or an exclusive license under a patent, may be the only incentive great enough to induce the investment needed for development and marketing of products. Such commercial utilization of the results of government-sponsored research would insure that the public would receive its benefits in the way of products and services, more jobs, more income, etc. The cost of government funding will be recovered from the taxes paid by the workers and their companies.

Therefore, all the members of this subcommittee recommend transferring the patent rights on the results of government-sponsored research to the private sector for commercialization. In the case of university or private contractor work sponsored by the government, the members of this subcommittee recommend that title to the patents should go to the university or private contractor, but some members feel the government should have "march-in-rights" (i.e., when the invention is not being used and it appears that there is a public need to use the invention, the government would have the right to transfer patent rights to those in the private sector willing to use the invention). With respect to inventions made by government employees at government expense, the subcommittee members are divided about equally between those who feel that the government employee should have title to the invention, and those who feel that such inventions should be transferred to an independent, non-governmental organization, perhaps modeled after the Connecticut Product Development Corporation,[1] or auctioned to the private sector or transferred to the private sector in some other manner. In all cases, the government would retain a nonexclusive license to use and have made for its use inventions founded in whole or in part by governmental expense.

At the present time, the government has a portfolio of 25,000 to 30,000 unexpired patents. These include patents arising as a result of research and development work in government laboratories by government employees, and also from work done by non-government employees wherein the government retained title because it funded the work. In fiscal 1976, 2,646 patents issued to the government, of which 1,824 were for inventions by government employees.

Considerable sums of money are involved in government patent ownership, the patent budgets of the various government agencies including funding for patent attorneys, supporting staff and equipment being in the millions of dollars.

Our information indicates that the United States government has been filing in excess of 3,000 United States patent applications per year, which amounts to approximately 3 percent of the total workload in the United States Patent and Trademark Office. A decision not to file patent applications on behalf of the government would result in the PTO having available 3 percent of its total capability that could be directed to reducing the backlog in the PTO and handling special problems that have been created by the new reissue program and the anticipated reexamination procedures. In addition, this decision would save the time of government patent attorneys who normally prepare and prosecute the patent applications and the cost of having patent applications prepared by attorneys in private practice. Time and money thus saved could be utilized to provide needed services in other areas of the government.

According to this subcommittee's proposals, the decision to file a patent application would be made by the university or contractor; in the case of inventions made by government employees at government expense, the decision to file would be made by the employee, if he were to retain title, or by the independent nongovernmental organization (suggested above), which would obtain title to the patent.

The subcommittee recognizes the argument that the government applies for patents to preserve its right to institute an interference with patent applications from the private sector. However, such interferences are a very rare occurrence under present practices. Furthermore, establishment of prior invention by the government would generally constitute a defense in an infringement suit on the basis of prior invention. Prior invention may not be an adequate defense in instances where the government has not reduced the invention to practice, or has, for good reasons, kept the invention secret; special legislation may be required to provide adequate protection to permit royalty-free government use in such instances.

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[1] 111 Lafayette Street, Hartford, Conn. 06106. See Appendix F.

SECTION 3

OTHER PROPOSALS WHICH WOULD INCREASE INNOVATION

In addition to the proposals noted above, this subcommittee endorses the following proposals, which, in the opinion of at least a majority of the subcommittee, would result in significant stimulation of innovation.

PROPOSAL VI

Clarify the statutory definition of patentable invention: 35 U.S.C. §103

In the course of the foregoing discussion of national patent court (Proposal III), it was noted that the federal circuit courts of appeal have enunciated different and incompatible views of what constitutes, and the requirements for a finding of, patentable invention.

It is the view of this subcommittee that the creation of a national patent court will do much to eliminate these disparate views on the critical issue of what constitutes patentable subject matter and, in the process, to make for a more reliable and predictable patent system. A majority of this subcommittee also feels, however, that the patentability standards has been subjected over the years to such a wide variety of viewpoints, some of them antithetical to the constitutional purpose of promoting all the useful arts, as to militate strongly in favor of a Congressional restatement and clarification of the metes and bounds of patentable subject matter. Good legislative action would insure not only more consistent and predictable future adjudication but that which best comports with an implements the constitutional goal of promoting the progress of the useful arts, which is the raison d'etre of the patent system. Any such clarification should not only eliminate departures from rigorous application of the statutory standard of non-obviousness, as set forth acceptably in *Graham* v. *John Deere Co.*, 383 U.S. 1 (1966), but should ensure the taking into account of the so-called secondary considerations involved in determining the presence or absence of non-obviousness.

Some members of the subcommitee feel that, as with almost any legislative changes, legislation further defining the standard of patentability might increase rather than reduce patent litigation, and could well result in more, rather than less uncertainty in predicting the strength of patents. These committee members believe that the standard of patentability is defined in the current statute as precisely as necessary; they contend that the problem is not the statutory definition but rather the tendency the courts have to apply the statutory definition non-uniformly (and this problem would be minimized upon implementation of this subcommittee's recommendation for a single court to hear patent appeals).

PROPOSAL VII

Permit licensee to agree not to challenge licensed patent

Some members of this subcommittee recommend legislation permitting a licensor and a licensee to expressly contract for a licensee estoppel (under which a licensee is prevented from contesting the validity of a licensed patent) to correct perceived abuses by patent licensees.

Under the Supreme Court decision in *Lear Inc.* v. *Adkins*, 395 U.S. 653 (1969), the patent owner, who is bound by a license contract, may offer a license to a potentially major infringer coincidental with the first sign of infringement, and may for a time "enjoy" the infringer's agreement to a license under which the infringer is to pay a royalty that may be substantial if the market develops as the patentee hopes. By the act of granting the license, however, the patent owner is at the virtual mercy of the licensee if the licensee later wishes to renege on the license agreement and to challenge the validity of the patent. Indeed, at least some licensees have signed agreements planning at that time to challenge the licensed patent at a later point in time.

By granting a license to a competitor, the patentee—

(1) gives up his choice of time of litigation against the competitor;

(2) gives up his choice of forum for the litigation, which sometimes is dispositive in terms of results and very commonly has great effect on the settlement figure; and

(3) has compromised too low the amount of royalty that he might get or ought to get from a valid patent because he thinks he is saving litigation costs and risks.

The licensee, on the other hand, having taken the license, is enabled by Lear to pick his own time for litigation when he sees the market develop, and to pick his own forum in which to file a declaratory judgement action.

If the licensee wins then he may not pay anything following his validity challenge, though he received a very valuable consideration. Even if the licensee "loses" he can, as a practical matter, depend on the court not to assess a royalty higher than the contract's compromise low royalty as the damages, in spite of the fact that his act was quite deliberate in nature. Thus, by taking a license he never intends to honor, the licensee extorts a low royalty.

The majority of this subcommittee submits that the solution is to statutorily restore to the law the capacity of the licensor and licensee expressly to contract for a licensee estoppel, at least so long as the license continues in force. By restoring the licensor to a position of licensing parity with his licensee, the desirable social goals of protection of the inventor's property, fairness in the law and sponsorship of innovation by the inducements of Title 35, United States Code, are achieved.

Some members of the subcommittee can find no reason for not affording full freedom to contract for permanent licensee estoppel. They contend that this is the only mechanism whereby litigation may be finally settled and the reneging licensee is not permited to profit by his perfidy.

Other members of the subcommitee were of the view that this proposal, which is the only recommendation of the patent subcommittee specifically directed to the legislative overruling of a judicial decision, will have no effect on innovation. For these members, this view is further supported by what they feel is the conservative way in which *Lear* v. *Adkins* has been applied by the lower courts, and the fact that the elimination of invalid patents may remove blocks to innovation on the part of the industry covered by the patents.

PROPOSAL VIII

Extend patent term to compensate for delays in commercialization caused by governmental regulations

There are circumstances where extension of the term of the patent may be appropriate to insure that the rewards from the patent system enhance innovation. It is recognized that innovators of many different types of products may not lawfully vend such products within the U.S. without securing from various federal agencies such as the EPA, FDA, etc. pre-marketing approval. Inevitably such approvals require considerable testing of the product over a long period of time to establish environmental acceptability, safety, and, for some products, efficacy. Improved efficiency in the examination of patent applications by the Patent and Trademark Office results in the grant of patents to the innovator of such products long prior to federal approval for marketing of the product, resulting in a shorter patent-assured exclusivity period than the 17 years contemplated by Congress. This inequity could be remedied by legislation which would permit extending the patent term to compensate for delays in commercialization caused by governmental regulations. Such legislation would be similar in principle to current legislation which provides for the delayed issuance of patents to inventors when, for security reasons, their patent applications are prevented from issuing in the normal course (35 U.S.C. §§ 181 and 183).

Some members of the subcommittee feel that the proposed extension of patent term could cause difficulties in planning for competitive activities at normal patent expiration.

PROPOSAL IX

Encourage other countries to provide U.S. innovators the right to obtain enforceable patent rights

During the past ten to fifteen years, steady erosion of patent protection available for United States inventors has taken place in many foreign countries. This was due to agitation by certain economists and politicians in developing countries acting on the national scene, as well as through and with the help of intergovernmental organizations, particularly agencies of the United Nations. It is being incorrectly asserted by these circles that the patent systems in developing countries benefit only foreigners, and therefore maintenance of a strong, efficient patent system is not in the best interest of these countries. Mainly as a result of these activities, in large geographical areas of the world—notably, Latin America, Asia and Oceania (with the exception of Japan, Australia and New Zealand) and in Africa (with the exception of South Africa)—no effective patent protection exists at present. This development, which is continuing and is gaining momentum, has an adverse effect on United States industry, particularly those segments which are most research-intensive.

The extent of the funds which United States industry can make available to finance R&D activities is directly dependent upon the amount of domestic and foreign sales and profits realized. The loss of sales and profits, through inability of United States enterprises to obtain effective patent protection in many countries for the results of their R&D activities, could have a direct negative effect on the amount of funds available to support future R&D. The erosion of patent protection or the complete lack of it in certain fields of technology puts the innovative United States industry in an intolerable position by depriving it of the ability to defend itself against copiers of successful innovations who have not incurred heavy R&D expenses in creating and developing them. Turning large geographical areas and large current and potential markets into patent-free zones and subjecting United States enterprises to unfair competitive pressures by local enterprises and, increasingly, also by other multinational and state-owned enterprises, will inevitably result in serious erosion of United States technological leadership.

Foreign trade—in the form of direct exports, foreign investment in subsidiaries, and in manufacturing facilities—is an ever-increasing important part of the business of United States enterprises, particularly those which are highly research-intensive. In a number of industries, foreign business activities account for 50 percent or more of total corporate sales and profits.

In order to finance research and development, maintain United States technological leadership, and improve the balance of trade, it is imperative that the ability of United States enterprises to do business abroad shall not be impeded through the action of foreign governments or groups of governments denying patent protection.

The respect for patent rights, whether owned by the nationals of a country or by foreigners, formerly universally recognized as socially and economically desirable, would also in the long run directly benefit the developing countries in creating employment, attracting investment, and encouraging the transfer of technology. A strong United States posture for seeking improved patent protection in third-world countries, which would in all likelihood be supported by other Western nations, would therefore be not merely in the enlightened self-interest of the United States, but also in the long-term interest of the developing countries.

United States Government action, as outlined, to support the reestablishment and maintenance of a full and effective patent system in foreign countries would no doubt trigger resistance and protest from third-world governments, various international organizations and United Nations agencies. The United States might be accused of serving its own narrow self-interest, and inflammatory slogans such as "economic imperialism" or "neo-colonialism" might also be uttered. The good faith of the United States in striving to assist developing countries in their rapid development and industrialization might also be questioned.

Nevertheless, it is submitted that there is no inconsistency. The primary and essential factor in the industrial development of third-world countries through the transfer of technology is the voluntary, good-faith cooperation between the transferor and transferee. This is a two-way street where the security and protection of industrial property rights are an essential element. It is therefore also in the enlightened self-interset of the technology-recipient countries that inventions should enjoy meaningful patent protection.

PROPOSAL X

Patent rights to be available for new technological advances

The Constitutional purpose of the patent system is to promote the progress of the useful arts. The subcommittee believes in the patent system, and supports the use of the patent grant as a method of encouraging invention and innovation as broadly as possible under the patent law.[1] The subcommittee supports the following statement of Judge Markey: "As with Fulton's steamboat 'folly' and Bell's telephone 'toy', new technologies have historically encountered resistance. But if our patent laws are to achieve their objective, extra-legal efforts to restrict wholly new technologies to the technological parameters of the past must be eschewed. Administrative difficulties, in finding and training Patent and Trademark Office examiners in new technologies, should not frustrate the constitutional and statutory intent of encouraging invention disclosures, whether those disclosures be in familiar arts or in areas on the forefront of science and technology."[2]

By way of example, the subcommittee feels that patent protection should be accorded new life forms and computer programs.

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[1] See Patent Law Perspectives, Section A.2 at page 79.
[2] In re Chakrabarty (CCPA, 1978) 197 USPQ 72 at page 76.

A. *New Life Forms.*—It is difficult to accurately forecast the extent of the benefits that can be provided to mankind by technologies which produce new, useful and unobvious life forms. However, we have already seen a preview of these benefits in the reports of the production of insulin and somatostatin (Chemical and Engineering News, June 19, 1978, pp. 4,5) and through the promise of quicker, more complete cleanup of oil spills (National Geographic, September 1976, pp. 374, 375) by certain genetically modified microorganisms.

At present, two patent appeals, *In re Bergy et al* (Patent Appeal No. 76-712) and *In re Chakrabarty* (Patent Appeal No. 77-535) are near resolution in the Court of Customs and Patent Appeals. *Bergy* relates to a life form which was found in nature but which was isolated and purified to produce a useful product. *Chakrabarty* relates to genetic manipulation to produce a useful life form previously unknown in nature.

If the position taken by the United States Patent and Trademark Office in both cases that a living thing is not patentable subject matter under Section 101 of the Patent Act of July 19, 1952 is not overruled by the courts, it will be necessary to seek implementing legislation from Congress if non-plant life forms are to be patentable.

In the *Bergy* situation where life forms discovered in the natural state are isolated and propagated, the argument has been made that it is unlikely that such cultures are within the Congressional intent as to patentable subject matter. Analogizing to the content of the Committee Reports (Senate Committee Report No. 315, 71st Congress, 2nd Session, and House Committee Report No. 1129, 71st Congress, 2nd Session) accompanying the bills (S. 4015 and H.R. 11372) resulting in the Plant Patent Act of 1930, it is pointed out that Congress refused to provide coverage for the mere discovery of wild varieties of plants. It is argued that however meritorious the discovery of a new and useful microorganism in the wild state, like the wild variety of plant, such microoganism even after culturing remains the same as its relatives in the wild state awaiting rediscovery by others.

Therefore, the culture should not be patentable. However, there is already some case law supporting the patentability of substances extracted and concentrated in purified form, and there are good reasons for this. The purified form of the microorganism did not exist in nature, would never have been available but for the work of the researcher, and the benefits to the public would not have been available. Thus, there is logic for saying that the purified form is a manufacture, was certainly not obvious and patentability should attach. The availability of patents in this instance is certainly a stimulus to research, just as in the pharmaceutical fields, and seems justified for that reason.

In the case of the genetically modified bacteria as in *Chakrabarty,* there is a strong argument that a new "manufacture" clearly exists. As such, the argument of availability in nature does not attach, and the only contention against patentability is the proposition that Congress did not intend to afford the patent grant to living organisms. This contention is based at least in part on the fact that it took a special statute to make plants patentable and that the same is needed for other life forms. (This argument of course also applies in the case of the pure culture.) The counter to this is that Congress when it has passed patent statutes over the years could not possibly have foreseen what man would evolve in the way of manufacture. Space vehicles, jet engines, computers, etc., were certainly beyond the imagination of the national legislature when it provided for the first patent coverage, but yet there has never been any question as to these. If the progress of science is in the national interest, the term manufacture should be construed broadly, and patentability afforded to the useful bacteria resulting only from the efforts of man.

Another argument in favor of patenting certain new, useful and unobvious life forms is that it provides an alternative to the less desirable avenue of trade secrets. Practically speaking, an industrial user must fully contain the microorganism within his facility lest the trade secret be lost. Such containment will increase the costs of the process or product, costs which inevitably are passed on to the consumer. Maintenance of trade secrets also tends to stifle the free exchange by technology and hinders the progress of science by postponing the benefits to mankind of these technologies. Underhindered by the threat of piracy, there will be stronger incentives to invest money in new and useful technology under the protection of the patent system. In the circumstance where the living invention is itself placed in the stream of commerce, it is impossible to maintain it as a trade secret. There the protection of the patent system is needed to stimulate investment because once the invention is used, it is disclosed to the world.

B. *Use-Specific Chemical Formulations.*—United States industry has effectively competed in the development of agricultural and pharmaceutical products of benefit

to mankind here and throughout the world—and have made a major contribution to the United States balance of trade in these fields. Major fields of research in this application of the life sciences relate to the development of chemical formulations (such as herbicidal emulsions, insecticidal solutions, and pharmaceutical tablets) which include as the essential ingredient in their composition a chemical which exhibits a newly discovered biological activity. These formulations, after appropriate testing for environmental and health safety and efficacy, become commerical entities and important to agriculture and health. Under the present interpretations of the patent laws, protection is denied to such chemical compositions if the biologically active chemical is not itself patentable. Patent protection available under such circumstances has been limited to method of use patents to be asserted only against those actually using such chemicals in the agricultural or pharmaceutical application of such products, i.e., against one spraying corps, ingesting the pills, etc. Courts have concluded that the patent owner is prohibited from enforcing his patent against those who similarly formulate the active ingredient so that it may be used in accordance with the patentee's teachings. The subcommittee believes that the denial of useful patent protection for such use-specific formulations has had an adverse effect on investment in innovation in such fields. To encourage testing and innovation of chemcial compounds, unpatentable as such, for their potential use in agricultural and pharmaceutical applications, the subcommittee recommends that patent protection be extended to such use-specific chemical compositions since the composition is rendered novel by the inclusion of the active ingredient for the new use. Without such a possiblity for useable patent support, discoveries of new biological uses for known compounds will necessarily be withdrawn from the innovation sequence because of the recognized high cost of innovation in these fields.

C. *Patentability of Computer Programs.*—This topic is developed more full in the report of the Information section of the subcommittee. However, the Patent section of the subcommittee feels that patent protection should be accorded computer programs and computer software, provided the subject matter thereof meets the statutory definition of patentability.

SECTION 4

OTHER MATTERS CONSIDERED

In addition to the proposals discussed above, the subcommittee considered a number of other proposals and recommendations which are set out in this Section of the report.

This subcommittee makes no recommendations with respect to these matters, either because of lack of time to complete a thorough study or lack of concensus as to the wisdom of adopting these proposals.

A. Compensation of employed inventors

The committee as a whole agreed that corporations should be encouraged to motivate their employees to participate in all phases of the innovative process. This encouragement could be in the form of awards, promotions, release of unused inventions to the inventors and other systems presently being successfully used throughout industry in the United States.

Some members of the committee proposed that legislation requiring corporations to give employees a greater stake in their inventions would be a stimulus to innovation. The committee conceded that such legislation might increase the number of invention disclosures but not have a positive effect on the overall innovative process. In fact, the committee felt very strongly that an attempt to apply a uniform system on all corporations (such as is done in some European countries) would result in a singificant decline in overall innovation and could have the additional negative impact of flooding the Patent Office with patent applications directed to inventions of little or no commercial value. The results in countries that have initiated such systems bear out these results. The attached paper submitted by Mr. Richard C. Witte (Appendix G) entitled "Implication of a Federal Law Providing Employee Inventor Awards" sets forth in greater detail the implications of such proposed legislations.

Mr. Richard L. Garwin's paper presented to the subcommittee on November 16, 1978, and Mr. Eric P. Schillen's paper submitted to the subcommittee on December 8, 1978 set forth proposals for dealing with the inventions of employed inventors. Both papers are included in Appendix G.

B. Financial stimulus of innovation

The subcommittee did not have the time nor the availability of information as to what the Government has been doing or is authorized to do in providing either

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venture capital to individuals or small businesses or financial assistance to inventors. Certain areas in which the Government is already active have been identified as warranting special attention in the area of energy-related innovations and in the area of encouraging minority enterprises. insofar as this activity may have been successful, other areas should be identified. As the concept of such assistance is believed to provide societal advantages, it is recommended that this type of assistance be provided in those and additional identified areas.

C. Infringement of U.S. patents by the U.S. Government

Unfortunately, many agencies of the United States government appear to have a policy of doing as little as possible to resolve an administrative claim against them for patent infringement. A recommendations is that the Executive Branch of the United States government issue orders to all government agencies that any agency must render its final opinion on all claims for patent infringement no later than six months after the initial claim is filed. If such decision is not rendered at this time, it will be presumed that the patent is valid and infringed, and the agency cannot rebut this presumption.

D. Different classes or forms of patents

Incontestable patents

A trademark, after a certain period of use, can be regarded as incontestable, with certain exceptions, upon filing an appropriate affidavit.

One proposal considered by the subcommittee was that, five years after a patent has issued, it would be incontestable with respect to Section 103 (obviousness over the prior art) and, with respect to prior art, it could only be held invalid under Section 102—in effect, if the invention was, for all practical purposes, identically shown in the prior art. This would have the result that a patent could not be held invalid for obviousness over the prior art after a period of five years had passed after it was issued by the United States Patent and Trademark Office.

As Section 103 obviousness is probably the major ground for invalidity of patents, incontestable patents could significantly reduce the cost of litigation, although a patent could still be held invalid if it was clearly shown in the prior art as provided for by Section 102 and for the other reasons provided in Section 102 and other parts of the various patent statutes.

Another suggestion was that a patent could be held incontestable against all attacks, rather than only Section 103 attacks.

It would also be possible to make the patent incontestable if it has been used commercially for a certain number of years, such as five years, rather than have the period run from the issue date.

Any of these incontestable patents could reduce the cost of litigation and increase certainty as to the enforceability of patents.

Guaranteed patents

This new class of patents would be guaranteed by the United States government to the owner as to its validity. If some party wanted challenge validity, they would sue the United States government, not the owner. If a court declared the patent invalid, the owner would be paid by the government under the guarantee, up to some maximum established by law, and consistent with the value of the patent had its validity not been contested. Guaranteed patents would not obsolete the present patent form.

The PTO would make a more thorough examination, perhaps with two examiners, of any application for patent under the new form. Because of less-than-perfect human performance, and less than complete file information, some new-form patents could still issue which would later be declared invalid. but the owner would be protected against this type of error by the government. Without this protection, innovation is reduced because of the great exposure of personal finances and time and effort which the small business and individual inventor need to devote to commercialize the invention. Government guarantee of validity would facilitate financing. Guaranteed patents could be made available only to small businesses and independent inventors.

Elite or super patents

These patents would require the payment of a significant additional fee, such as $500, and a statement by the Applicant that a thorough prior art and validity search had been completed, within some specified period after the patent application was filed in the PTO. The results of this search, with comments, would be submitted to the PTO, and the PTO would then make a more comprehensive search and examination than usual. It is felt that the additional search and examination,

with the special made by the Applicant, would give the patent a stronger presumption of validity.

Petty patents

Petty patents would require novelty but not unobviousness; would be limited in scope of exact copies and close variations of the invention disclosed; and would run for less than ten years, preferably six to eight years. Petty patents could be examined on the same basis as regular applications, except that they would not be subject to the rejection for lack of obviousness under 35 U.S.C. 103. The PTO would charge a lower fee for petty patents.

E. Modification of patent term

Extend patent term in certain instances

It is well known that the present patent term (seventeen years from patent grant) often fails to coincide with commercialization. This fact suggested the following questions:

(1) Should some sort of a tribunal be empowered to hear the facts, and make binding decisions as to extensions of life beyond the seventeen years?

(2) Because of the formidable problems individuals often face in commercializing their inventions, should unassigned inventions (independent inventors) automatically be granted patent life greater than seventeen years after date of issue?

(3) Should the seventeen-year term start after some event other than the date of issue? For example, after the date of first significant sales, provided due diligence commensurate with capability has been used to bring it into production and marketing? Or after the date of first payments to the inventor for assignment or licensing of his invention?

Certain principles would seem fundamental in any system relating to the extension of patent term:

(1) No extension of term would be warranted if a patentee had not made diligent efforts to commercially develop the invention.

(2) Delay in commercial development should be measured from the time the inventor had adequate evidence of the commercial embodiment of his invention.

(3) The patentee should be compensated with patent term extension equivalent to the period of delay and the period of extension should not be dependent upon the extent to which the patentee had or had not profited from his invention during the patent term.

It is clear that the equities determining whether extension should be granted would require review by some tribunal. Such review could occur either:

(1) By the patentee filing, at any time during the life of the patent but no later than some fixed period prior to normal expiration, a petition with a competent tribunal for extension of the patent expiration date. This petition would cite facts satisfying the statutory criteria for extension. Publication of the petition would be made and opposition to the extension could be entertained by the tribunal; or

(2) The date of an objective act on the part of patentee (such as first commercial sale) would be the date from which the patent term of seventeen years is measured. Notification of such act would be given by the patentee to a tribunal, and this notification would be published. The extension of the patent could be opposed by the filing of a petition by a party in interest to foreclose the extension.

Patent term to run twenty years from earliest effective U.S. filing date

The term of a U.S. patent now extends for a period of seventeen years from the date of issuance. Measuring the term from this date sometimes results in patents which expire long after filing, for example, when the patent application is involved in an interference or lengthy appeal.[1] Setting the patent term to run twenty years from filing would prevent late issuing patents from disrupting industry, but could be inequitable to patentees whose patents had not issued promptly.

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[1] See Forbes, September 15, 1977, page 204:

"Last month the U.S. Patent Office threw a stunner into the laser industry. After years of temporizing, it granted key patents potentially covering 90 percent of the lasers in this country to a physicist named R. Gordon Gould. Not that the industry had never heard of Gould. His claims had been around for years, and Refac Technology Development Corp. of New York, which finally pressed the claims, was not the first patent licenser Gould had approached to represent him.

"What exasperates the laser-makers, beyond a potential liability for Gould patent infringement, is the fact that they thought they were already paying royalties (2 percent) to the owner of the basic laser patents through Research Corp., another licensing firm."

F. Ideas for reducing the cost of litigation

I. Expert Panel to Decide Patent Litigation

(1) A complaint is filed in Federal District Court by a patent owner or by a possible infringer under the usual declaratory judgment procedure.

(2) Within ten days of the time the complaint is responded to by the defendant, the plaintiff and defendant must each select a patent lawyer who has been registered to practice before the United States Patent and Trademark Office for a period of no less than ten years and who must have never represented, or been an employee of, the party selecting him, nor can he have ever been associated in patent practice with counsel of the party selecting him.

(3) Within ten days after both patent lawyers are selected, they in turn must select a third patent lawyer, making a panel of three.

(4) Patent lawyers, whether in private practice or employed by corporations, universities, government agencies, etc., should be willing, if they believe that the patent system is of value to the public, to give some reasonable amount of time, on a pro bono basis with their actual out-of-pocket expenses being paid, to sit on such three-lawyer panels, once within each three-year period.

(5) There will be no discovery by either side and the three-lawyer panel has the power of subpoena and discovery if necessary. However, the lawyers for each side would formally or informally suggest areas which should be looked into. The panel will, on its own initiative, look into any of these areas and any other areas they wish, and may obtain answers from individuals, corporations or from counsel on each side, subject of course to the usual attorney-client privileges, work product, etc. They may, in effect, ask questions similar to interrogatories, may receive testimony from individuals and should act on their own initiative to uncover whatever facts they feel are necessary to perform their function as set forth below.

(6) Within four months from the time the last lawyer is selected (one-month warning period and three months in which to perform their duties, although it is contemplated that only a certain number of days within this period would be necessary), the three-lawyer panel will render an opinion on the following items:

(a) Patentability under Section 101 (invention was patented or described in a printed publication before the invention date, etc.).

(b) Section 103 (obvious over the prior art of Section 102).

(c) Section 112 (adequate description and specific claims).

(d) Section 185 (patenting the invention overseas without the appropriate "export" license required in Section 185).

(e) Fraud on the Patent Office in procuring the patent.

(f) Substantial public use.

(g) Adequately disclosed prior public use.

(h) Possibly other areas.

(7) When all information regarded as necessary by the panel is obtained, copies of it would be forwarded to the Board of Appeals of the United States Patent and Trademark Office.

(8) Both the Board of Appeals and the patent lawyer panel would prepare a written opinion with neither having the benefit of the other's opinion.

(9) If both opinions agreed in substance (the patent is valid and infringed, invalid, not infringed, etc), that would be regarded as a final decision which could only be appealed to the special Appellate Court proposed herein (see Proposal III, Section 2).

(10) If the patent suit, as is often the case today, involved other issues such as antitrust, etc., the case could be forwarded to the United States District Court which would be bound by the two opinions if the two opinions agreed with each other. If they did not agree, the District Court could use them for what they were worth.

Advantages.—Costs would be comparatively low because there would be no money paid to the lawyer panel nor to the Patent Office Board of Appeals, the only costs being providing secretarial and clerical services to the patent lawyer panel. It is felt that if the patent lawyer panel were actually on a *pro bono* basis, they would be able to complete their investigation and reach their decisions very quickly and get back to their normal practice.

II. Amend Sections 102a and b to provide that prior use mentioned in these two sections would have to be a substantial amount, such as selling price of the products involved being at least $10,000, or the products being sold in a quantity of at least 1,000 units. Public use by the inventor, on the other hand, would continue as present law provides.

Much patent litigation is involved with wide-ranging discovery in an attempt to find prior public use by others. In many lawsuits, days of depositions are taken in an attempt to find or prove an early public use by others which may have involved

very small numbers of items or very small amounts of money and which was completely unnoticed by society until a defendant in a patent suit tried to discover it.

If the public use was smaller than the amount mentioned above, it did not contribute to society and was unnoticed. On the other hand, if the use had to be at least this amount to be an effective public use bar, it should be much easier and cheaper to discover and the time and cost of patent litigation would be reduced substantially.

III. Revise Sections 102a and b so that any use not obvious to the public on inspection or analysis of the product sold or available to the public is not a bar to patentability.

It can be argued that the prior user who did not disclose the invention to the public, even though the end product of his invention was made available to the public, should not be entitled to prevent another who did disclose his invention to the public from obtaining a patent.

Such a change in the law could significantly reduce discovery in a lawsuit and thus reduce the cost. Possibly the prior practitioner of this public use should be permitted to be able to continue to use the invention.

IV. Certain Patent Infringement Cases Be Given Priority in the Courts

In patent infringement cases where the patent owner is either an individual, a small business, a university or a non-profit organization, the infringement case would be given priority in the federal courts immediately behind that of the criminal cases so that a decision could be reached as early as possible. While it would be preferred that all patent cases be decided promptly, it is thought that this is one situation where it can be reasonably argued that, in lieu of having all patent cases decided promptly by possibly adopting one of the other proposals, it would be preferable to the present system to have at least some patent cases decided promptly. It is felt that, on the basis of fairness, the ones in the above categories should be those selected. If the cases can be promptly decided, the time involved and probably the actual cost of litigation would be reduced and innovation would be encouraged.

V. All Patent Trials in Federal Courts Can Only Be Before a Judge Who is a Patent Expert

The cost of litigation might be reduced by the appointment of more judges with technical backgrounds and adoption of a procedure that allows for assignment of technically qualified judges for those patent cases where a judge with a technical background would materially assist in expeditiously and correctly disposing of complex litigation. See the October, 1978 issue of Judicature, which includes an article by Mr. Shapiro, Chairman of duPont, urging assignment of judges with special qualifications to handle complex cases dealing with the subject matter in which the judge is specially qualified.

G. Impact of antitrust laws on innovation

Any narrowing of the rights granted by the patent has a detrimental effect on the innovation process, because it discourages investors. Such restrictions include limitations on transferring the rights in a patent by assignment or licensing, as well as enforcement of the patent.

Patents can and have been misused through licensing practices. However, the constant attacks on licensing practices by government agencies and the courts has the net effect of eroding the value of the patent grant and hence the willingness of investors to rely on patents to justify investments in the innovation process.

Such restrictions could be removed by adopting the following recommendation, made by the Report of the President's Commission on the Patent System, 1966, which reads as follows: "The licensable nature of the rights granted by a patent should be clarified by specifically stating in the patent statute that: (1) applications for patents, or any interests therein may be licensed in the whole, or in any specified part, of the field of use to which the subject matter of the claims of the patent are directly applicable, and (2) a patent owner shall not be deemed guilty of patent misuse merely because he agreed to a contractual provision or imposed a condition on a licensee, which has (a) a direct relation to the disclosure and claims of the patent, and (b) the performance of which is reasonable under the circumstances to secure to the patent owner the full benefit of his invention and patent grant. This recommendation is intended to make clear that the "rule of reason" shall constitute the guideline for determining patent misuse.

Also, passage of the "Scott" amendments, which modify existing case law pertaining to licenses and misuse of patents, would limit the extent to which Department

of Justice attorneys could effectively make new law in this area by merely giving speeches.

Another means by which the Administration could keep the Department of Justice from inhibiting innovation would be to issue an Executive Order requiring that the Department of Justice, Antitrust Division, conduct an "innovation impact study" and a "competitive impact study" before bringing any action against a patentee alleging antitrust violations. Such an Executive Order could require that the Department of Justice find affirmatively that if it prevails in the case that competition would be increased and that innovation would either be increased or not deterred.

A thorough study, such as by a Presidential Commission, including not mere theorizing and suppositions, but also factual economic data and market analysis, would lead to an assessment of the extent of the decline of innovation due to the antitrust interference with the leveraging powers of the patentee. Such a study could well suggest appropriate remedies.

The subcommittee heard several expressions of concern over Department of Justice attitudes toward joint ventures in R&D projects. Antitrust liability in such a case would be predicated on the theory that joint activity by two parties, who might possibly engage in the same activity individually, excludes competition by having one party in the field instead of two. Alternative attacks might be directed against the pooling and cross-licensing of patents resulting from such joint ventures. Although the Department of Justice almost invariably approves plans for such joint ventures when presented to it in advance, the situation might be clarified by the addition of the following sentence to 35 U.S.C. § 262: "The legality of joint ownership of patents under the antitrust laws shall be determined by the rule of reason."

The proposed amendment would be intended as a codification of existing case law, and not a major change. However, it would provide a statutory basis for arguing the legality of any particular joint venture.

H. Miscellaneous

(1) Negotiations conducted by the U.S. Government Relating to International Technology Transfer

The United States government should consider making it mandatory on all their international negotiating meetings at the United Nations and at other places to include people from the private sector who are expert in the matters being discussed. This should not be taken as a recommendation that a delegate should be appointed to make sure a large corporation's interests are taken care of. The value of an expert from the private sector is that such an expert can point out to the United States delegates and, sometimes more importantly, to delegates from other countries, the practical results and impact of a particular proposal which may have exactly the opposite end effect that it appears to have on its face.

(2) Unpatented technology is important to protect from misappropriation in order that those who invest in research and development may obtain a proper return on that investment. It follows from this that mechanisms should be developed by which such unpatented technology is not misappropriated from its proprietor through the activity of governmental regulation and other disclosures to the government, coupled with requests by competitiors for information under FOIA—a source of industrial espionage which is now commonly in use.

(3) Make it a crime for anyone to knowingly infringe a valid patent.

(4) Change to a first-to-file system, so that the first applicant to file on an invention would be entitled to the patent. Our current patent laws award the patent to the first-to-invent (provided certain conditions are met), rather than the first-to-file.

Position Statement on the U.S. Patent System

Industrial Research Institute

The Industrial Research Institute (I.R.I.) affirms the basic concepts of the U.S. pantent system as originally premised in the Constitution and as they exist today. We believe that the fundamental merits of the patent system are as sound today as they were in the period of industrial growth and respect for patents in the nineteenth century and in the first half of the twentieth century. The Federal patent law still responds to the Constitutional objective "to promote the progress of . . . useful arts by securing for limited times to . . . inventors, the exclusive rights to their . . . discoveries." Continued industrial success of the U.S. requires the incentives of the patent system, not only to encourage the necessary investment of capital

and effort in research and for the commercialization of inventions so that society can enjoy their benefits, but also to encourage the disclosure of inventive technology.

The grant of a lmited exclusionary right by the enabling Federal patent statute in return for the prompt disclosure of newly created technology provides the basis for these incentives. Without these incentives, innovative research and development would not be supported with the degree of enthusiasm and willingness to invest risk capital that has been the American tradition. Moreover, the inventions produced by R&D might otherwise be kept secret to an extent which would inhibit technological progress. The exclusionary right granted under a well-examined patent does not take from the public anything that previously existed; rather, the patent right stimulates the creation, early disclosure, and utilization of *new* technology thus adding to the store of human knowledge. The exclusionary right often stimulates others to "invent around," resulting in further technical progress.

Our patent system has a number of features of significant merit which should be preserved and strengthened:

1. The basic requirements of a patent-novelty, utility, unobviousness, best mode, and enabling disclouse—are reasonably well developed in the statutes and patent jurisprudence. I.R.I. advises against attempts to legislate detailed changes or additions to these requirements or to introduce standards of judgment and disclosure that would be stricter than the American inventor, executive, or patent lawyer can reasonably understand and manage. Such attempts would result in unnecessary and undesirable uncertainty.

2. The U.S. Patent and Trademark Office generally performs well in its examination of patent applications, but there is room for improvement. It is staffed with many competent and dedicated professional employees of high integrity. I.R.I. encourages improvement in funding, training, and management of the examining corps and, especially, their adminstrative support.

3. The examination of patent applications should be as comprehensive and thorough as practicable so that issued patents will be respected by competitors of the patent owner and by the courts. Such respect is an essential part of the patent incentive for industry. This thorough examination need not be exhaustive, but should be reasonably prompt, however. Early issuance of worthwhile patents adds to the certainty of businessmen when considering the investment of risk capital to make the New technology available to the public; they want to know if they can plan on patents of their own and whether patents of others will cause problems. Early disclosure also helps keep the published technologies current with the actual state of advance. The balance between thorough and prompt examination should be weighted in favor of thoroughness.

4. Awarding a patent to the first-to-invent rather than the first-to-file is deemed by the I.R.I. to have continuing justification. It respects the value of the indiviudal in American tradition and avoids inequities which can result from a "race to the Patent Office"; thorough and thoughtful reduction-to-practice of meritorious technology should continue to be encouraged.

5. I.R.I strongly endorses the present one-year grace period between certain events such as first sale or publication and the application filing date. This likewise facilitates thoughtful and thorough refinement of invention; it encourages prompt patent disclosure but with greater completeness than occurs under the abrupt requirements of those foreign countries which require absolute novelty without a grace period.

The U.S. patent system, despite its basic soundness and almost 200 years of valued existence, is not without areas where improvement could be made. I.R.I. encourages attention to the following areas, on a tailored basis, point by point, to avoid confused, poorly drafted, or overly detailed patent law revisions.

1. We recognize the generally sound examining skills of the Patent Office and the basic honesty and sincerity of patent applicants, patent owners, and patent lawyers. We also recognize, however, the inability of the Patent Office to examine applications as comprehensively as the public and courts might desire, even with the frequent assistance of the patent applicant in supplying prior art and other information to help the examination process. Without judging the merit of the criticisms, we beliveve that the examination procedure is criticized because it is necessarily conducted in secret to protect the invention before it is deemed patentable.

Therefore, the I.R.I. endorses the concept of permitting useful, reasonable, and timely post-issuance participation by the public in the examination of the invention and the propriety of the patent grant.

Such participation should occur after the patent has issued to preserve the rights of the inventor. Participation should only be permitted in a manner which strength-

ens the presumption of validity and adds confidence in the overall examination system; it should not unduly increase the expense and difficulty of getting a patent, and should not detract from the certainty desired by the patent owner for making a commercialization investment. The reissue practice, introduced by former Commissioner Dann, is a sound step toward this public participation, but could be improved by rule changes or legislation which would permit reasonably simple and prompt re-examination of an issued patent by permitting any person to cite prior art and possibly other re-examination considerations.[1] I.R.I. does not favor re-examination adversary proceedings of the type employed in German oppositions or U.S. patent litigation. Such proceedings would unduly erode the U.S. patent system by favoring those patent applicants with resources and by introducing unacceptable delay and unmanageable uncertainty.

2. The I.R.I. believes that the term of a patent should be changed from the present 17 years from issuance to a term of 20 years from date of the first filing. If examination is expeditious and there is no interference, the current 17 years is satisfactory. However, there continue to be a number of patents, particularly commercially important ones, which have lengthy and complex prosecution of as much as 5 to 10 years because of refilings, appeals, or interferences. This can result in patent terms which expire as long as 22 to 27 years after initial filing. A carefully conditioned term ending 20 years after first filing will provide greater equity and certainty for patent owners and their competitors.

3. Enforceability of a patent is an integral part of the patent system because assertion in litigation is the ultimate test of the basic exclusionary property right of the patent. Many patents are afforded their deserved respect without the necessity of litigation. This respect will be broadened if overall patent quality is improved by better examination. There has, however, historically been a need to litigate patents which involve honest differences of opinion on validity and scope between the patentee and alleged infringer. Unfortunately, such litigation has become complex, lengthy, and expensive, in a large measure because of the scope of discovery; this presents difficulties for both the patent owner and accused infringer. Litigation problems have unduly discouraged patent owners, particularly those with limited financial resources from asserting their patents because a validity determination by a court is expensive and uncertain; and if the patent is upheld, the damages may not be enough to pay for the litigation. This reluctance to assert has encouraged infringement of patents which should otherwise be respected. Litigation expense may intimidate a patent owner into accepting unfavorable settlements. Conversely, a patent owner may intimidate a weak infringer with the expense of litigation. Compounding these problems is the variance in the opinions in the Federal courts regarding patentability standards. Patent owners and infringers jockey to get into courts which favor their own interests. This further adds to the expense and uncertainty of owning patents and making investments in reliance on patents.

The I.R.I. supports legislative and judicial efforts to decrease the expense, uncertainty, and inequities experienced by patent owners and those accused infringers having honest differences of opinion on the validity and scope of a patent. We believe that it would be worthwile to give careful consideration to a single court of appeals for patent litigation which would speed up patent litigation and make it more uniform and certain. If such a court could institute discovery reform, litigation expenses could be reduced. This concept of a Patent Appeals Court has been controversial because of a prediction that the patent court would be rigid, technical, inflexible, and unable to handle issues ancillary to patent validity and infringement, such as unfair competition and antitrust issues. Even if this prediction were accurate, we submit that the reduction in expense, time, and uncertainty would significantly offset any shortcomings of the specialized court.

[1] 53 percent of the I.R.I. membership were in favor of limiting re-examination to published prior art; 42 percent were not in favor (see Patent Survey Results, attached).

Patent Survey Results

This is a summary of the responses to the questionnaire which accompanied the draft I.R.I. position statement on the U.S. Patent System, distributed in June 1978 to the 245 I.R.I. member companies. There were 127 responses, which provided yes or no answers to the questions. Many extra comments were also made and the numbers of these are tabulated.

A. Do you agree with the basic premises of the first two paragraphs?
Yes *100%* No *0%* 21 extra comments.

B. Regarding the U.S. Patent system features of merit, do you agree that:

1. The basic requirements are well defined and should not be changed?
Yes *93%* No *6%* No Answer *1%* 24 extra comments.

2. The Patent Office performs generally well:
Yes *86%* No *12%* No Answer *2%* 46 extra comments.

3. Thorough examination is important:
Yes *97%* No *1%* No Answer *2%* 34 extra comments.
It should be balanced with reasonably prompt examination:
Yes *97%* No *1%* No Answer *2%* 27 extra comments.

4. The patent should go to the first-to-invent:
Yes *89%* No *7%* No Answer *4%* 43 extra comments.

5. The one-year grace period should be retained:
Yes *94%* No *5%* No Answer *1%* 31 extra comments.

6. Are there any other features of merit which should be emphasized in the paper?
Yes *32%* No *50%* No Answer *18%* 42 extra comments.

C. Regarding areas for improvement, do you agree that:
The I.R.I. should take a positive approach and some initiative?
Yes *95%* No *1%* No Answer *4%* 25 extra comments.

1. The Patent Office examination should be supplemented by public participation to improve thoroughness and openness of examination:
Yes *85%* No *13%* No Answer *2%* 53 extra comments.
Such re-examination should be after issuance:
Yes *75%* No *17%* No Answer *8%* 41 extra comments.
Such re-examination should be limited to published prior art:
Yes *53%* No *42%* No Answer *5%* 54 extra comments.
Such re-examination should be moderate in procedure and scope:
Yes *78%* No *13%* No Answer *9%* 43 extra comments.
Do you agree that the Courts' and the Department of Justice's concern about the lack of public participation in the examination process will continue even if Congress loses interest in Patent Law Revision?
Yes *75%* No *13%* No Answer *12%* 40 extra comments.

2. The term of the patent should be 20 years from filing rather than 17 years from issuance.
Yes *70%* No *27%* No Answer *3%* 69 extra comments.

3. Enforceability of a patent in court is so complex, lengthy, expensive, and uncertain that the full value of the patent incentive is being eroded:
Yes *84%* No *10%* No Answer *6%* 35 extra comments.
Variance in the courts on standards of patentability is a part of these problems:
Yes *84%* No *11%* No Answer *5%* 35 extra comments.
Some legislative and judicial efforts to decrease these problems should be made:
Yes *86%* No *7%* No Answer *7%* 32 extra comments.
A single court of appeals for patent litigation should be considered:
Yes *72%* No *26%* No Answer *2%* 52 extra comments.
Would such a court, if properly organized, streamline and speed up patent litigation and make it more uniform?
Yes *76%* No *13%* No Answer *11%* 48 extra comments.
Would such a court tend to be rigid, technical, inflexible, and unable to handle issues ancillary to patents?
Yes *21%* No *64%* No Answer *15%* 69 extra comments.
If such a court did have these problems, would the improvement advantages outweigh them for the principal industrial users of the patent incentive?
Yes *59%* No *29%* No Answer *12%* 26 extra comments.
Do you know of any other legislative or judicial change which should be considered to reduce the burdens of litigation?
Yes *59%* No *11%* No Answer *30%* 84 extra comments.
Should this be used instead of, or in addition to, a single patent appeals court?
Yes *36%* No *9%* No Answer *55%* 43 extra comments.*
*(but many related to the ambiguity of the question)

4. Are there any other areas for improvement which should be emphasized in the paper?
Yes *20%* No *47%* No Answer *33%* 46 extra comments.

STATEMENT OF THE NATIONAL ASSOCIATION OF MANUFACTURERS

The National Association of Manufacturers (NAM) is a voluntary membership organization of more than 12,000 companies and is affiliated with an additional 158,000 businesses through the National Industrial Council encompassing all sizes and classifications of industry in every state. Together these companies produce approximately 80 percent of the goods manufactured in the United States. Among NAM memberships, some 80 percent can be classified as small businesses. This statement is made on behalf of the NAM by its Committee on Science and Technology and Task Force on Intellectual Property Legislation.

Most of our members use and rely on patents in one form or another, and the NAM has long had an official written policy on patents, which reads as follows: "The patent laws of the United States have contributed greatly to the high standard of living of our people and to our world leadership in modern technology. The incentives of our American system of patents are vital to our continuing industrial growth as well as to the establishment and success of new ventures. The property represented by a valid patent should stand before the law on a par with other property and should be accorded the same legal protection. In keeping with these principles, and in order to encourage prompt use of worthwhile inventions, the rights of patent owners to license their patents in whole or in part, for specified territories, times, amounts or uses, must be preserved in the public interest, but we are opposed to compulsory licensing as destructive of the 'exclusive right' which is the entire property secured by a patent under the Constitution."

Thus, the NAM, as the leading association for manufacturing companies, is unequivocally supportive of patents and their owner(s). In addition, the NAM patent policy reflects the Association's views on patent rights under government research and development contracts, when it says: "The incentives of the American system of patents are vital to our continuing industrial growth and leadership in modern technology. Consequently, it should be the basic policy of the Federal Government as to its contracts for research and development that the contractor should retain the commercial and foreign rights in inventions made in the performance of the contract subject to a royalty-free, non-exclusive license to the Government for governmental purposes; provided that any such license should not convey any right to the Government to manufacture or use any invention for the purpose of providing services or supplies to the general public in competition with the contractor or the contractor's commercial licenses in the licensed fields."

As yet, such a policy position has not been reflected in either a generalized federal government patent policy—none exists to date—nor in the patent policies of the various government agencies which support research and development out of which might flow patentable inventions. Agency policies are many, are often complex, duplicative or even at odds. That complexity and insecurity have had a dampening effect on invention and industrial innovation, an effect we are all too well aware of. In considering S. 1215, the Science and Technology Research and Development Utilizatiion Policy Act, we are pleased to note that in contrast with other legislation in the same general area, S. 1215 does not limit its provisions to specific sectors of our economy such as small business, the universities, or non-profit institutions.

Although NAM has a majority membership of small businesses, we are concerned about special kinds of legislation that would fragment the private sector into categories. While acknowledging the plight of small businesses today, especially as they are confronted with indiscriminate and burdensome regulations, taxation and antitrust prohibitions, we would favor legislation which addresses problems faced by all of the private sector at one time or another, in one form or another.

The nature of government contracting in the research and development area and its attendant patent problems are as much a disincentive for the large manufacturing entity as for the small business. Each, in its way, can become immersed in bureaucratic mire in servicing the contractual needs of government in research and development.

In considering the whole area of patents—and cutting through the sometimes intractable legal technicalities that often attend the matter—we are impelled to go back to the 1966 Report of the President's Commission on the Patent System, "To Promote the Progress of * * * Useful Arts—In an Age of Exploding Technology." The phrase "to promote the progress of * * * useful arts" is of course derived from the great Constitutional mandate concerning patents. That is undisputed. And we cannot but be even more aware today that if 1966 was "an age of exploding technology", then surely we are now in an era in which that phrase has taken on more force than ever over the past 20 or more years.

Yet, as we read that Commission report, then, and again as we read it today, there is one phrase therein that seems to have an almost prescient connotation. On Page 2 of that Commission report, we read: "The members of the Commission unanimously agreed that a patent system today is capable of continuing to provide an incentive to research, development, and innovation."

We would draw that conclusion today more emphatically than ever—surely, we are more seriously and urgently faced with a need to stimulate and encourage invention and innovation to meet national and international needs. We are more than ever pressed to improve our productivity from inventions so that we can maintain—let alone improve—the standard of living for everyone, and even more urgently to control and dampen inflation.

We have noted that of the 28,000 to 30,000 patents owned by the Federal government, something less than 4 percent (according to some reports) have been licensed to private producers. This represents an unacceptable stagnation of undeveloped technology in a nation in which there is an apparent slowdown in innovation. It is especially serious when there is extensive evidence that U.S. manufacturing industry has proven capability to move quickly and very creatively in successfully innovating.

It is worth stating here that innovation does not derive from research and development alone. Innovation requires much more—beginning with the recognition of a potentially marketable product, followed by the decisions to begin the processes of product development, tooling, manufacture, and final marketing. It is the decision to go forward with these processes that requires the commitments of large sums of money, often at considerable risk of failure. Various studies estimate that the money required for development of an invention or discovery is from 10 to 20 times the cost of making that invention.

In an article entitled "Improving the Climate for Innovation—What Government and Industry Can Do" (Research Management, September 1976), the Comptroller General of the United States, Elmer B. Staats, took patents as an example of whether Federal funds are being spent wisely in the public interest, such as to stimulate innovation. "Some government officials," Mr. Staats says, "believe that the patient derived from federally funded R&D must be owned and controlled by the Government. However, in most cases, the public interest may best be served when private industrial contractors, with a few provisos, are granted exclusive licenses for commercial development."

The NAM concurs in that conclusion.

In the recent Domestic Policy Review of Industrial Innovation instigated by President Carter and conducted by the Department of Commerce, seven issues were addressed as having an impact on innovative processes. Among those seven issues was patent policy. The Draft Report (dated December 20, 1978) of the Advisory Subcommittee on Patent and Information Policy of the Advisory Committee on Industrial Innovation, established as part of the Domestic Policy Review, draws some important conclusions about transfer of commercial rights to government-sponsored research to the private sector. In proposal V of that document, the following is stated: The idea that what the government pays for belongs to the people is not only appealing, it is true. The question is: What instrumentalities can be brought to bear to maximize the possibilities that people will indeed have available the fruits of their government's expenditures? Nonexclusive licenses to *undeveloped* inventions, offered by the government or anyone, have few takers, whereas patent ownership or exclusive licenses of sufficient duration are much more likely to attract the money and talent needed to make and market real products to meet consumer needs." (Emphasis in original.)

Further, the report stated that: "If the results of federally sponsored R&D do not reach the consumer in the form of tangible benefits, the government has not completed its job and has not been a good steward of the taxpayers' money. The right to exclude others conferred by a patent, or an exclusive license under a patent, *may be the only incentive great enough to induce investment needed for development and marketing of products.* Such commercial utilization of the results of government-sponsored research would insure that the public would receive its *benefits in the way of products and services, more jobs, more income, etc. The cost of government funding will be recovered from the taxes paid by the workers and their companies. (Emphasis added.)*

Thus, *all* members of the Advisory Subcommittee on Patent Information Policy "recommended transferring the patent rights on the results of government sponsored research to the private sector for commercialization." We note here that the Advisory Subcommittee makes proposals that very closely parallel many of the provisions of S. 1215. It is not inconsistent with the basic objectives of the NAM

policy on this score. Thus we concur strongly with Sec. 101 "Findings" of S. 1215, and particularly with Sec. 101(3), namely: "(3) Scientific and technological developments and discoveries resulting from work performed with Government contracts constitute a valuable national resource which should be developed in a manner consistent with the public interest and the equities of the respective parties."

We would contend that the Federal Government has not administered its contracts in scientific and technological areas as "valuable national resources[s]", nor has it developed the results of those contracts in "a manner consistent with the public interest" or the "equities of the respective parties." To the contrary, it seems that the Federal Government has followed the practice of simply doling out money in the expectation of developing "valuable national resource[s]" without any concomitant effort to promote those resources on behalf of the public interest. The proof of that inadequacy, surely, is in the failure of the various federal agency technology transfer programs, and in the thousands of government patents that are as yet uncommercialized.

And we would concur in Sec. 101(6) that "There is a need for the establishment of a flexible Government-wide policy for the management and utilization of the results of federally funded research and development."

We would like to comment on some of the specific provisions of the bill:

In Sec. 201, "Responsibilities," we are of the view that giving the responsibility to a single agency to coordinate, direct and review the implementation and administration of the Federal policy set forth in S. 1215 with respect to the ownership of inventions resulting from federally sponsored research and development could result in an additional layer of bureaucracy. Both those responsibilities and the promotion of efficient and effective utilization of the results of federally sponsored research and development could be left to each individual agency which best knows and understands the programs of its sponsorship of research and development and can best evaluate where utilization of the results of such programs might be most efficient and effective.

For example, concerning Sec. 201(c)(4), we would ask, what will qualify the Commerce Department "to identify those inventions with the greatest commercial potential and to promote the development of inventions so identified"? Although we might suspect that even the individual agencies might encounter some difficulties in fulfilling this responsibility, the agencies are much better qualified to make such identifications and promote them for their commercial potential than is the Secretary of Commerce.

In the same area of responsibilities, we would also ask, in Sec. 201(c)(7), how will the Department of Commerce "demonstrate the practicability of the inventions for the purpose of enhancing their marketability"? We can't for a moment comprehend how the individual agencies, let alone the Department of Commerce would have such capabilities. Surely the demonstration of marketability of an invention is best left to those with the experience of the market. The Government is not in marketing. This is a responsibility that only the private sector can carry out, and the private sector *will* assiduously carry out this responsibility if it determines there is commercial practicability of an invention and there is a market for it. We would say about the entire Sec. 201 (c), that all of its provisions would create an unnecessary additional bureaucracy that we cannot see as being as effective as leaving such responsibilities to the individual agencies working under the umbrella of a government-wide, unified patent policy.

Sec. 201 (e) most exemplifies what we are concerned about in this respect. Establishing interagency committees as are necessary to assist in the review and formulation of rules, regulations, and procedures implementing provisions of this Act, makes for more layers of complexity, bureaucratic delay, and regulation. We believe that if a clear unified patent policy were to be enacted, there would be no need for such interagency committees on such a formal basis. If there needs to be some coordination among particular agencies in implementing patent policy, then it can be instituted as needed, and dispersed on completion of the task.

In Sec. 202 "Agency Technology Utilization Program," we take a cautious view of expanding the federal bureaucracy through the establishment of technology utilization programs in those federal agencies supporting research and development activities. For example, the Federal Laboratory Consortium for Technology Transfer today numbers in its membership some 200 federal research and development laboratories and centers. Yet, we are not aware, in the five years of the Consortium's existence, of a substantial increase in the transfer of the fruits of research and development in the federal laboratories to innovations beneficial to society.

We believe that the key point here is not an expansion of agency technology transfer or utilization programs, but rather a formula by which industry and the

private sector can be brought to the inventions so as to evaluate them for their commercial potential. What Sec. 202 provides for is a "push" mechanism for government agencies. Such a mechanism is beset with problems unless there are incentives to bring the "pull" of the innovative industrial community to the inventions.

In the matter of "Allocation of Rights" [Sec. 301], we would support the provisions of the "Rights of Government." Similarly, the bill would have our support on "Rights of the Contractor" [Sec. 302]. However, we foresee some problems with some of the provisions of Sec. 303 Waiver. We generally applaud the provisions in this section since it is our view that, in prinicple, this is the way that waiver should work. Nonetheless, we sense that Sec. 303(4) might be rather inappropriate since it seems to us to be beyond the capability of agencies supporting research and development to deal with "situations inconsistent with the antitrust laws."

In Sec. 304 "March-in-Rights," in subsection (b), we believe that there is no need for prior approval of the Secretary of Commerce concerning the exercise of march-in-rights by a Federal agency as described in Sec. 304(a). Again, we would prefer that the particular agency be left to determine the exercise of march-in-rights whenever a situation arises in which they are to be invoked.

Finally, we would especially applaud Sec. 306 "Background Rights." Such a provision is at the very core of a successful government-wide patent policy and the involvement of the private sector in its implementation. Without such protection, the likelihood of private sector involvement would be poor indeed.

SUMMARY

In summary, the NAM looks upon S. 1215 with favor and, in general would support passage of this legislation. In some of the specific provisions, we are concerned for those that would create a bureaucratic superstructure to implement a government-wide patent policy or complicate the role of individual government agencies in fulfilling the positive thrust of the bill.

AMERICAN PATENT LAW ASSOCIATION,
Arlington, Va., May 31, 1979.

Senator HARRISON SCHMITT,
Senator HOWARD CANNON,
Senator ADLAI STEVENSON,
Senate Office Building, Washington, D.C.

GENTLEMEN: By coincidence the Board of Managers of the American Patent Law Association had a meeting May 25, immediately after the May 22 introduction of S. 1215. It would be an overstatement to imply that the members of the Board have had a chance properly to study the entire bill. On the other hand, they had theretofore been studying comparable subject matter in the Bayh bill and were in a unique position for instant appreciation of the values in S. 1215.

Feeling that you might be interested in the views of the APLA Board promptly, the Board considered and unanimously adopted the following resolution:

Resolved, That the American Patent Law Association approves the general intent and principal objective of the Schmitt/Stevenson Bill, S. 1215, 96th Congress of May 22, 1979, to use the patent system to promote commercialization of inventions resulting from work sponsored by the government. APLA believes that the fundamental principle of the Schmitt/Stevenson Bill of retention by government contractors of principal rights to patents based on government-sponsored research (except where exceptional government needs must govern) should be uniformly applied to all government contractors. APLA therefore endorses and supports enactment of the Schmitt/Stevenson Bill.

Please let me know if there is anything that APLA can do by way of helping your advocacy of this bill.

Yours truly,

TOM ARNOLD.

GENERAL ELECTRIC CO.,
Fairfield, Conn., July 2, 1979.

Hon. ADLAI STEVENSON,
U.S. Senate,
Washington, D.C.

DEAR MR. STEVENSON: This letter is to record the support of General Electric Company for the "Science and Technology Research and Development Utilization

Policy Act", S. 1215, which you have co-sponsored with Senators Cannon and Schmitt.

Title III of your Bill is particularly important in its recognition that the ownership of the applicable patents can stimulate Government contractors to commercialize the results of federally sponsored research and development. When an R&D program has commercial possibilities, the contractor is usually in the best position to carry the R&D results to the marketplace. However, this normally requires a substantial investment in time, manpower and private funds, and without the protection afforded by patent ownership, the contractor may be unwilling to make that investment. If the contractor does not do so, it is very unlikely that anyone else will.

Thus, although patent ownership afforded the contractor will not guarantee that consumer products will flow to the marketplace, it should provide an effective stimulus to that end. The alternative of the Government keeping the patents works in exactly the opposite direction, providing a disincentive to commercialization. In our opinion, your Bill takes the proper approach in limiting Government ownership to specific situations and then allowing waivers if the controlling conditions no longer exist.

In the event that changes in the Bill can be taken up for consideration, we would suggest the following:

1. S. 1215 carries throughout the concept of an inventor "who has made an invention under a contract but who has not agreed to assign his rights in such invention to the contractor". Such an inventor appears in the following sections: 302(a) and 305(a) (1), (3) and (6). The concept of such an inventor, seemingly working on his own, would raise many legal difficulties in respect to ownership of invention rights and we recommend deletion of reference to such an "inventor".

2. Section 201(c)(9) would provide that proceeds from licensing, etc. received by the Government could be used for "purpose of this Act". Such proceeds ought to be transferred to the Federal Treasury so that administration of the Act becomes part of the budgeting process and thereby subject to fiscal controls. As it now stands, the administration of Government inventions could enter a spiral of unchecked growth which would be undesirable for the Country.

3. Section 201(c)(7) directs the Secretary of Commerce to "acquire technical information" to be used in promoting and demonstrating Government-owned inventions. We believe that the quoted language should be deleted because the presence of such a directive may well result in the mounting of a more intensive effort to acquire technology from contractors than would be desirable. Merely leaving the directive in the form of engaging in negotiations and other activities for promoting licensing ought to suffice.

4. Section 305(a)(2) would provide for a mandatory reservation of a non-exclusive license to the States and domestic municipal governments (in addition to the United States) "unless the agency determines that it would not be in the public interest to acquire" such license. We would prefer to have the reference to the States and domestic municipal governments deleted altogether. At the least, it is believed that the "public interest" test should be deleted and something more definitive provided. For example, a non-exclusive license for States and domestic municipal governments should not be reserved when it would tend to substantially negate the usefulness of principal rights retained by the contractor and thereby blunt his incentive to commercialize the patented inventions. One instance of this may be mass transit equipment.

Again, we wish to indicate our support for S. 1215, and if comments are desired on any particular issue, we will be glad to work with your staff in getting them to you.

Very truly yours,

H. F. MANBECK, Jr.

JULY 18, 1979.

Hon. SENATOR ADLAI STEVENSON,
Old Senate Office Building,
U.S. Senate, Washington, D.C.

PERSONAL AND CONFIDENTIAL

DEAR SENATOR STEVENSON: Glenn Stephenson requested that I write you and discuss my feelings, perceptions, and experiences in the field of technological innovation, new product development, and product protection. As he explained, due to

the sensitive stage of development of our technology, I must request that I remain anonymous at this time. If you should desire to meet with me personally, in private, at some point in the future, this can be arranged.

Let me be very frank and state that the ideas, concepts, feelings, and experiences described in this letter are my own, and do not necessarily reflect the opinions of my business associates. Finally, if you should wish to read the body of this letter into the Record, you have my permission, providing you observe my request to remain anonymous.

BACKGROUND INFORMATION

I am a businessman by profession. I became associated with a development scientist in March of 1976. He is responsible for product research and development. My role is to develop financial backing, product strategy, business feasibility assessment, and arrange for product marketing. Our development scientist currently owns some 60 patents, and owns substantial additional inventions which remain unpatented. While I have reviewed many inventions and new products for investment and marketing, this is my first major experience in the realm of patent protection for advanced energy technologies. I will attempt in the remainder of this letter to explain why our organization has elected to bypass the patent system for a procedure judged to have a higher probability of success given the nature of our technology.

SUMMARY OF PERCEPTIONS REGARDING THE PATENT SYSTEM

1. Utilizing the patent system by small inventors, and small organizations involves considerable risk exposure, while the protections afforded by the patent code are minimal.
2. Economic intimidation of the small inventor by the large firm is built into the adjudication procedure. The costs associated with a patent defense can often be substantially greater than the development costs of the basic invention.
3. The legal systems current interpretation of the patent code legitimizes patent challenges and illegal patent infringement by well financed corporations.
4. When the court costs are less than the expected royalty or licensing fees, the legal and economic incentive for a well-capitalized firm is to infringe the patent and play the expected probabilities that the inventor cannot afford to litigate.
5. The patent office exists within an aura of suspicion based upon unethical leakages in the past.
6. With respect to selling our technology, NOT filing a patent offers the purchasing company both security and the element of surprise in the marketplace.
7. Because of the high probability of patent infringement and expensive litigation regarding an innovative new product, it appears that only the marketplace offers true economic protection via a strategy of maximizing market share.

PRODUCT INFORMATION

The technology which we are currently developing deals with the problem of electrical energy storage and generation. More simply, battery technology. It is our belief that we have developed a significant advance in battery technology. We judge our power-to-weight ratio is approximately 5 times better than currently available conventional lead-acid batteries. For comparison, a good lead-acid battery (6 volt) will store 100 amperes hours of power if discharged at a moderate rate (1-5 amp draw). Current tests of our technology have produced 500 ampere hours of electricity based upon a 10 amp draw. Note: our battery configuration is comparable in size and weight as a regular car battery for the comparison made above.

It is our judgment that the technology of commercially feasible, and capable of mass-production within 3-5 years. The materials and components could be manufactured economically and domestically, relying, to a large extent, on domestic resources.

Our current stage of development centers around pre-production planning and experimenting with various construction methods. My assessment is that development is 70-80 percent completed to its introductory commercial form.

PRODUCT IMPLICATIONS FOR DOMESTIC ENERGY SUPPLIES

If our technology proves in the marketplace as powerful as in a laboratory setting, some major economic opportunities present to the U.S.A. in the near term.

1. Electrical vehicles capable of 200 miles per recharge, and with comparable performance characteristics as conventional autos, would be immediately feasible

without significant industry retooling. Various forcasts suggest that an electric car capable of the above performance characteristics would be capable of penetrating 10 percent of the domestic automobile market. The associated petroleum savings are estimated to range between 60 million and 100 million barrels of oil per year. At current OPEC prices, the savings would approach $1.2 to $2.0 billion per year.

2. Solar and wind energy systems, currently lacking an efficient and economical battery storage system, would become more economical, and therefore more attractive as energy alternatives.

3. Other industries currently facing energy-storage constraints include: defense; aeronautical, electric utilities; recreational vehicles; and emergency generation facilities. Estimated fuel savings in these industries have not been defined.

4. Electric utilities may have the opportunity to store considerable quantities of electricity generated during off-peak hours using our technology. If so, it would be possible to minimize and delay the additions of incremental nuclear or petroleum-based generation facilities. Note: our technology is not suggested as a long-term solution or alternative to these forms of power, but rather a postponement mechanism to control oil imports and to provide additional time to assess and solve the problems of nuclear energy.

As you can see, it is very difficult for me to assess the full range and impact of this technology on our domestic energy picture. However, I do believe that the technology offers significant opportunity to minimize the severity of our energy crisis and our energy dependence on foreign sources. Needless to say, any improvements in this area would aid in the reduction of political tension in the Middle East and elsewhere.

MARKETING AND PATENT PROTECTION

Given the nature of our technology (relatively simple, easily copied, made largely from available materials, and significant economic potential) we concluded that filing for a patent exposes us to added and significant risks while offering little real protection. The patent system, and the adjudication procedure, exposes us to new, non-business-related risks (i.e. legal) which are not areas of our expertise, and which add to the probability of theft of our proprietary information. Attempting to protect our technology within the parameters defined by the current patent system and adjudication process appear impossible, and remain the major obstacle to our using the system.

The predatory practices of large firms regarding patent infringment and patent challenges force a small organization such as ours to carefully evaluate the risks and rewards of using the system. A long court contest would ruin us financially, and prevent us from selling the technology while in litigation. The apparent anti-patent sentiment of the judicial system indicates that any patent challenge would inherently involve a significant risk of patent denial regardless of the merits of the case. By revoking patents on a more regular basis than upholding them, the court system is forcing people to avoid using the patent system. Further, it must be remembered that a small inventor does not have the luxury of picking and choosing the district court in which he has the most favorable chances, as is common practice for all large corporations.

The economic incentive is clearly in favor of the large corporation with respect to contesting patents and even infringing on patents. In the case of the small inventor, it is even more advantageous to contest or infringe, knowing that the inventor probably does not have the resources, expertise, or constitution to wage a long and costly court battle. When it is economically cheaper to contest or infringe a patent than to pay royalty or licensing fees, then it is clear that economics, not ethics shall dictate the results. Unfortunately, the patent system and the legal system support and contribute to this form of economic intimidation. It would certainly be nice to see the system balance the scales by supporting the small, independent inventor, who has basically been responsible for every major invention in America since Colonial times.

PATENT AND PRODUCT PROTECTION STRATEGY

Having opted not to incur the risks associated with using the patent system, we feel we have finally developed an approach which will offer us manageable risk exposure with a good opportunity for successful marketing of the technology to a major firm. Note: the approach I am about to describe is uniquely tailored to the specific nature of our technology. I would not offer it as a blanket approach because it involves considerable development, testing, marketing, and analytic expense. Many technologies would simply not lend themselves to the "Black Box" analysis central to our approach.

Basically, we will choose as target companies only those firms which have highly ethical reputations regarding outside inventors. We will deal only at the Chairman or President level, and only after afforded a personal introduction by someone of honesty and integrity.

Basic to our negotiation posture will be that the details of the technology will never be disclosed until a contract, non-disclosure, and non-competition agreements have been signed. The technology will be sold based upon performance characteristics only. Particularly, a "Black Box" electric car will be central to proving that our battery produces mileage performance unequalled in the marketplace.

In closing, while I am sincerely interested in improving the patent system, I am far more interested in successfully marketing our technology so it can have a real impact on our domestic energy situation.

I must request that you honor my requirement for personal anonymity at this stage. You may read the entire body of this letter into the Senate Record, providing my name be withheld. Should you wish to contact me further, please do so via Glenn Stephenson. A brief résumé is attached for your review.

Sincerely,

(Name withheld by request.)

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS,
Washington, D.C., July 31, 1979.

HON. ADLAI STEVENSON,
Chairman, Subcommittee on Science, Technology, and Space,
U.S. Senate, Washington, D.C.

DEAR CHAIRMAN STEVENSON: The National Society of Professional Engineers, a nonprofit organization representing nearly 80,000 individual members working in every aspect of the engineering profession, recently conducted a survey of its patent policy experts regarding the problems and promises of the current patent system.

I am enclosing a copy of the results of this survey for your information and review. I believe they will be useful in your Subcommittee's review of Federal patent policy.

We appreciate this opportunity to present to you this information. We respectfully request that it be made a part of the official hearing record.

Very truly yours,

HERBERT G. KOOGLE,
Professional Engineer, Chairman.

Enclosure.

SURVEY ON PATENT POLICY AND POTENTIAL SOLUTIONS TO PATENT PROBLEMS

(By Michael M. Schoor, Director, and Joan E. Porte, Legislative Assistant, Legislative and Government Affairs Department)

NOTE.—This Legislative Opinion Request was sent to the Society's Exective Committee, Board of Directors, State Presidents, State Presidents-Elect, State Secretaries or Administrators, Practice Division Executive Boards, Legislative and Government Affairs Committee, and Experts. Nineteen people responded, primarily Experts and members of Practice Division Executive Boards. Not all of the respondents answered all of the questions.

1. S. 414, introduced by Senator Birch Bayh (D-Ind.) provides an option to inventors to seek patents and have exclusive use of products invented under government contract and allows the government to recoup money back from the inventor when the patented invention makes over a certain amount.

(a) Will this increase innovation in government-funded projects?
Probably (3).
Yes, but government should recoup only business taxes (1).
Yes. (9).
No, too much—a government inhibitor (1).

(b) Is the concept of this bill too broad or too narrow?
Both (1).
Narrow (7).
Broad (2).
Undecided (2).
Neither (1).
Comments:

The bill should also stop the Department of Justice from regarding patents as permanent monopolies;

Government should not limit profits and collect taxes on patents; bureaucratic strings should be cut to increase innovation;

People should exclude individuals specifically engaged by the government for research;

The bill should require an agreed amount to be recouped and should define contractors, subcontractors and inventors;

Payback should be limited to the amount of government input—repayment schedule be favorable to the inventor;

There should be some split of the royalties after costs are recouped;

If the government supplies the equipment and money, they should have all "rights";

Government must not retain title under any circumstances.

2. Should there be a time limit in which an employer must apply for a patent application for new products or lose that right to the employee-inventor?

Yes (17).

No (2).

If so, What is a reasonable time limit?

1 year (3).

2 years (2).

7 years (1).

4 to 5 years (2).

1 to 2 years (2).

9 months (1)

6 months (1).

If employers do not commercialize a patent within a reasonable time period, should the patent be released to the employee?

Yes within one year (1).

Yes (11).

Yes in two years (1).

Yes in five years (1).

Yes in 12 years for market research items (1).

Comments:

Time limits should be established but should be flexible to allow the inventor to release his patent rights—when someone is given a salary, equipment etc. by a company, that company has the freedom to deal with that person's invention;

If the invention is out of the scope of the business, it should release rights to the inventor;

If the employee's duties include research, the employer should have the option to commercialize;

If the invention leads to an unexpected windfall for the employer, the employee should receive an award not to exceed one-third of the estimated value of the windfall and not to be less than one-twentieth;

Employees should not be able to commercialize unless the item is a trade secret which the inventor shares;

If the rights are released the employer should also have the right to use it at a later date.

3. Should employee-inventors receive remuneration on patents commercialized by the employer?

Yes (13).

Employer's option (2).

Comments:

Employee should get raises plus one to two percent royalty;

If the employee is "hired to invent" the profits should go to the employer, if the employee is "not hired to invent" he/she should receive support;

This should be agreed to in advance.

4. What do you feel are the major problems of current patent policy? How do you propose they be solved?

Contracts that employees must now sign stifle innovation—these contracts should specify that patent ownership will revert to the inventor if the corporation does not patent/market within a specific period of time;

Engineers should be employed on a contractual basis so they would not be terminated before a specific date without notice;

The government should not maintain ownership of patents;

The patent policy has nothing to do with productivity—other factors intervene;

It is too easy to get a patent—there is an "allow the patent and let them fight it out in court mentality";

It is too time consuming and expensive to get a patent (stressed several times);

The government should standardize its policy towards handling intellectual property with its contractors;

"Patent courts" with technically oriented judges should be instituted;

Strict laws against patent infringement should be made (stressed several times);

Invention promotion is too risky (stressed twice);

There is too short a time (one year) between conceptualization and filing for a patent;

Products for sale vs. patents for company machinery to make products for sale under the products for sale royalties can be calculated, under the patents for machinery it is more difficult; it can possibly be a percentage of the annual cost reduction achieved or a flat payment and an annual percentage of sales.

Other comments:

The U.S should reward inventors and examine the invention incentives now in use in Europe;

Risk capital should be recovered first followed by government expenses;

Strict time and documentation requirements regarding the employees specific assignment and specific concept must be filed by the employer not involved in specific R&D programs in order to acquire full rights to the patent.

INTERNATIONAL BUSINESS MACHINES CORP.,
Armonk, N.Y., August 6, 1979.

Hon. ADLAI E. STEVENSON, *Chairman,*
Hon. HARRISON SCHMITT,
Subcommittee on Science, Technology, and Space, Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.

DEAR CHAIRMAN STEVENSON AND SENATOR SCHMITT: Thank you for inviting our comments on S. 1215 introduced by Senator Cannon and you to establish a uniform Federal policy on the management and use of inventions developed under Federal contracts. In view of the lagging pace of American industrial innovation and productivity, this is an extremely important bill.

As Vice President, Commercial and Industry Relations for IBM, I supervise the company's worldwide patent operations as well as its contracts and licensing activities. In addition, I am a member of the Advisory Committee on Patents to the U.S. Department of Commerce.

We think enactment of S. 1215, with some relatively minor changes suggested below, would be very much in the public interest. In our judgment, the different patent policies of the various departments and agencies are confused and confusing, and tend to discourage commercialization of patents developed under Government contract. Further, they inhibit bids from qualified companies because of the potential demand for access to background patents owned by the contractor, and particularly in those areas where work performed for the Government draws significantly on the experience and knowhow developed with private funds.

The proposed legislation would clarify the conditions under which title to an invention would go to the Government and would give the contractor the option of retaining the title in all other situations, preserving march-in rights for the Government in certain cases. This seems to us to be an eminently sensible approach, assuring that the Government will be able to keep title where necessary and at the same time giving contractors and potential contractors a much clearer understanding of their position.

The legislation will reduce the administrative burdens imposed by the necessity for deciding the type of patent rights clause to be included in thousands of research and development contracts annually and by the processing of large numbers of waiver petitions.

We believe that S. 1215 is a fair and balanced bill overall. It is an improvement over S. 3627 in the last Congress because of the addition of Section 302(b) which guarantees contractors a license to use an invention to which the Government takes title. Since we called attention to this point in our comment on the previous bill, I want to record our appreciation of the change. However, we think Section 302(b) still falls somewhat short of what is needed. It should be amended to allow the coantractor to grant sublicenses to subsidiaries, affiliates and existing licensees. For that purpose, we suggest the addition of the underlined language:

"(b) When the Government obtains title to an invention under Section 301, the Contractor shall retain a non-exclusive, royalty-free license which shall be revocable

only to the extent necessary for the Government to grant exclusive license. Contractor's license to practice the invention, or to have it practiced on Contractor's behalf, shall include the right to grant sublicenses of the same scope to subsidiaries and affiliates within the corporate structure of Contractor's organization and to existing licensees who Contractor is legally obligated to license or to assure freedom from infringement liability."

We think the march-in rights principle, embodied in Section 304, has merit. However, we believe that consideration should always be given in a march-in proceeding to whether the contractor already offers a fair and reasonable license to responsible applicants. We also think that once a license has been granted by the contractor, it should not be abrogated by the Government. Lastly, where the contractor is using the invention or has made a substantial investment toward such use, we propose that the contractor should retain an irrevocable and non-exclusive license, We believe this is extremely important if the incentive for the contractor to engage in commerical use of the invention is to be maintained.

These objectives can be attained by adding the following language to the end of Section 304(b) after the word "Secretary":

"Provided, such rules, regulations, and procedures shall include a provision that agency action under subsection (a) may not be proper whenever Contractor offers a license to responsible applicants upon terms reasonable under the circumstances; and shall not be proper to the extent that such action would cause termination of any license previously granted by Contractor other than licenses to subsidiaries and affiliates within the corporate structure of Contractor's organization; and Provided further, such rules, regulations, and procedures shall reserve to the Contractor an irrevocable, non-exclusive and royalty-free license under such invention where Contractor is using or has made a substantial investment leading to the use of such invention."

In our view S. 1215 represents a logical culmination of efforts which began in the Kennedy Administration and continued in the Nixon Administration to deal with problems resulting from a title-in-Government policy. We believe the legislation which you and your co-sponsor have introduced is a reasonable balance—increasing the incentive for contractors to commercialize inventions made on Government contract while protecting the Government's interests and rights.

With the changes suggested in this letter, we support S. 1215 and urge its enactment. If you or your staff wish to discuss this matter further, I will be happy to provide additional information and clarification as needed.

Very truly yours,

WALLACE C. DOUD.

AMERICAN PATENT LAW ASSOCIATION,
Arlington, Va., August 8, 1979.

Hon. ADLAI E. STEVENSON, *Chairman,*
Hon. HARRISON SCHMITT,
Subcommittee on Science, Technology, and Space, U.S. Senate, Washington, D.C.

GENTLEMEN: I received your letter of invitation to testify before you on July 27 after I had already prepared my written paper, and since I felt that my subject was addressed to these specific questions in your letter of invitation in generality, and was short on time to address your questions specifically, I proceeded to deliver what I had previously prepared.

However, your letter contained some specific questions that perhaps I might answer, seratim, by dictating more or less off the top of my head.

Your question. What is the utility of patents to individual inventors, entrepreneurs, investors, and small medium and large firms?

Answer. The Constitutionally recited purpose is a real purpose for all these different participants in technology. You will recall the Constitutional phrase is that "the Congress will have the power * * * to promote the progress of science and the useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries".

The concept, of course, is that if you hold out the carrot of a property right in the results of an investment in research and development, you will induce persons to invest sweat, intellect, and capital, not only in the technical undertaking of conceiving an invention but in the market and technical undertaking of developing the invention for useful applications and bringing it to market—these latter steps sometimes being the more expensive and higher risk undertaking, giving the nature of today's market place.

There are, however, some differences in the way the patent system functions with respect to the different classes of interested parties, inventors, entrepreneurs, investors, and small, medium-size and large firms.

Large firms often use patents in the conventional patterns known to entrepreneurs and inventors, but in some industries the large firms have tended sometimes to develop a portfolio of patents in the area of their major business competition with other large firms, and then to use this portfolio in patterns that are referred to as "defensively". In this pattern, we find that the several major oil companies are unlikely to sue each other for infringement of their patents on secondary oil recovery methods. Why? Because each company knows that he is infringing the other companies' patents in this area; a suit will beget a counter-suit; the expense will be great; the result will be uncertain; and we are better off spending our money on research in this area than paying lawyers to try to sort out the relative values of our respective rights as against each other, using the judicial system which is not really competent to do this job well, anyway.

Even this defensive use of a patent portfolio purchases for the proprietor a freedom from charge of infringment by the similar portfolios of patents owned by large competing firms, and thereby the "defensive" portfolio purchases a freedom from royalty obligation to others, and this is an important part of the value that such firms get for their R. & D. in these areas where the "defensive" pattern has developed. Only if they compete significantly in research and development in the subject areas, can they maintain a good defensive portfolio, so the defensive practice that some firms slip into is still serving the public interest in fostering R. & D.

In response to your question it is to be noted that the defensive value of a portfolio of patents is not commonly available to the new entrepreneur or investor. These persons much more commonly are forced to take their patent to court and seek to enforce it in order to realize the value they absolutely need from it, to protect their high risk investment in a new business endeavor. Thus, to whatever extent big companies live by defensive use of patents without going to court, to that extent the significant costs and shortcomings of the judicial system of patent enforcement tend in a way to be visited more heavily upon inventors, entrepreneurs and investors in new entrepreneurship—all of the smaller business undertaking—than upon the larger firms. This, of course, is no fault of the big firms but an unhappy result of the short-comings of judicial enforcement of patents. And indeed, when the big firms depart from the heart of their major competitive lines into new entrepreneurship, they too tend to slip into the same mode of patent system utilization as described for the smaller entrepreneurships.

There are other important values in the so-called defensive portfolio of patents. Commonly, larger companies build up a portfolio of patents and knowhow but for a variety of international regulation and foreign investment reasons cannot attempt, or do not want to attempt, to build a foreign plant or launch major sales efforts abroad. Thereby, major markets for the technology are not being reached and no income is being derived from those markets. The know-how is kept confidential from all who might use it competitively with the owner who developed it.

But if the owner can license its know-how (whether or not protected by foreign patents) and not license its United States patents, the owner protects its local profit-on-sales (often two to five times what royalty income is on the same sales) while reaching new markets with its technology. Thus, the defenisve portfolio of patents when it becomes commercially valuable, also becomes its own pressure for foreign licensing, and a pressure for licensing not just patents but know-how which often has its own great importance.

Similarly, when a technology has use, shall we say, on aircraft propellers and also on motorboat propellers, the defensive portfolio of patents becomes a pressure for licensing domestically in field of use not served by the proprietor of the technology.

One of the least understood but still tremendously important aspects of technology economics, is the role of know-how and the importance and unpatented know-how in the total picture, together with the relationship of patents to that know-how. So perhaps I should spend a paragraph on that topic.

Patents address primarily new concepts by contrast with masses of detailed know-how, the "wrinkle technology" which permits one to take the patented concept of, for example, the internal combustion turbine (a subject of my 1940's engineering degree paper) and make it into the J-59 jumbo jet aircraft engine with high power/weight ratio, low noise levels, high fuel efficiency, etc. After the second wave of patents relating to internal combustion turbines as applied to aircraft engines had expired, it still took half a billion dollars to develop the J-59, and Rolls-Royce's effort to develop a competitive engine flat bankrupted the company.—Mostly unpa-

tented know-how of value equal to or much greater than the still-patented know-how.

A few improvement patents scattered amongst the mass of know-how are often THE critical thing which precipitates the foreign licensing not just as patents, but the entire valuable know-how package that otherwise would be kept largely secret, forcing competitors to re-develop the same know-how.

Domestic patents, you see, are often key to foreign know-how licensing and foreign know-how licensing is a multi-billion dollar value for U.S. companies and thereby a major contributor to our balance of payments credits.

It is often observed that there are many motivations for research, particularly among big businesses, more than just the motivations delivered by patents. This, of course, is true. Whether competitor A is copying from competitor B or is doing his own independent research, he cannot get too far behind, and so there is a natural degree of competition in R. & D., and this is aided by the degree wherein the know-how thereby developed can be preserved in some degree of effective secrecy for at least a very few years.

But, the patent protection of the significant concepts so developed, adds a frosting on the cake of considerable significance, increases the profit margin on research and development, and particularly sponsors the movement of research and development into the higher risk more basic areas, by comparison with lower risks "re-packaging" developments that are likely to be indulged without the benefit of a patent system.

Make no mistake about it: Patents are important to the motivation for research, to motivation to start the research into higher risk areas, and to the motivation for licensing among big businesses, medium businesses, small businesses, and particularly new business ventures whether undertaken by small or large business.

I can tell three dramatic tales of the way the patent system functions, in context of the dried-up risk capital market which also seems critically relevant to the total picture.

One of my current tales from current practice relates to lawn care equipment, one to environmental control power plant wastes, and one severe service valves for the chemical industry.

In two of these instances the private inventor, in one of these instances a very small business inventor, created major new businesses that without doubt would never have come into being but for faith that the patents would protect the R. & D. and new business investment. Expanding entrepreneurships have critical need for high risk venture capital that in 1969 came to 3.5 billion dollars from public stock offerings. In 1978 however, public stock offerings by new entrepreneurships were not a viable financing alternative. What is the result?

In each of these three instances, the cost and delay and uncertainty of patent protection afforded by the court system (part of the fault being weak examination of applications for patent by the Patent Office), virtually forced the new entrepreneurs to sell out to big business which had the money and staying power for the protracted court fights. If the cost of patent enforcement in time and money and the certainty of patent enforcement had been much more benign, and/or if there had been a ready source of venture capital from public sources that could be tapped by small high technology new entrepreneurships as was the case in 1969, these three new companies would likely have remained growing new high technology business ventures, soon to become major competitive forces in technology industry.

As it happens, however, through no fault of big business, the big businesses who had the source of capital critically needed for these companies to fight their necessary patent infringement fights in the court room over long periods of time, were asked to buy out the young entrepreneurships and they did so, and our economy lost the three new businesses in favor of industry concentration.

I think it is important that big businesses have access to money and capital, and I do not fault big businesses for spending some of that money and capital in acquisition of high risk ventures that must fail for lack of capital if big businesses do not make it available. The point here is that, if we could make venture capital available in the public market place once again, and could reduce the cost in time, money and uncertainty of the enforcement of the new entrepreneurship's patents, we could have preserved these new independent businesses as viable operations, rather than having them absorbed by big business.

Your question. In what circumstance is patent protection essential or not to the commercialization of innovation technologies, either by new companies or established firms?

Answer. As implied by the stories outlined just above, the new entrepreneurships and small and intermediate size businesses frequently are in critical need of practi-

cal, prompt and inexpensive patent protection if they are to survive immediate competition from others who are entrenched in given product lines. How does a small new company take on a Eastman Kodak in the camera market unless it has patents on its "instant snap-shot" cameras and films to give it a protection while it is trying to develop its manufacturing facilities, its marketing organization, public acceptance of its trademark, a reputation for quality and reliability equal to those same strengths as held by an Eastman Kodak.

In significant degree large companies undertake commercialization of their new inventions independently of whether they have patent protection on their particular invention. In doing this to a significant degree, they can, not infrequently, rely for the degree of protection that they really need to get a product marketed, upon their previously established trademarks, established risk distribution systems, reputation for good quality, available capital—that is always important—and the like. Having available capital to risk and a manufacturing and marketing strength, they assume a lower risk than the new entrepreneurship in proportion to availability and therefore are better able to bring new products to market without patent protection, even though ROI typically would be higher if they had patent protection.

By comparison with the big company, contrast the real estate man who invented the Weed Eater, the nylon line lawn trimming device that has sold many millions of dollars worth in the last few years since its first introduction. And contrast the private engineer who invented the severe service refine re-valves that are so critical to many of our modern chemical plants, and the small lime company that provided the first and only environmental disposal of masses of pollutants from coal burning power plants. Each of these needed hundreds of thousands of dollars for technical development, plus hundreds of thousands of dollars for market development.

Investors I know, and their bankers I feel sure, were interested in the patent protection that seemed available or not available to them, were interested in whether they would have their strength drained by protracted patent litigation. And when the dollars in litigation got too steep in context of the uncertainty and delay in result, the private investor, small business and banker types had to drop out in favor of the strength of big business. [Let me not mislead by over-simplification; obviously there were other factors involved too, ranging from A to Z and including things like the age of the early investors who wanted to retire from the fight; but the factors I have reported were assuredly very important factors in what happened in each of the three examples I am alluding to.]

The small firm or new entrepreneurship by an inventor and his financial backer is, at least commonly though certainty not uniformly, not even undertaken unless there is some reasonable measure of confidence that, having spent the money to commence the new business or new product line, they will not be promptly driven from the market by big competitors with established market might (trademarks, distribution systems, production capacity, reputation for good quality, etc., that the new business might not have). My experience teaches me that the fear of the big business competition is probably greater than reality, that entrepreneurs who have the courage to take on established competition find that they can do so. But confidence is a very important part of encouraging the entrepreneur to try, and patents that can be relied upon are a very important part of that confidence.

There is another aspect of the patent system providing an essential catalyst to the development and marketing of new technologies which can be referred to as competitive research or competitive leap frogging.

Whenever one company has a dominant market position and finds its market being lost to a new competitor, the first company has the alternative of copying the new competitor's development if not protected by patent, or doing original research of its own.

If the new competitor's entry into the market is protected by patent, the established company must indulge a competitive research to design around those patents. Since the design around will not normally sell well unless it is also an improvement, the competitive research by the first company to meet competition continues until a better alternative is produced and offered into the market.

Necessarily, the second company finding its strength being taken away by this new development, must in turn commit more of its dollars to research and development to recapture the market advantage it was using as its basis for earlier growth.

Taking turn about, so to speak, the two companies—or in many instances 10, 12 or 15 companies—are all goaded to competitive research in order to be sure that their competitors do not come up with an important market advantage that is protected for the competitor by the competitor's patent.

It may very well be that this sponsorship of competitive R. & D. out of fear that the competitor will develop a protected market advantage, is the most important service that the patent system renders to promoting progress of the useful arts.

Your question. What, if any, trends in the patenting process or patent litigation have diminished utility of patents?

Answer. This, or course, was the central theme of my written paper and oral testimony delivered to your sub-committee on July 27, 1979.

The increasing delays in Patent Office action, the unreliability of Patent Office actions due in part to underfunding of its search facility, the sharply increased delays in litigation time, the increased cost in litigation, and the increased uncertainty of the result of it all owing to such factors as some courts applying one standard of patentability while other courts apply different standards of patentability—these are the trends which have a tremendously debilitating effect upon the utility of patents to aid small business development and contribute to technology development, generally.

In a phrase, cost, time delay, uncertainty of result, and the view in some courts that only a once-in-a-generation-break-through is of patentable stature, are the four heavy burdens that the patent system carries, and all of them seem currently to be on the substantial rise.

By mentioning those four, I do not intend to belittle the significance of the circumstance that we also have several simply bad rules of law that need correction, such as that made by the Supreme Court in *Lear Inc.* v. *Adkins,*[1] and the Supreme Court's announcement that patents are not favored in public policy and therefore reasonable doubt in patent cases should always be resolved against the patentee whether on a lawful license issue or a validity of the patent issue, etc. It seems clear to me that the public interest is well served by resolution of those reasonable doubts in favor of those who indulge high risk investment in R. & D. The statute enacted by Congress connotes that enforcement of good patents is favored by public policy, but most courts no longer practice that theme.

Your question. Is the so-called "weakness" of American patents a serious deterrent to domestic invention, patenting, licensing and commercial exploitation, or, alternatively, an incentive to the transfer of technology abroad?

Answer. I consider that the weakness of the American patent system—I focus on "system" because it is the lawyers and the judicial address to the patents as well as the poorly examined patents themselves that give rise to the weakness—is a serious deterrent to domestic innovation, patenting, licensing and commercial exploitation.

I myself have sat with clients and have advised them that, in this area we cannot expect reasonable patent protection and therefore you should not spend your money doing research and development in this area or seeking to patent this subject matter, and without protection you are not sharp or strong enough to crack this market. I have advised that "your patents have issued but are so subject to question in the court that you should not afford the cost of licensing undertaking, because competitors will not honor the patent and we will spend all of the potential license income on negotiation and litigation". I myself have advised clients that this is a technology which we are better off to try to keep secret, than to patent, because we cannot trust the patent system to give us reasonable protection at reasonable costs within a reasonable time frame.

These advices are not the uniform rule but they are very common. Since I find myself giving that advice to one client or another every two months or so, I feel very strongly that the weakness of the system is a significant deterrent to domestic innovation.

The United States Patent System weakness has a more indirect effect upon the incentives to technology transfer abroad, but even there the connection is very real. Not uncommonly, a company is simply not equipped to build a factory and market abroad, but would like to sell its know-how and license its patents to a foreign manufacture to reach markets that owner simply cannot reach. One important fear that discourages licensing of such technology abroad, is fear that the licensee will then manufacture and export back to the United States in competition with the original technology owner's business, taking jobs away from American workers who would have manufactured every item but for its being bought from the foreign licensee, etc.

In this connection, recall also that the profit from manufacture and sale commonly exceeds greatly the income from license of the same sale. Accordingly, if we had strong domestic patents that the United States licensor could refrain from licensing to foreign manufacturers, the United States manufacturer might then license his

[1] See my Texas Law Review article on the mischief of *Lear Inc.* v. *Adkins* at Vol. 48, No. 7, November 1970.

technology abroad with confidence that he would not be destroying his own profits and the jobs of his own workers by the foreign licensee taking over the licensor's market with imports into the United States.

By affording license-reach to the otherwise unserved foreign markets, these foreign licenses would also provide more return on the R. & D. investment, and thereby be an incentive for more research and development by the licensor to the benefit of the United States pool of technology and competitive posture with the rest of the world.

Your question. What should Congress do to strengthen the patent system?

Answer. In simplistic terms, do all of those things that are necessary to reach the seven performance specifications that I outlined in the paper I delivered to your Sub-Committee on July 27, that was drafted before I received your set of questions.

To merely itemize a few future particulars:

Re-draft Section 103 in more positive terminology to tell the courts what you are going to tell them, what you are telling them, and what you have told them, so that they will more uniformally follow the standard of patentability that was intended when 35 U.S.C. 103 was first enacted in 1952.

Establish a court structure by which all appeals from patent application and patent infringement trials are handled by a single court of patent appeals which will thereby come to have a uniform set of patent law, by contrast with the widely divergent patent law of the many courts of appeal that now hear patent cases.

Provide affirmatively in Section 101 of present title 35 that new technologies, such as micro-organisms, are as much within the "useful arts" as old technologies, and that the whole concept of the patent system is to help foster new technologies, thereby to reverse the Supereme Court's philosophy that it will not extend the patent system to new technologies unless and until Congress specifically so writes.

Provide for the 17- or 20-year copywrite protection of electronic "chips" and computer programs as well as patent protection of both, these being among our most vital new technologies are in need for different reasons of each of these two varieties of concurrent, moderate term protection.

Establish some effective program for speeding trial of patent cases wherein they may be finally disposed of within two years, including appeals.

Establish a mechanism for inviting participants in an industry into a first patent litigation following which an *In Rem* judgment of patent validity is granted so that the patent owner does not have to re-litigate his patent again and again against every potential infringer that comes down the pike.

Provide special rules for litigation of patent cases that will aid both a more speedy trial and a less expensive trial.

Provide statutorily for the legality of arbitration of patent cases (by present court decision patent subject matter may not be arbitrated) in order that parties may get a cheaper and more prompt disposal of their controversies than the present typical many years and many hundreds of thousands of dollars.

Improve the Patent and Trademark Office function by computerized search facilities; integrity checks of the search shoes; indexing of technical literature as well as patents in the search data base; providing for reexamination on request (though with no delay of litigation for the re-examination); increasing time allotted to each examination; shortening response time by the PTO to applications for patent and amendments thereto, to 30 days, issuing patents with any allowed claims within 18 months even though other claims remain pending in examination.

I should emphasize that a number of my proposals have never been submitted to the American Patent Law Association and do not have their endorsement, although assuredly the association champions the goals which give rise to even those proposals which do not have APLA endorsement.

The accomplishment of the performance specifications mentioned in my presentation to you on July 27, or of the individual specifics outlined above, is not nearly as easy as might appear, for a number of reasons. Even the Bar, itself will be sharply divided on whether we should give up what it perceived to be the quality of justice given up in order to get a lower cost and more timely decision—this though the businessman's focus tells us that somehow we *must* find a lower cost and more prompt decision making process. The courts will howl over special rules for one class of case or another and certainly can be expected to smart under a compulsion that they decide a patent case after trial before sitting on other cases—as of now, it is at least as common as not that a court takes a full year to render an opinion in a patent case, after the trial is concluded.

I could write a full book on those things that need to be done statutorily to make a major move toward each of the performance specifications, and included in that

book will be several chapters of adverse reactions that can be expected from the Bar and from members of Congress and/or the Administration.

I mention this problem because a small timid approach will fail to accomplish the seven performance specifications which seem so eminently reasonable, even loose and not-adequately-tight from the point of view of the investor in innovation. The job of accomplishing something even close to those performance specifications will be difficult as a matter of statutory concept, and hideously more difficult as a matter of political reality, but it is oh so tremendously important.

Hopefully you will find that this letter rounds out the presentation that I presented to you on July 27.

You know that if I can, I and the American Patent Law Association will be glad to offer additional help.

Yours truly,

TOM ARNOLD.

LICENSING MANAGEMENT CORP.,
New York, N.Y., August 14, 1979.

Senator ADLAI STEVENSON,
Old Senate Office Building,
Washington, D.C.

DEAR SENATOR STEVENSON: I was pleased to have had the opportunity to add my voice to those distinguished witnesses testifying at the July 27th Subcommittee on Science, Technology and Space hearing.

I believe that our patent system is based on sound principles, although it is in poor health at the moment. Our patent system's ills are reflected in how we, as a nation, are able to invent and to innovate creating progress and prosperity. The present decline in innovation is indicative of an ailment not requiring radical surgery. Though the disease is serious, I believe a few simple but potent changes will bring back its former vitality.

The serious problems within our patent system are attributable, in varying degrees, to a single source—chronic underfunding of the Patent and Trademark Office (PTO). Insufficient support by Congress of the PTO causes inadequate searches with a substantial incidence of prior art not being reviewed by the PTO. These inadequate searches cause a definite court hostility to patents indicated by a de facto overruling of the statutory presumption of validity and increased uncertainty in the patent system. Uncertainty within the patent system is inversely related to the amount of venture capital that investors are willing to risk. The resulting limitation of invested venture capital causes a lack of developmental products and a decline in the United States commerce.

In order to reverse this destruction of innovation, I *recommend* that the funding mechanism of the PTO be added to in the following manner:

The Internal Revenue Code should be amended to provide for additional funding of the Patent and Trademark Office from taxes of those utilizing the office. Inventors, companies and all parties reaping royalty benefits would, on a separate, supplemental tax form, enter information concerning the income from licensing and sales of patents and trademarks. A percentage of the income tax normally paid on royalty income would then be directly allotted to the PTO. The tax form would also be broken down to provide information of value regarding exclusive licenses, non-exclusive licenses, sales, income on patents held within and without the United States, as well as foreign and domestic trademark licensing. This provision for funding in combination with the information obtained by the required form could have many advantages over the present system. For example, it would provide an income mechanism which would finance the PTO in proportion to the benefits contributed by those intellectual property systems provided for the public; it would provide, that funds come on a direct basis from the system; the financial structure would remove the PTO, to some extent, from Congressional politics. (In the past, the PTO, without a large special interest group to influence legislation, has been a victim of budget cuts that have impaired its proper administrative function.) Funding would be self-adjusting, thereby accounting for inflation and be somewhat dependent upon the quality of the administrative office functions. Information provided on the tax forms would allow for accurate feedback on the vitality of the patent system and of the economic benefits of the system. Additionally, reliable information concerning the dependence on foreign technology relative to the U.S. system will be provided. Also the supplemental funding would enable the Patent and Trademark Office to modernize and strengthen its search and examination procedures; the modernization techniques would result in a higher degree of reli-

ance on the conclusions of the administrative office. In addition to providing direct payment of taxes incurred on intellectual property income, I recommend that the application fee for original and reissue patents be raised and that a cost-of-living index be provided allowing the Commissioner to raise certain fees in accordance with inflation changes.

The changes in funding should bring a halt to the continued anti-patent trend of case law development. This anti-patent philosophy has been largely, though not entirely, due to lack of judicial confidence in the underfunded Patent and Trademark Office search procedure. While the above system provides sufficient financial support and should prevent the recurrence of new judicially created doctrines that hamper innovation, it is necessary to rectify those doctrines that are presently taking their toll on the system.

I therefore *recommend* that Title 35 of the United States Code, Section 103, be amended to explicitly state that a primary factor in the test of obviousness should be a showing of commercial success.

In addition, I *recommend,* in order to reduce the prohibitive cost of defending title to a patent, a mandatory reissue and reexamination procedure be instituted whereby all patent validity issues will be resolved by recourse to the administrative expert in the PTO, with appeal to the Court of Customs and Patent Appeals (CCPA). An amendment to Title 28 of the United States Code should provide that District Court jurisdiction in patent cases be limited. Jurisdiction should be exercised only after the PTO has been consulted in a reexamination procedure to determine the validity of the patent in light of all assertions against the patent. The PTO reexamination proceeding would have the full participation of both parties as adversaries. Both sides would be allowed discovery. The patent adversary would have the right to cite other prior art as invalidating the patent. However, his evidence should prove invalidity by a recognized standard (for example, beyond a reasonable doubt or clear and cogent evidence), in order to outweigh the PTO's original determination. Once the PTO, within this reexamination proceeding, has determined the validity of the patent, its decision would be reviewable by the CCPA within a specified time. If the patent was determined valid and an appeal was not taken, the issue of validity is resolved and will serve as res judicata for all other judicial determinations. The suit would then be brought in the District Court to determine infringement.

I also *recommend* that appellate jurisdiction from all patents be limited to the CCPA. Disputes involving technical matters such as infringement and interferences would be appealable then only to the "expert" court subject to ultimate appeal to the United States Supreme Court. The channeling of technical cases to an established appellate court with special expertise along with the removal of validity questions for appeal would rid the patent system of the rampant forum shopping and uncertainty which presently pervades its entire body.

I have taken the liberty of sending copies of this letter to other parties interested in the actions taken so far by the Senate. I invite each party receiving a copy to comment on my proposals.

I suggest that a member of each Congressional staff interested in the subject matter be delegated to work with representatives of the American Patent Law Association and the Patent, Trademark and Copyright Research Foundation (PTC) to review all of the proposals submitted. After reviewing these proposals, I believe that this joint effort of the APLA, the PTC and the various Congressional staffs could then appropriately draft a bill to finally resolve the unfortunate circumstances that have caused innovation to decline in the United States.

Sincerely yours,

JEROME H. LEMELSON.

AMERICAN CHEMICAL SOCIETY,
Washington, D.C., August 17, 1979.

HON. ADLAI STEVENSON,
Chairman, Subcommittee on Science, Technology, and Space, Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.

DEAR SENATOR STEVENSON: The American Chemical Society appreciates this opportunity to comment on S. 1215, the "Science and Technology Research and Development Utilization Policy Act." Primarily through its Joint Board-Council Committee on Patent Matters and Related Legislation, the Society monitors legislation and federal agency regulations relating to ownership of inventions and patents as well as policies and procedures pertaining thereto. The comments which follow are forwarded to you with the approval of our Board of Directors.

It is the position of the Society that technological innovation underlies and supports modern society. Strong and continuous efforts to enhance and expand technological innovation result in high standards of living as exemplified by the history of the United States. Every effort should be made to encourage and strengthen technological innovation so that these standards are maintained and expanded. Continued innovation must be a national policy if we are to find solutions to ever more complex social, economic, and environmental problems.

Any national policy to encourage innovation must make it as easy and attractive as possible to invent, to perform research and development on inventive ideas, to demonstrate the commercial feasibility of these ideas, and to diffuse new products and processes embodying the ideas throughout the marketplace for the benefit of the general public.

In the real world, implementation of these steps is hindered by many factors—technological, economic, environmental, and the mere resistance of humans to change, to mention only a few.

One important factor which encourages innovation is a strong patent system. In the United States we have been fortunate that our forefathers laid the foundation for such a system in our Constitution. Over the years the U.S. patent system has been a strong positive influence in the economy of the country.

Nevertheless, certain good features inherent in the patent system may have become eroded through court actions or been made less effective through the enactment of legislation or by administrative actions within the federal government. An important area where administrative action may have been inhibitory results from a lack of uniformity of patent policy between federal agencies. The Society is pleased to note that S. 1215 recognizes that a uniform policy is necessary for the most effective management and use of the results of federally-assisted research and development.

The ACS is pleased that the bill authorizes the Secretary of Commerce to develop, coordinate, and implement this uniform policy through a centralized office. However, the Society recommends that this office should not be a component of an existing government agency, but rather a separate, semi-autonomous organization. Furthermore, such an organization should have a minimum internal staff which would have decision making power, but be primarily a clearinghouse and communication link between all federal contracting agencies and private contractors, This centralized office also should have, when necessary, the flexibility and authority to cut across agency lines; for example, when litigation is required. Having such an organization under the Secretary of Commerce could lead to difficult conflict of interest situations, and to undue inhibition or restriction of the centralized office's flexibility and authority; especially since the Patent and Trademark Office and the National Technical Information Service also come under Commerce's jurisdiction.

There are limitations to the activities and efficacy of any centralized government office faced with the very large responsibility of disseminating government technology. The effectiveness of such an office can be enhanced if the office maintains a policy of liberally contracting for services in the private sector. In addition, the office should do all in its power to aid, instruct, and encourage nonprofit research organizations to set up appropriate patent administration activities. Obviously, if the nonprofit organization maintains a patent administration office, the government does not have to become involved in the dissemination of the technology, thereby relieving the central office of some of its responsibilities.

It is noted that the authority for this office is to expire 7 years from the effective date of the Act, unless renewed by Congressional action. This time space is too brief to expect definitive and unequivocal results to become apparent. Ten to fifteen years for its initial lifespan would be more realistic.

Section 202 of S. 1215, relating to the development and implementation of a technology utilization program, would be impractical, expensive, and not cost-effective. Similar programs currently are being conducted by the National Aeronautics and Space Administration with few really positive results as compared to the number of government inventions available for public use. The Society suggests that this proposed program be dropped at this time.

Retention of a nonexclusive, royalty-free license by the contractor in those cases where the Government obtains title to an invention seems inadvisable. Such a license may inhibit the widespread use of the invention, since other companies would be unwilling to undertake development of the invention with a royalty-free license in the hands of a possible competitor. The Society believes a fairer arrangement would be to make the non-exclusive license royalty-bearing, rather than royalty-free.

As you are aware, S. 1215 is one of many bills currently addressing government patent policy problems. S. 414, the "University and Small Business Patent Procedures Act," addresses itself to this issue by creating a consistent policy and procedure concerning patentability of inventions made with federal assistance. The Society views S. 414 as a desirable first step in solving some of the problems in this area, and firmly believes that enactment of this legislation will result in increased productivity, and aid in the reassertion of the technological leadership of the United States. A copy of our statement on this matter is attached.

However, S. 414, of and by itself, will not be sufficient to reverse the alarming downward trend in the rate of technological innovation and economic growth in this country. Technological innovation itself is an exceedingly complex endeavor. It requires careful nurturing, a favorable climate and as deep an understanding as possible of the real world factors influencing its conduct; to increase the rate of technological innovation requires a conscious and continuing effort to promote it. At the same time undue and unnecessary control of the innovative process must be avoided in order to prevent its hindrance or, when carried too far, its suppression.

What is needed is a change in climate at all levels of government—from excessively defensive to helpfully encouraging—involving an integrated approach at the administrative, legislative, and judicial levels. Since the innovation process is extremely complex, a single omnibus law also would be exceedingly complex, difficult to administer, and in the end, might have very little real effect. Several pieces of legislation, each addressing a separate issue, would be preferable, as modifications and changes could be made more easily as the results of their influences on the innovative process become apparent. Extreme care must be taken to assure there is cooperation between sponsors of all such legislation so that it will be uniform in its approach and tenor.

A start in this direction already is provided by the introduction of S. 414, addressing government patent policy; S. 1215, providing a consistent policy for the encouragement of the participation of private industry in the further development of federally-assisted research and development results; and, S. 1250 which attempts to foster the development of a favorable climate for the enhancement and improvement of the innovative process. These three bills are companion bills which together set a positive pattern for the future. However, they must be supplemented by other bills which will address additional issues important for influencing the rate of innovation before overall improvement can be perceived.

To acquaint you with the American Chemical Society, we are including here some background information on the Society. The American Chemical Society is an individual membership organization made up of approximately 116,000 chemists and chemical engineers, reflecting a broad spectrum of academic, governmental, and industrial professional pursuits. Approximately 60 percent of the membership is employed by industry, 25 percent by academic institutions, and 15 percent by governmental and nonprofit institutions.

The Society was founded in 1876 and chartered as a nonprofit, scientific and educational organization by an Act of Congress signed into law on August 25, 1937. Under its National Charter, the Society is charged with the responsibility to encourage in the broadest and most liberal manner the advancement of chemistry and the promotion of research in chemical science and industry "thereby fostering the public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people."

The Charter imposes an obligation on the Society to provide assistance to the government in matters of national concern related to its areas of competence. Since one of the objectives of our Federal Charter is the promotion of research, we have welcomed this opportunity to comment on S. 1215.

We hope your Subcommittee will give serious consideration to the thoughts and recommendations of the American Chemical Society during deliberations on this legislation. If we can be of further assistance, we would be happy to cooperate with you.

Sincerely yours,

GARDNER W. STACY.

MACHINERY & ALLIED PRODUCTS INSTITUTE,
Washington, D.C., August 23, 1979.

HON. ADLAI E. STEVENSON,
Chairman, Subcommittee on Science, Technology, and Space, Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.

THE PROPOSED "SCIENCE AND TECHNOLOGY RESEARCH AND DEVELOPMENT UTILIZATION POLCY ACT"

DEAR MR. CHAIRMAN: In connection with the current consideration by the Subcommittee on Science, Technology and Space of S. 1215, the proposed "Science and Technology Research and Development Utilization Policy Act," we are writing to present our comments and recommendations. As you know, the Machinery and Allied Products Institute represents the capital goods and allied product industries of the United States. These companies, of course, rely heavily upon continuing technological development and excellence for the maintenance of their competitive positions. Hence, they are vitally concerned with the policies of the federal government with respect to patents and technical data in connection with the performance of government contracts, even though these companies, for the most part, are predominantly commercial rather than government oriented in terms of their total sales. This concern with patent and data problems in government contracts has been reflected by the Institute in a number of studies and in testimony before congressional committees and government departments and agencies.

S. 1215, which Senator Schmitt introduced, for himself, you, and Senator Cannon on March 22, would establish a uniform policy throughout the government as to the disposition of patents and other rights to inventions occurring during the performance of research and development (R&D) contracts whith the federal government. With the exception of a few specified situations in which the government would generally be required to take title to contractor inventions, contractors under the bill would have the option to take patents on such inventions, subject to the reservation to the government of a nonexclusive, royalty-free license (the so-called "license" policy). The contractor right would also be subject to the excercise of "march in" rights under which the government might compel licensing of other parties if the invention is not brought to practical application within a reasonable period of time or if other specific considerations relating to the public interest are determined to exist.

MAPI supports S. 1215. We have long believed, and have so stated on many occasions in the past in public hearings before congressional committees and elsewhere, that there should be a general presumption in favor of the license policy rather than the "title" policy under which the government would normally insist on full rights in inventions under research and development contracts. Although certain technical revisions in the bill might be desirable—such as the deletion of the provision requiring the government to take title in the case of classified work being done under contract—we think that the proposed legislation, with what amounts to a general presumption in favor of the license policy, merits our support and we urge its prompt adoption.

THE TITLE POLICY AND RESULTING PROBLEMS

At the present time, specific statutes governing the performance of R&D contracts for such federal agencies as the Department of Energy, the Department of Transportation, the Department of Health, Education and Welfare, NASA, and others require the use of the title policy which has caused a number of problems. In many instances, although waviers of the government's title are possible in some cases, there have been inordinate delays in finally acting on such contractor waiver applications. The substantial disincentive aspects of this situation, of course, have made it increasingly difficult for agencies to secure firms which have substantial commercial market alternatives to do R&D work for the government. In addition, there has been very substantial lack of progress in securing commercial application and development of the rapidly growing portfolio of government-owned patents, a problem which seems to be getting worse as time goes on.

THE HISTORICAL BACKGROUND

In the post-World War II period, with the increase in the government's R&D budget, there was growing concern about what should be the government's policy concerning rights to inventions occurring in the performance of R&D work. The Department of Justice urged a title policy, largely on antitrust grounds, while the

Department of Defense continued with its traditional license policy. Then, by statute, the Atomic Energy Commission in 1954 and the National Aeronautics and Space Administration in 1958 were required to follow what amounts to a title policy, and, as indicated previously, soon thereafter, beginning in the early 1960's, a number of other statutes were enacted requiring a title policy in connection with new R&D programs and agencies. this situation led to growing concern that frequently whether the contractor had to cope with the title or the license policy depended upon the agency with which he contracted. To bring about some semblance of uniformity in treatment, President Kennedy in October 1963 issued a memorandum and Statement of Government Patent Policy (slightly revised and improved by President Nixon in 1971) which established a uniform policy to be followed by all government departments and agencies in similar contracting situations, expect to the extent that those departments and agencies were subject to contrary direction by specific statutory provisions. Subsequently, the late Senator McClellan, who then chaired the Senate Judiciary Subcommittee on Patents, Trademarks and Copyrights, proposed to establish a statutory policy on this subject. However, there was considerable opposition to such legislation from those in Congress and elsewhere who claimed that anything other than a title policy represented a "giveaway" of the public's rights to inventions.

CURRENT STATUS

In real sense, the matter has now come to a head as the result of what has happened following the recommendations of the commission on Government procurement (COGP) in December 1972. In brief, with respect to patent policy, the Commission recommended that the Presidential Memorandum and Statement on Government Patent Policy be implemented promptly and uniformly and that, if further experience with the memorandum so indicated, consideration in the alternative be given to a statue establishing a general presumption in favor of the license policy but subject to strong "march in" rights to protect the public interest. A government Interagency Committee on Patent Policy, after evaluating further experience under the Memorandum, accepted the alternative approach and developed a draft legislative proposal embodying that approach in September 1975. There the matter has stood—now for nearly four years—with the Executive branch, apparently because of strong Department of Justice opposition to the legislative proposal, unable to arrive at a position on the matter. Clearly, if anything is going to be done in this area, Congress will have to take the initiative because the Administration seems either unwilling or unable to act. Moreover, the need for a resolution of the problem along the lines suggested now has assumed a greater urgency with the growing concern, particularly in recent months, about the decline of both productivity and technological development in the country and the obvious need for the government to do whatever it can in terms of policy to reverse this trend.

CONCLUDING COMMENT

Summing up, we support S. 1215 and its resolution of the present controversy concerning government patent policy under R&D contracts. In essence, the bill would help to get the right companies involved in the performance of federal R&D work and it would also provide the proper incentives for the commercial application of resulting inventions. Finally, the public interest would be adequately protected by both the specific government title-taking criteria and by the very strong "march in" rights also reserved to the government.

This completes our comments in connection with the proposed "Science and Technology Research and Development Utilization Policy Act." If we can be of further assistance, please let us know.

Cordially,

CHARLES W. STEWART,
President.

PHARMACEUTICAL MANUFACTURERS ASSOCIATION,
Washington, D.C., September 12, 1979.

HON. ADLAI E. STEVENSON,
Chairman, Subcommittee on Science, Technology, and Space, Committee on Commerce, Science, and Technology, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: We appreciate the opportunity to present the Pharmaceutical Manufacturers Association's views on S. 1215, the Science and Technology

Research and Development Utilization Policy Act. The Pharmaceutical Manufacturers Association is a non-profit national association representating 140 manufacturers of prescription and ethically promoted pharmaceuticals, drugs and medical devices. PMA member compaines regularly seek to develop new techologies arising out of federally funded research. We strongly believe that the incentives of the United States patent system must be reasonably available to private industry so that discoveries made with public money can be developed and commercialized.

PMA supports a uniform system of government patent policy under which first rights to inventions resulting from federally supported research are made available to the private sector. Therefore, we endorse the basic approach stated in S. 1215. Further PMA supports the patent policy of the Department of Health, Education, and Welfare under which institutions receiving federal grants may qualify to obtain principal rights to inventions resulting from such research. Qualifying institutions then have the opportunity to enter into license arrangements with private concerns for the development and commercialization of such inventions. S. 1215 would appropriately allow non-profit organizations to retain patent rights to inventions that have been made under federally funded research programs if these institutions have demonstrated the capability to develop and market these inventions.

We appreciate the opportunity to present our views on this important legislation and ask that our comments be included in the hearing record.

Sincerely,

BRUCE J. BRENNAN.

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